INTEGRATION OF NCD SCREENING, MANAGEMENT AND CARE CONTINUITY THROUGH PRIMARY HEALTH CARE USING PEN PROGRAM IN NEPAL

ASSESSING PRACTICES AND BARRIERS

FINAL REPORT

Government of Nepal
Nepal Health Research Council (NHRC)
Ramshah Path, Kathmandu, Nepal

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FACTSHEET

Overview: A convergent parallel mixed-method study design was used to evaluate PEN program from March 2021 to August 2021 in Nepal. We randomly selected 105 primary healthcare facilities (34 PHCCs and 71 HPs) using multistage stratified random sampling for health facility assessment. Semi-structured health facility inventory questionnaire based on WHO SARA tool and the national PEN manual was used for the assessment. Direct observation of health service providers adherence to PEN protocols (Protocol- 1, 2 and 3) while managing NCD clients visiting the OPD (136 clients for protocol 1, 182 for protocol 2 and 23 for protocol 3) was conducted using an observation checklist based on PEN protocols. Extraction of secondary data on reported NCD morbidities (HTN, DM, COPD, asthma, suspected breast cancer, and cervical/uteri cancer) from District Health Information Software-2 (randomly selected 14 PEN implemented and 14 PEN non-implemented) was conducted using a data extraction guide. For qualitative data collection, key informant interviews (KII) with health authorities (23) and health service providers (47) using an interview guide based on WHO system building blocks framework and in-depth interviews (IDI) with NCD clients (35) using interview guidelines based on WHO Health Belief Model was carried out.

Health Facility Assessment

Results (in weighted percentage) for health facility assessment	HPs (n=71)	PHCCs (n=34)	Overall (n=105)
Basic amenities			
Electricity available	88.5	93.1	88.8
Visual and auditory privacy	81.6	75.4	81.2
Client latrine	89.4	100.0	90.0
regular internet	68.8	92.4	70.3
Communication equipment	14.2	51.3	16.4
Functional computer	47.0	93.4	49.8
Infection control consumables			
Running water	89.5	96.2	89.9
Soap	70.1	67.6	70.0
Sanitizer	100.0	96.7	99.8
Disposable gloves	85.7	94.1	86.2
Medical mask	89.0	93.9	89.3
Gown	66.8	95.0	68.4
Eye protection	68.2	73.8	68.5
Spirit	47.4	54.9	47.9
Infection control equipment			
Pedal waste bucket	66.3	81.6	67.2
Labeled waste bucket	72.2	89.8	73.2
Sharp container	95.7	100.0	96.0
Chlorine solution	73.0	85.8	73.5
Autoclave	85.9	100.0	86.8
Glutaraldehyde	3.1	10.6	3.6
Waste basket/bags	33.7	63.1	35.4
Needle destroyer	33.4	71.9	35.7

Results (in weighted percentage) for health facility assessment	HPs (n=71)	PHCCs (n=34)	Overall (n=105)
HMIS recording and reporting			
HMIS 9.3 register	100.0	100.0	100.0
Online reporting	46.0	77.3	47.9
Designated staff for reporting	17.4	26.2	82.1

Results (in weighted percentage) for PEN specific health facility assessment	HPs (n=71)	PHCCs (n=34)	Overall (n=105)
Protocol-1 Diagnosis and procedures			
Blood sugar test	31.8	88.9	35.2
Urine protein test	22.0	86.7	25.8
Urine ketone test	14.2	56.7	16.8
Lipid profile test	4.2	41.1	6.5
Cardiopulmonary resuscitation	11.9	48.2	14.1
Manual ventilation	41.0	69.7	42.7
Foot examination	2.0	48.0	18.9
Protocol-1 Drugs			
Amlodipine	45.4	84.2	47.7
Atorvastatin	7.5	50.8	10.0
Metformin	47.7	88.7	50.2
Furosemide	61.7	81.8	62.9
Hydrochlorothiazide	1.0	17.3	1.9
Protocol-1 Equipment			
BP apparatus	95.9	100.0	96.2
Glucometer	41.2	70.9	43.0
Glucometer test strips	27.8	53.7	29.4
Urine protein strips	22.0	86.8	25.8
Urine ketone test strips	14.2	56.7	16.8
Weighing scale	90.0	98.0	90.1
Stadiometer	50.6	62.7	51.3
Protocol-3 Diagnosis and procedures			
Peak flow test	5.4	8.0	5.6
X-ray	0.0	59.1	3.5
Spirometry	0.0	5.7	0.3
Chest rehabilitation	1.3	14.2	2.1
Administration of oxygen	28.2	82.4	33.9
Protocol-3 Medicines and equipment			
Tab Salbutamol	81.0	77.3	80.8
Beclomethasone inhaler	0.0	12.8	0.8
Hydrocortisone	27.5	80.4	30.6
Stethoscope	98.6	100.0	98.7
Peak flow meter	98.6	100.0	98.7
Nebulizer	11.7	16.8	12.0

Results (in weighted percentage) for PEN specific health facility assessment	HPs (n=71)	PHCCs (n=34)	Overall (n=105)
Thermometer	40.0	91.5	43.0
Protocol-4 Diagnosis and procedures			
Cryotherapy	0.0	0.0	0.0
Visual Inspection using Acetic acid	8.3	18.2	8.9
Pap smear test	0.0	2.6	0.2
Mammogram	0.0	0.0	0.0
Equipment			
Examination table	92.0	100.0	92.5
Speculum	60.7	94.1	62.7
Acetic acid	14.9	85.1	15.0
Cryotherapy unit	0.0	0.0	0.0
PEN Guidelines/ Manual			
Availability of PEN manual	17.1	34.8	18.1
PEN recording and reporting tools			
NCD register	20.2	19.9	20.2
NCD monthly reporting form	14.6	84.6	14.6
NCD OPD card	17.7	17.4	17.7
Trained human resource (at least one)			
PEN protocol	65.7	91.5	69.4
VIA	12.2	17.3	13.5
Chest physiotherapy	0.0	5.7	0.4
Monitoring and supervision visits			
Federal government	0.0	16.1	1.2
Provincial government	19.2	27.2	2.0
Local government	14.9	10.6	14.7
Financing (other than the Nepal government)			
NGO/INGO	6.7	5.2	6.7
Service charge	2.7	94.5	5.2
Social Health Insurance	0.0	41.4	2.5
Referral mechanism			
Reported availability of referral form	43.6	56.5	45.0
Follow referral guideline	18.2	25.3	18.6
Can arrange ambulance for referral	83.0	95.3	83.7
Send reminder for follow-up visits	17.0	16.1	16.9
Contact clients when missed appointment	22.9	13.7	22.4

Adherence to PEN protocol- 1

Results of adherence to PEN protocol-1 procedures	Patients managed by	
	PEN Trained (n=65)	PEN Untrained (n=71)
Adherence to PEN protocol-1 procedures		
Ask		
Prior history of NCDs	37.5	42.4

Results of adherence to PEN protocol-1 procedures	Patients managed by	
	PEN Trained (n=65)	PEN Untrained (n=71)
NCD specific symptoms	80.0	71.8
Lifestyle behaviors	30.8	15.5
Family history of NCDs	3.1	1.4
Physical examination		
Waist circumference	1.5	0.0
Blood pressure	81.5	66.2
Auscultation of heart	1.5	4.2
Auscultation of lungs	12.3	4.2
Estimate		
CVD risk estimation	7.7	0.0
Tests		
Blood sugar (FBS/RBS/PP)	24.6	15.5
Urine sugar	3.1	0.0
Urine protein	4.6	2.8
Prescription of drugs	(n=51)	(n=55)
Anti-hypertensive drugs	88.2	65.5
Diabetes care	(n=21)	(n=27)
Urine ketone	4.8	0.0
Oral examination	4.8	3.7
Feet examination	14.3	7.4
Anti-diabetic medicine	85.7	77.8
Advise for oral care	9.5	3.7
Advise for foot care	19.1	7.4

Adherence to PEN protocol-2

Results of adherence to PEN protocol-2 procedures	Patients managed by	
	PEN Trained (n=92)	PEN Untrained (n=90)
Assessment of unhealthy behaviors		
Unhealthy diet	27.2	15.6
Physical activity	7.6	10.0
Tobacco consumption	17.4	12.2
Alcohol consumption	17.4	8.9
Counseling for health behaviors		
Moderate physical activity	17.4	8.9
Restriction of salt	41.3	21.1
Consumption of fruits and vegetables	3.3	1.1
Avoid consumption of tobacco	13.0	7.8
Avoid consumption of alcohol	9.8	7.8
Medication instruction	62.0	33.3
Follow up date	68.5	42.2

Adherence to PEN protocol-3

Results of adherence to PEN protocol-3 procedures	Patients managed by	
	PEN Trained (n=15)	PEN Untrained (n=8)
Ask for		
Cough	73.3	62.5
Chronic breathlessness	86.7	12.5
Wheezing	26.7	37.5
Assess		
Oxygen saturation	6.6	25.0
PEFR-1st reading	0.0	0.0
PEFR-2nd reading	0.0	0.0
Auscultate lungs	60.0	37.5
Advice		
Avoidance of factors triggering exacerbation of CRDs	40.0	25.0
MDI/DPI use	40.0	25.0

Facilitators and barriers to implementing PEN program at primary healthcare and community levels

Facilitators and Barriers to PEN Implementation: HA's and HSPs' Perspective	
Facilitators • Social health insurance • Peer discussion sessions • Decentralization of power to the local government • Availability of a standard guideline as a reference • Existence of other NCD related programs • PEN training	**Barriers** • Inadequate medical supplies • Inadequate human resource • Excessive workload of existing human resources Inadequate NCD recording and reporting tools • Low priority and insufficient budget • Effect of COVID-19 • Inadequate PEN/NCD specific monitoring and supervision • Inadequate community engagement for PEN/NCD services and awareness • Health illiteracy
Facilitators and Barriers to PEN Implementation: Client's Perspective	
Facilitators • Accessibility (geographically and financially) Accessibility and availability of medicine and services • Less waiting time • Positive experience in interaction with service providers • Improvement in health condition • Self-efficacy • Client's symptoms • Knowledge of disease consequence and management • Self-awareness • Support from peers and family members	**Barriers** • Unavailability of medicine and services • Inaccessibility and unaffordability • Inadequate health information from service providers Poor adherence to the advice from HSPs Misconception about disease and treatment • Lack of awareness • Impact of COVID-19

EXECUTIVE SUMMARY

Background: In 2016, the government of Nepal endorsed the WHO PEN protocol and piloted the program in two districts: Ilam and Kailali in 2017. By FY 2018/19 (FY 2075/76 BS), the program was expanded to 31 districts; and to all 77 districts by 2021. Although previous studies have reported gaps in NCD service delivery and preparedness, no study has been conducted to evaluate PEN implementation at a national level. Hence, this study was undertaken with three major aims. First, the study evaluates the integration of PEN service delivery and care provision in primary health care settings. Second, the study identifies the facilitators and barriers to PEN implementation from the perspectives of health authorities (HA), health service providers (HSPs), and NCD clients. Third, the study compares the trends in NCD morbidities reported by the PEN implemented and non-implemented districts in Nepal.

Methods: We utilized mixed method approach for this study: (a) Health facility survey: We randomly selected 105 primary healthcare facilities (PHCs and HPs) using multistage stratified random sampling (step 1: selection of all provinces, step 2: random selection of two PEN implemented districts from each province, step 3: random selection of primary healthcare facilities). We assessed status of PEN services in the primary healthcare facilities using a structured questionnaire based on the WHO Service Availability and Readiness Assessment (SARA) and PEN reference manual; (b) Observation: We observed patients and provider's interaction on the day of data collection to assess the adherence to PEN protocols at the health facilities. (c) Qualitative interviews: we conducted 23 key informant interviews (KIIs) with HAs at different levels of the government, and in-depth interviews (IDIs) with HSPs (47 IDIs) at the primary healthcare level and NCD clients (35 IDIs); (d) Secondary data analysis: we obtained HMIS 9.3 NCD data from the Department of Health Services (DOHS) to analyze the trend of NCD morbidities reported by the sampled PEN implemented districts and compared them with non-implemented districts which were randomly sampled from other remaining districts.

The primary data collected through health facility assessments were entered into the KOBO Toolbox and imported into Excel for data cleaning. Data were exported and analyzed in STATA after adjusting for the sampling weights. The findings of the study were presented using descriptive statistics frequencies and percentages after adjusting for sampling weights. The qualitative interview recordings were transcribed verbatim and coded using a codebook which was developed using an inductive and deductive approach. Data were coded and analyzed using the thematic approach in Dedoose software. The findings of qualitative and quantitative have been triangulated to present the obtained results.

Key Findings:

PEN implementation situation:

- **Human resources:** Sixty-nine percent of the health facilities had at least one PEN trained health worker. Team-based approach among the health workers of the PHCCs was found while performing daily tasks.
- **Diagnostic tests and procedures:** Regarding Protocol-1 related diagnostic test and procedures, only 35 percent of the health facilities had blood sugar test and 17 percent had urine ketone test available. Only 7 percent had lipid profile test available. Regarding Protocol-3 related diagnostic test and procedures, peak flow test and x-ray was provided in only 6 percent and 4 percent of the health facilities, respectively. Spirometry was available in 7 percent of the PHCCs and none of the health posts. Regarding Protocol-4 related diagnostic test and procedures, cryotherapy and mammogram was not available in any health facilities. VIA service was available in 9 percent of the health facilities and Pap smear test was available in almost none of the health facilities.

- **Medicines and equipment:** Protocol-1 medicines like amlodipine and metformin were available in half of the health facilities surveyed. Metformin was available in 89 percent of the PHCCs and 60 percent of the health facilities in urban area compared to 48 percent in HPs and 43 percent of the health facilities in rural area. Protocol-1 related equipment like BP apparatus and weighing machine were available in 96 percent and 90 percent of the health facilities, respectively. The availability of other equipment included in the PEN protocol-1 was low. Glucometer was available in 43 percent, strips were available in 26 percent, and urine ketone test strips were available in 17 percent of the health facilities. Of the Protocol-3 drugs, salbutamol was available in majority (81%) of the health facilities surveyed whereas less than 1 percent of health facilities had beclomethasone. Of the Protocol-3 equipment, peak flow meter was available in only 12 percent, and nebulizer was available in 43 percent of the health facilities. Protocol-4 equipment like examination table was available in majority (81%) of the health facilities surveyed whereas none of the health facilities had cryotherapy units. Speculum was available in more than half (63%) of the health facilities.
- **Guidelines:** Eighteen percentage of health facilities had PEN guideline available. The guideline was more common in PHCCs (34%) compared to HPs (17%).
- **Information system:** All health facilities reported to had HMIS recording register and regular reporting. Less than half (48%) had an online reporting system in place. Only 20 percent of the health facilities had NCD registers, 15 percent had NCD monthly reporting form, and 18 percent had NCD OPD card.
- **Monitoring and supervision:** Overall, the monitoring and supervision visits in the health facilities from all three levels of government was low.
- **Finances:** Some of the health facilities (7%) received financial support from non-governmental organizations, service charge (5%) and social health insurance (3%).

Adherence to PEN protocol

- **Adherence to PEN protocol-1:** A total of 136 NCD clients were observed to assess adherence of HSPs' to PEN Protocol 1. Out of 136 observed cases, 65 were managed by PEN trained and 71 by PEN-untrained HSPs. PEN trained HSP examined NCD-related symptoms in 80 percent of the clients observed, compared to 77 percent of the clients by untrained health service providers. Family history of NCD assessment was low in both groups. CVD risk estimation was conducted by only PEN trained HSPs, however only on 8 percent of the clients. Among diabetes clients, feet examination was done among 14 percent of clients examined by PEN trained HSP and 7 percent of clients seen by untrained HSPs. Foot care was advised in 19 percent and 7 percent of NCD clients seen by PEN trained and untrained HSPs, respectively.
- **Adherence to PEN protocol-2:** A total of 182 clients receiving counseling sessions were observed. Out of 182 observed cases, 92 were managed by PEN trained and 90 by PEN-untrained HSPs. Unhealthy dietary behaviors were the most commonly assessed risk factors in NCD clients by the PEN trained (27%) and untrained (16%) HSPs. Assessment of tobacco consumption done among PEN trained HSPs (17%) compared to untrained HSPs (12%). Counseling on salt restriction was substantially higher (41% vs. 21%) in PEN trained HSPs. NCD clients were poorly advised to increase the consumption of fruits and vegetables by both PEN trained (3%) and untrained HSPs (1%).
- **Adherence to PEN protocol-3:** A total of 23 clients with CRDs while receiving NCD services from the health facilities were observed. A higher proportion of PEN trained HSPs asked for the presence of CRD-specific symptoms such as cough (73% vs. 63%) and chronic breathlessness (87% vs. 13%) compared to untrained HSPs. None of the HSPs, PEN trained or untrained, performed Peak Expiratory Flow Rate (PEFR) tests in CRD clients. Higher proportion of CRD clients managed by the PEN trained HSPs received advice compared to the clients attended by the untrained HSPs.

Monthly trend of NCD cases:

- **Hypertension:** There was no difference in trend of reported hypertension prevalence per 100,000 population between PEN-implemented and non-implemented districts until Aug 2018, then reported cases were higher from PEN-implemented district.
- **Diabetes:** The reported prevalence of diabetes mellitus cases increased for PEN-implemented districts from May/Jun 2018 (Jestha 2075) as compared to PEN non-implemented districts.
- **COPD:** There was not much difference in reported cases of COPD per 100,000 population between PEN-implemented and non-implemented districts. There was slightly higher reporting from October 2018 to August 2019, then after the reporting was not different between PEN implemented and non-implemented districts.
- **Asthma:** Throughout this period (from Jul/Aug 2016 to Jun/Jul 2021), the reported asthma cases were slightly higher among PEN-implemented districts as compared to non-implemented districts. During the COVID-19 first wave (March 2020) and second wave (April 2021), there was a decreasing trend in reported hypertension, diabetes mellitus, COPD and asthma cases in both PEN-implemented and non-implemented districts.
- **Cervical cancer:** Mainly, PEN non-implemented districts reported a higher number of suspected cervical cancer cases as compared to PEN-implemented districts. In non-implemented districts, around the first (March 2020) and second (April 2021) COVID-19 wave, we observed a decreasing trend in reported suspected cervical/uteri cancer cases.
- **Breast cancer:** There was not much difference in reported cases of suspected breast cancer between PEN implemented and non-implemented districts, except in June 2019 that shows a peak in reported cases in PEN non-implemented districts which was much higher than PEN implemented district. This was due to reporting from Lalitpur district that reported 88 percent of suspected breast cancer cases from non-implemented district.

Facilitators and barriers to PEN implementation

- **Health service providers and health authority's perspective:** From the health authorities and health service provider's perspective, facilitating factors for PEN included: (a) social health insurance (b) peer discussion sessions (c) decentralization of power to the local government (d) availability of a standard guideline as a reference (e) existence of other NCD related programs and (f) PEN training. The major barriers included: (a) inadequate medical supplies (b) inadequate human resource (c) excessive workload of existing human resources (d) inadequate NCD recording and reporting tools (e) double reporting (f) low priority and insufficient budget (g) effect of COVID-19 (h) inadequate PEN/NCD specific monitoring and supervision (i) inadequate community engagement for PEN/NCD services and awareness and (j) health illiteracy.
- **NCD clients perspective:** From the patient's perspective, the major facilitators for PEN service utilization were: (a) acceptability (b) accessibility (c) accessibility and availability of medicine and services (d) less waiting time (e) positive experience in interaction with service providers (f) improvement in health condition (g) self-efficacy (h) client's symptoms (i) knowledge of diseases consequence and management (j) self-awareness and (k) support from peers and family members. The major barriers included: (a) unavailability of medicine and services (b) inaccessibility and unaffordability (c) inadequate health information from service providers (d) poor adherence to the advice from HSPs (e) misconception about disease and treatment (f) lack of awareness and (g) impact of COVID-19.

➲ **Conclusion:** The study reveals several gaps in PEN service provision in all levels of health systems including inadequate budget, human resources, medicines, equipment, NCD recording and reporting forms, supervision and monitoring, and financing. PEN guidelines use is also limited by service providers at the primary healthcare facilities. Findings from the study, including the factors affecting the success or failure of the program, will be used for improving the performance as well as to plan the further scale-up of the PEN program in Nepal. Government should strengthen PEN implementation through training all staff in PHCs and HP through onsite or online platform; train a cadre of health providers to share tasks and delivery NCD care (such as counselling, monitoring of BP, glucose, medicine, community awareness) at the community level; ensure adequate finances and set up of diagnostic tests, supplies, equipment and medicine; expand social health insurance to all health facilities; make protocols visible and easier to use; integrated NCD information into HMIS and DHIS-2; systematically supervise and monitor PEN program; and extend community-based activities to raise awareness and strengthen linkages with clients.

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LIST OF ABBREVIATIONS

AHW	Auxiliary Health Worker
ANM	Auxiliary Nurse Midwife
CVD	Cardiovascular Disease
COPD	Chronic Obstructive Pulmonary Disease
DALY	Disability Adjusted Life Years
DM	Diabetes Mellitus
DOHS	Department of Health Services
EDCD	Epidemiology and Disease Control Division
FCHV	Female Community Health Volunteers
FY	Fiscal Year
GDP	Gross Domestic Product
HIS	Health Information System
HMIS	Health Management Information System
HP	Health Post
HA	Health Authority
HSP	Health Service Provider
HTN	Hypertension
ID	Identity
IDI	In-depth Interview
KII	Key Informant Interview
LMIC	Low- and Middle-Income Countries
MO	Medical Officer
NCD	Non-communicable Disease
OPD	Outpatient Department
PEN	Package of Essential Non-communicable Disease Intervention
PHCC	Primary Health Care Center
PHI	Public Health Inspector
PHO	Public Health Officer
RA	Research Assistant
SARA	Service Availability and Readiness Assessment
UHC	Universal Health Coverage
WHO	World Health Organization

INTRODUCTION

Non-communicable diseases (NCDs) account for 71 percent of all deaths worldwide, and low-and middle-income countries (LMICs) disproportionately bear two-thirds (77 percent) of global NCD mortalities (1); the South Asia has one of the highest burdens of NCDs (2).The projected economic losses due to major NCDs (cardiovascular disease, cancer, diabetes, and chronic respiratory diseases) for the 20-year since 2010 are predicted approximately 47 trillion US dollars, 75 percent of the global Gross Domestic Product (GDP) (3).

In 2018, cardiovascular diseases, chronic respiratory disease, cancer, and diabetes, were responsible for 66 percent of all deaths in Nepal (4,5). The prevalence of hypertension is 25 percent, diabetes mellitus is 9 percent, and chronic respiratory diseases is 12 percent in adult population (6). Population Based Cancer Registry showed higher incidence of cervical cancer in rural part of Nepal and higher incidence of breast cancer in urban area (7). The proportion of the adult population with overweight or obesity was 24 percent, current smoking was 17 percent and almost everyone (97%) consumed less than five servings of fruits and vegetables on an average day (8).

Cost-effective health information and communication strategies to promote healthy eating and physical activity have yielded positive health gains (9,10), especially when delivered as multi-component interventions and adapted to the local context (11). Specifically, physical activity is known to reduce the risk of ischemic heart disease by 30 percent, diabetes by 27 percent, and colon and breast cancer by 21-25 percent (12,13). A fifteen percent reduction in salt intake is estimated to prevent 3.1 million deaths from NCDs (12,14,15). A single smear test for a cervical lesion at age 40 followed by lesion removal and cancer treatment would avert 1327 disability-adjusted life years (DALYs) per million women (16).

NCDs burden can be reduced by population-wide interventions to address tobacco use, and elevated blood pressure, blood cholesterol, and blood sugar (17). Similarly, advice on tobacco cessation, psychosocial support to harmful alcohol users, counseling and referral for physical activity, and treatment of new cases of acute myocardial infarction with aspirin at a 95 percent coverage exceeded the cost-effective analysis threshold of more than 100 International dollars per DALYs averted in LMIC (18). In light of this strong evidence, the World Health Organization (WHO) proposed a cost-effective Package of Essential Non-communicable Disease Interventions (PEN) that includes population and individual level strategies to address NCDs in LMIC (19). PEN sets a minimum standard for the management of NCDs, through integration and improvement of primary care for heart disease, stroke, cardiovascular risk, diabetes, cancer, asthma, and chronic obstructive pulmonary disease in low-resource settings (20,21).

In Nepal, the PEN Implementation Plan (2016–2020) was developed in line with the Multi-sectoral Action Plan for the prevention and control of NCDs (2014-2020) (22). Nepal adopted the WHO PEN intervention with the Epidemiology and Disease Control Division (EDCD) under the Department of Health Services as the main responsible agency for the PEN implementation. Nepal endorsed the WHO PEN program for the management of CVD, diabetes, asthma, Chronic Obstructive Pulmonary Disease (COPD) and cancer at the primary healthcare level such as Primary Health Care Center (PHCC) and Health Post (HP). PEN includes 4 sets of Protocols for PHCC and HP: PEN Protocol 1 (Prevention of heart attack, stroke, and kidney disease through integrated management of diabetes and hypertension), PEN Protocol 2 (Health education and counseling on healthy behaviors (applied to all), PEN Protocol 3.1 (Management of Asthma), PEN Protocol 3.2 (Management of COPD), PEN Protocol 4.1 (Assessment of breast health and referral of women with suspected breast cancer) and PEN Protocol 4.2 Assessment and referral of women with suspected cervical cancer) (23).

In October 2016, with the aim of increasing accessibility for Universal Health Coverage (UHC), PEN was piloted in two districts. By FY 2017/18 (FY 2075/76 BS) (when this study was conceived), PEN was implemented in 33 districts. In the FY 2020/21 (FY 2077/78 BS), the PEN program has been expanded to all the 77 districts of the country (24). However, initial reviews suggested inadequate human resource capacity to implement, monitor, and evaluate it (25). The PEN implementation has not been systematically evaluated. Currently, no empirical information is available to rate the status of the program nor the factors affecting its success or failure. Using a mixed-method approach, our study generates vital evidence on the performance of the PEN program implemented by 2018, morbidity trends in NCDs and explores the facilitators and barriers to implementing the PEN program in Nepal.

OBJECTIVES

GENERAL OBJECTIVE

To evaluate the implementation of the PEN program at the primary health care level.

SPECIFIC OBJECTIVES

- To examine the status of primary healthcare facilities to deliver PEN program in human resources, medical supplies, financing, health information system, leadership, and governance.
- To analyze the trends in NCD morbidities in PEN implemented and non-implemented districts.
- To identify facilitators and barriers to the PEN implementation at the health system and community level.

METHODOLOGY

STUDY DESIGN

We used a convergent parallel mixed-method study design to evaluate PEN implementation (figure 1). We concurrently collected quantitative and qualitative data merging the findings for overall interpretation (26). We employed several quantitative methods. First, quantitative primary health facilities' assessments evaluated situation of primary health systems for PEN implementation from the perspective of six WHO building blocks: (1) human resources; (2) service delivery; (3) medical supplies; (4) health financing; (5) health information system; and (6) leadership/ governance. Second, we conducted direct observation of service provision by the health service providers to the NCD clients (age >30 years) with one or more NCD risk factors or symptoms visiting the outpatient department (OPD) of the health facilities to measure adherence to PEN protocols (1, 2 and 3). Third, we used District Health Information Software-2 (DHIS-2) HMIS 9.3 to retrieve secondary data on reported NCD morbidities (HTN, DM, COPD, asthma, suspected breast cancer, and cervical/uteri cancer) to compare reported NCD services between PEN implemented and non-implemented districts from FY 2016/17 to 20/21 (FY 2073/74 to 77/78 BS).

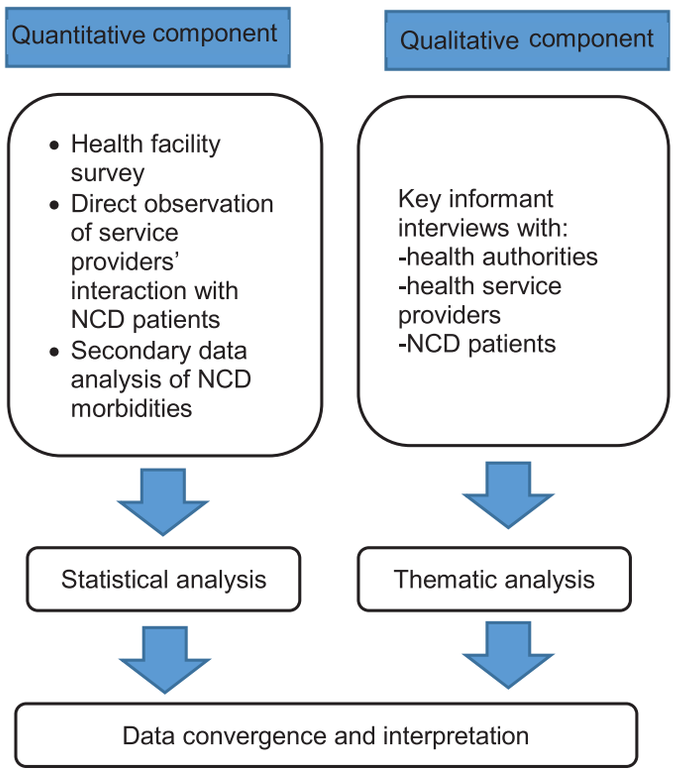

Figure 1. Convergent parallel mixed-method study design

The quantitative aspect used health facility survey and direct observation of health service provider's (HSP) interaction to map the situation of PEN implementation; while the qualitative aspect utilized key informant interviews (KII) with health authorities, health service provides and NCD clients to explore facilitators and barriers to PEN implementation and NCD service utilization at primary health in Nepal.

STUDY SETTING

The study was conducted in Nepal, a landlocked country in Southeast Asia, located between India and China. It is administratively divided into 7 provinces within which lies 77 districts. Each district is then divided into rural and urban municipalities.

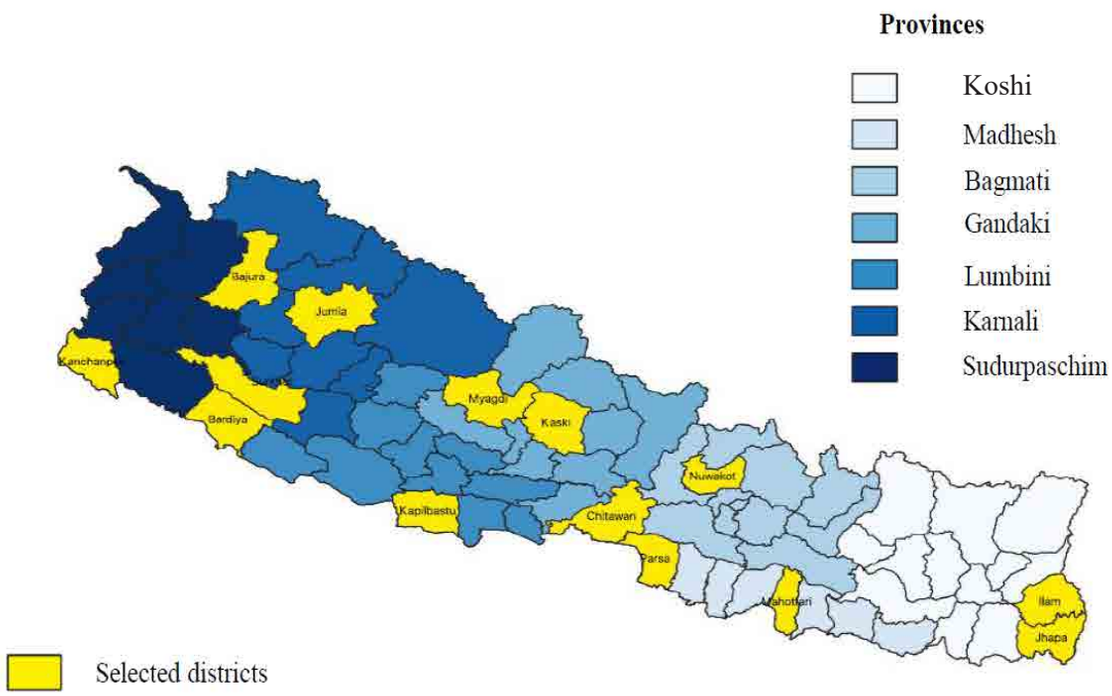

Figure 2. Geographical distribution of 14 randomly selected districts

STUDY POPULATION AND SAMPLING

The study population, eligibility criteria, sample size and sampling techniques for all methods are presented in Table 1.

a. Health facility survey: Health facility survey was conducted in a sample of 105 health facilities. We calculated the sample size using the Cochrane formula: sample size (n) = Z^2pq/d^2 (27), where Z statistics for 95 percent confidence level set to 1.96; proportion of facilities with attribute of interest (diabetes, hypertension, COPD, breast or cervical cancer service delivery procedure available) (p) at 50 percent, 10 percent absolute margin of error (d) and assumed 10 percent non-response rate. We used a multistage stratified proportionate random sampling technique to select the health facilities. From the sampling frame of 31 districts (PEN implemented districts as of 2018/19) across 7 provinces. At first step, we selected all provinces to conduct a nation-wide situation analysis. At the second step, we randomly selected 2 districts from each province (a total of 14 districts); at the third step, we from the frame of 653 health posts and 41 PHCs from the selected 14 districts, we stratified them into urban and rural location. Then, we randomly selected the health posts and PHCs proportionate to their total number within each district. PHCs were oversampled because comparatively they were only 4.1 percent of the total health facilities. The final sample size consisted of 71 health posts and 34 PHCs.

Table 1. Study population, eligibility criteria, sample size and sampling technique for each method

	Study population	Eligibility criteria	n	Sampling
Quantitative				
a. Health facility survey	• Health Posts (HPs) and Primary Health Care Centers (PHCCs) located in 31 PEN implemented districts as of 2018/19	• PEN implemented as of FY 2018/19	105	Multistage stratified proportionate random sampling
b. Observation of NCD patients care				
HSPs' adherence to PEN protocol 1 instructions	• Patient receiving OPD services of primary healthcare facilities of PEN implemented districts	• Adult patients (age >30 years) with diabetes, high blood pressure or cardiovascular diseases; or with at least one NCD risk factors*	136	Convenience sampling
HSPs' adherence to PEN protocol 2 instructions	• Patients visiting the OPD of the health facilities selected for health facility survey	• Adult NCD patients (age >30 years) with one or more unhealthy behaviors**	182	Convenience sampling
HSPs' adherence to PEN protocol 3 instructions	• Patients visiting the OPD of the health facilities selected for health facility survey	• Known cases of COPD and asthma • Adult patients (age>30 years) suspected for COPD and asthma	23	Convenience sampling
c. Secondary data analysis of reported NCD morbidities***	• PEN-implemented districts • PEN non-implemented districts	• HMIS 9.3 data available in DHIS-2 • FY 2073/74 to 77/78 BS)/(FY 2016/17 to 20/21 AD	28	Random sampling
Qualitative				
d. Key Informant Interviews (KII)	• Health authorities at federal, provincial and local levels of government	• Authorities involved in drafting PEN protocol, organizing and facilitating PEN training, or procurement and supply • Health coordinators responsible for overall PEN implementation, financing, monitoring and supervising PEN related activities.	23	Purposive sampling
	• PEN trained health service providers	• PEN trained service providers and directly involved in PEN service delivery at primary healthcare setting from sampled health facilities	47	Purposive sampling
	• NCD patients (HTN, DM, CVDs, COPD, asthma, cervical and breast cancer)	• NCD patients (HTN, DM, COPD, asthma, cervical cancer, breast cancer) receiving outpatient services from sampled primary healthcare facilities	35	Purposive sampling

*NCD risk factors: Smoking behaviors, abdominal obesity (Waist circumference >90 cm in women and >100 cm in men); family history of DM, CVDs and kidney disease in first degree relatives || **Unhealthy behaviors: smoking, alcohol consumption, tobacco consumption, unhealthy eating habits, physical inactivity, and overweight/obesity || ***Reported NCD morbidities : hypertension, diabetes, chronic obstructive pulmonary disease, asthma, suspected breast cancer, and cervical/uteri cancer on HMIS 9.3)

b. Direct observation of NCD clients care: Trained research assistants observed the NCD client care using PEN protocol 1, 2 and 3. The eligibility criteria were based on the Nepal's PEN protocol to receive the care that included: (a) Adults (age >30 years) with one or more NCD risk factors (history of tobacco use, overweight/obesity, known HTN and DM, and family history of CVDs, DM, and kidney disease in first-degree relatives for protocol 1; (b) All NCD clients (hypertension, diabetes, CVDs, COPD, asthma, and suspected cases of cervical and breast cancer) and adults (age > 30 years) with one or more NCD risk factors (smoking, alcohol consumption, tobacco consumption, unhealthy eating habits, physical inactivity, and overweight/obesity) for Protocol 2; and adult (age > 30 years) COPD or asthma cases for Protocol 3. Research assistants spent one day during

OPD hours in each of the sampled health institutions and observed all clients that were eligible and attended by the health worker during the data collection hours. We observed 136 clients for protocol 1, 182 for protocol 2 and 23 for protocol 3. Protocol 4 was excluded because no eligible clients were encountered during data collection time.

c. **Secondary data analysis of reported NCD:** The monthly trend in NCD morbidities in 14 PEN-implemented districts, that were randomly selected for the study were compared with other 14 districts not implementing PEN by FY 2018/19 AD (FY 2075/76 BS) that were selected randomly (2 from each province). The details of the list of districts are provided in Annex 1.

d. **Qualitative interviews:** We purposively selected three types of respondents to explore the facilitators and barriers to PEN service delivery and utilization at primary health care level: (1) Twenty-three health authorities who were directly involved in planning, implementing or monitoring PEN at municipal , provincial and federal level; (2) Forty-seven PEN trained health service providers responsible for providing PEN services at primary health care level; and (a) Thirty-five NCD clients visiting outpatient department of the health facility at the time of data collection. The sample size estimation for IDIs and KII was based on the grounds of code saturation and meaning saturation (29). The details of the list of respondents are provided in Annex 2.

DATA COLLECTION

The data was collected from March 2021 to August 2021. The field data collection began on 25th March 2021, but was paused on 28th May 2021 due to the COVID-19 lockdown. It was resumed on 1st August 2021 and ended on 16th August 2021. The details of data collection technique and tools are presented in Table 2.

Table 2. Data collection tools and techniques

	Data collection tool	Data collection technique
Quantitative		
a. Health facility survey	Semi-structured health facility inventory questionnaire based on WHO SARA tool and the national PEN manual	Face-to-face interviews Observation of health facilities
b. Direct observation of NCD patients	Observation Checklist based on the national PEN protocols (1, 2, and 3)	Non-participatory observation
c. Secondary data analysis of reported NCD morbidities*	Data extraction guide	Extraction form DHIS-2 database
Qualitative		
KIIs with health authorities	Interview guide based on the national PEN manual, and the WHO health system building blocks framework	Interview (face-to-face, telephonic or zoom)
KIIs with health service providers	Interview guide based on the national PEN manual, and the WHO health system building blocks framework	Interview (face-to-face, telephonic or zoom)
KIIs with NCD patients	Interview guide based on the WHO Health Belief Model	Face-to-face interview

NCD morbidities: hypertension, diabetes, chronic obstructive pulmonary disease, asthma, suspected breast cancer, and cervical/uteri cancer on HMIS 9.3)

a. **Health facility survey:** We developed a semi-structured health facility assessment questionnaire by referring to the WHO Service availability and readiness assessment (SARA) tool and PEN manual, and it evaluated the capacity and readiness of health facilities in terms of six building blocks of the WHO: 1) service delivery, 2) human resources, 3) medical technologies, 4) health information system, 5) financing, and 6) leadership/governance. (Annex 3) Trained research assistants (RAs) telephoned the health facility in-charge, informed them the study objectives, and scheduled a meeting at their convenient time. On the day of data collection, the RAs met the in-charge, obtained written informed consent, and collected data using a paper-based tool either by asking to the health care providers present (preferably in-charge) at the time of data collection or observed physical infrastructure of the health facility. The study coordinators checked the filled questionnaires for completeness and necessary corrections were made through subsequent health facilities visits or resolved through phone calls with the health facilities in-charge.

b. **Direct observation:** Trained research assistants made passive observations of the interactions between PEN trained health service providers and NCD clients to assess the adherence to the PEN protocols (1, 2, and 3). A research assistant identified eligible clients for observation at the registration and informed another research assistant stationed at the clinical examination room, who conducted the non-participatory observation. The observations were filled into a checklist (Annex 4) and assessed each step of history taking, clinical examination, medicine prescription, and health education and counselling session. The research assistant noted the clients' medical records and prescriptions Observation checklists were developed based on the national PEN protocols (1, 2, and 3) indicating each step in the protocol with a response of 'performed' or 'not performed'.

c. **Secondary data collection tools and techniques:** We used data extraction forms to obtain monthly reported HMIS 9.3 data on the number of NCD morbidities (hypertension, diabetes, COPD, asthma, suspected cervical/uterine cancer, and breast cancer), using an extraction guide (Annex 5).

d. **Key informant interviews:** The interview guides for key-informant interviews (KIIs) guides for health authorities and health service providers were developed by using the WHO PEN manual. The interview guides had open-ended questions to explore the facilitators and barriers to PEN implementation using the WHO's health system building block framework: i) service delivery, ii) human resources, iii) medical technologies, iv) financing, v) health information system, and vi) leadership and governance. (Annex 6) The interview guidelines for IDIs with NCD clients were based on the WHO health belief model constructs (30): i) perceived susceptibility, ii) perceived severity, iii) perceived benefits, iv) perceived barriers, and v) self-efficacy. (Annex 7) The interview guides were translated into the Nepali language and were pilot tested before finalizing. All interviews were conducted in Nepali language. Most of the data were collected in person (41); however, due to COVID-19 travel restrictions and social distancing requirements, some of the interviews were done virtually (online using Google meet (19) or phone (9). The interviews were conducted in a private room in the health facility. The interviews were recorded using a digital audio recorder. The average duration of the interviews was 54 minutes (23 to 77 minutes) for KIIs with HAs, 41 minutes (22 to 56 minutes) for HSPs, and 24 minutes (10 to 42 minutes) for NCD clients. After the completion of data collection for each day, we discussed the interview sessions and shared our experiences with the research team in the evening. If needed, we revised our interview guides through an iterative process.

DATA MANAGEMENT AND ANALYSIS

a. **Health facility survey:** The study coordinator checked the filled questionnaires (paper-based entries) for completeness and necessary corrections were made through subsequent health facilities visits or resolved through phone calls with the health facilities in charge. Data entry forms were created in Kobo Toolbox and deployed to research assistants to enter the paper-based data. Data entered in Kobo was exported as an excel file and cleaned using MS Excel. The cleaned data was then imported into STATA version 13 for coding, labeling, and analysis.

b. Sampling weight was calculated to reflect the sampling frame. First, we calculated district weight as the inverse of the selection probabilities of districts for each province; then we calculated health facility weight as the inverse of the probability of health care facilities by stratum of urban or rural setting. Finally, we calculated the final weight as product of the district weight and health facility weight. The descriptive statistics – mean (standard deviation) and frequency (percent) were adjusted for sampling weight.

c. **Direct observation:** Data entry forms were created to enter the observation data in KOBO toolbox. Trained research assistants entered the data. Data entries were cross-checked and exported to excel for data cleaning. The data were summarized using frequency and percentage.

d. **Secondary data analysis:** The HMIS 9.3 data obtained from the District Health Information System (DHIS-2 software) was imported to Microsoft Excel 2016 for data cleaning and analysis. The monthly trend of reported NCD morbidities in the target population (all ages for Hypertension, DM, COPD and Asthma and ≥30 years for suspected uterine and cervical cancer, and breast cancer) is presented in time series plots.

e. **Qualitative data:** The RAs transcribed the recorded interviews verbatim. The study coordinators compared transcripts with audio recordings and assigned pseudonyms to participants to maintain confidentiality. All the transcripts were exchanged among the RAs to review for inconsistencies in transcription which were rechecked by the research coordinators. Before the development of the codebook, the research team (RAs and coordinators) re-read some of the transcripts to familiarize themselves with the data. After several discussions among the experts and research team members, a codebook was developed through an iterative process for each of the categories (HA, HSP, and Client). The Dedoose software (version 7.0.23) was used for data management and coding using the codebooks. Initially, three interviews were coded twice (by the two coders independently) and coding was matched to calculate the percentage agreement. The coders discussed and resolved the disagreements in code application; and repeated the same process; they reached 80 percent agreement. After obtaining an 80 percent agreement, the coders independently coded the remaining interviews. Both deductive and inductive approaches were used to code and analyze the data. The coders searched, coded, and categorized excerpts within the dataset identifying a repetitive pattern of themes. The coders discussed all the emerging codes and meaningful patterns throughout the coding process. Through the thematic approach, the research team made consecutive discussions to identify emerging areas of importance.

ETHICAL CONSIDERATIONS

The ethical approval for the study was taken from the Ethical Review Board (ERB) at the Nepal Health Research Council (Registration no: 327/2020P) and the Institutional Review Committee at the Kathmandu University School of Medical Sciences (Approval no: 110/20). We informed HAs, health facilities in charge, HSPs, and NCD clients about the purpose and procedures of the study before obtaining informed consent. We further assured the respondents that their participation was completely voluntary and that they could withdraw anytime without any penalties. Moreover, we ensured the confidentiality and anonymity of the participants by replacing their names with codes during data analysis and presentation.

RESULTS

The results of primary and secondary data analysis have been presented in four sub-sections: Part I: Primary healthcare facilities assessment; Part II: HSPs' adherence to PEN protocols; PART III: Monthly trend in NCD morbidities in PEN-implemented and non-implemented districts; Part IV: Facilitators and barriers to implementing PEN program at primary healthcare and community levels

PART I: PRIMARY HEALTHCARE FACILITIES ASSESSMENT

BACKGROUND CHARACTERISTICS OF THE HEALTH FACILITIES

Table 3 shows the weighted percentage distribution of selected health facilities based on the facility type, ecological region, area, and province. About 94 percent of the health facilities in PEN implemented districts are health posts. Most of the health facilities (52%) are located in terai region. There were more facilities in rural areas compared to urban.

Table 3. Distribution of health facilities by their background characteristics (n=105)

Background characteristic	Weighted percentage of health facilities	No. of facilities surveyed	
		Weighted	Un-weighted
Facility type			
Health posts	94.1	99	71
Primary Health Care Center	5.9	6	34
Ecological region			
Mountain	6.2	7	10
Hill	41.4	43	39
Terai	52.4	55	56
Area			
Rural	57.1	60	52
Urban	42.9	45	53
Province			
Province 1	19.2	20	18
Madesh	18.0	19	22
Bagmati	19.3	20	14
Gandaki	12.5	13	12
Lumbini	17.0	18	18
Karnali	11.7	12	14
Sudurpaschim	2.3	3	7
National average	100	105	105

BASIC AMENITIES AVAILABLE IN THE HEALTH FACILITIES

Client latrine (90%), electricity (89%) and visual and auditory privacy (81%) were the commonly available whereas communication equipment (16%) was not common among basic amenities. Only half (55%) of the health facilities had regular electricity. Regular internet service was available in majority (70%) of the health facilities. The availability of basic amenities varied widely among health facilities based on their types, ecological region, area, and provinces. Communication equipment and functional computer were commonly available in the PHCCs compared to HPs. Communication equipment was available in 51 percent of PHCCs but only in 14 percent of HPs (Table 4).

Table 4. Percentage availability of basic amenities in health facilities (n=105)

Background characteristics	Availability of basic client amenities (Weighted %)						
	Electricity available[1]	Regular electricity[2]	Visual and auditory privacy[3]	Client latrine[4]	Regular internet[5]	Communication Equipment[6]	Functional computer
Facility type							
HPs	88.5	55.1	81.6	89.4	68.8	14.2	47.0
PHCCs	93.1	50.4	75.4	100	92.4	51.3	93.4
Ecological region							
Mountain	51.7	68.2	85.3	85.3	34.2	7.5	33.9
Hill	95.9	54.4	92.1	92.5	83.6	30.7	74.7
Terai	87.6	53.6	72.2	88.6	63.7	62.9	32.0
Area							
Rural	82.2	60	84.3	90.1	79.3	12.8	42.1
Urban	97.6	47.9	77.1	89.9	58.1	21.2	60.1
Province							
Province 1	100.0	20.9	94.9	100	64.8	20.7	69.6
Madesh	95.1	61.4	31	78.4	62.1	0.6	13.8
Bagmati	70.8	63.2	98.1	100.0	100.0	7.6	70.8
Gandaki	100.0	75.3	87.7	75.3	100.0	45.7	70.4
Lumbini	100.0	46.7	93.8	87.6	28.7	1.0	27.4
Karnali	61.1	76.7	79	92.2	76.7	32.3	42.5
Sudurpaschim	94.4	53.7	100.0	100.0	34.9	53.7	79.6
National average	**88.8**	**54.8**	**81.2**	**90**	**70.3**	**16.4**	**49.8**

[1] Connected to a national electricity power grid.[2] No interruption in electricity for two or more than two hours during the working hours within the last 7 days. [3] A private room or screened-off space available in the general outpatient service area that is a sufficient distance from other clients so that a normal conversation could be held without the client being seen or heard by others. [4] Functioning toilet accessible for general OPD patient use.[5] Access to email or internet via computer and/or mobile phone during normal working hours. [6] Functioning landline telephone or facility-owned cellular phone or a private cellular phone that is supported by the facility.

HEALTH WORKFORCE

Filled posts: Table 5 shows the weighted proportion of the filled posts compared to sanctioned posts. In PHCCs, 68 percent of medical doctors and 54 percent of staff nurses were filled. Most of the positions of paramedics were filled by more than 60 percent in PHCCs. Sr. ANM position was filled in only 20 percent of PHCCs. In Health posts, 79 percent of AHW and 81 percent of ANMs were filled.

Table 5. Weighted percentage of health facilities with fulfilled positions for various cadres of health service providers (n=105)

Designation	Health facilities with filled positions (weighted %)		
	PHCC (n=99)	Health post (n=6)	Total (n=105)
Doctor	68.3	N/A	68.3
Staff nurse	53.9	N/A	53.9
HA/Sr.AHW	75.2	78.9	78.6
Sr.AHW/AHW	97.2	37.1	40.7
Sr.ANM	19.6	15.5	15.7
AHW	76.6	59.5	60.6
ANM	69.3	80.9	80.2
Lab assistant	89.4	N/A	89.4
Supportive staff	42.6	89.0	86.2

Availability of trained staff: Table 6 shows the availability of at least one staff trained in selected NCD diagnostic and care services in the health facilities. Overall, 69 percent of the health facilities had at least one PEN trained health worker. Less than 1 percent of the staffs were trained in chest physiotherapy and spirometry. Less than 10 percent of staffs were trained in CPR (8%), ECG (2%) and Pap smear test (4%). Compared to health posts, more percent of PHCCs had trained human resources.

Table 6. Health facilities having at least one trained personnel (n=105)

Background characteristic	Types of training (weighted %)							
	PEN protocols	Chest physiotherapy	Spirometry	CPR	ECG	VIA	HPV	Pap smear
Facility type								
HPs	65.7	0.0	0.0	9.1	0.0	12.2	2.1	4.4
PHCCs	91.5	5.7	7.6	32.9	24.8	17.3	8.8	10.9
Ecological region								
Mountain	68.4	0.0	0.0	9.5	2.0	0.0	0.0	2.0
Hill	89.2	0.0	0.0	11.8	1.3	27.6	5.5	5.5
Terai	49.8	0.6	0.9	9.5	1.5	2.0	0.3	4.4
Area								
Rural	73.6	0.3	0.3	4.1	0.6	14.0	4.0	7.7
Urban	58.7	0.4	0.7	18.7	2.7	10.4	0.5	0.8
Province								
Province 1	91.8	0.0	0.0	16.3	2.0	28.3	1.0	12.2
Madesh	43.8	0.0	0.6	8.1	0.6	0.0	0.0	0.0
Bagmati	56.6	0.0	0.0	7.2	0.9	0.0	0.0	0.0
Gandaki	84.6	0.0	0.0	16.7	1.2	38.9	16.7	16.7
Lumbini	48.0	2.0	2.0	10.6	3.0	2.0	1.0	1.0
Karnali	92.2	0.0	0.0	0.0	0.0	11.2	0.0	0.0
Sudurpaschim	53.7	0.0	0.0	25.9	5.6	22.2	0.0	5.6
National average	**69.4**	**0.4**	**0.5**	**8.4**	**1.7**	**13.5**	**3.0**	**4.2**

CPR: Cardio Pulmonary Resuscitation; ECG: Electrocardiogram; VIA: Visual Inspection of Cervix with Acetic Acid; HPV: Human Papillomavirus

PEN Task sharing: Table 7 shows task sharing practices among the health workforce in the PHCCs. Medical officers are the in-charge of the PHCCs. Team based approach among the health workers of the PHCCs was found while performing daily tasks. Although some health workers had their roles and responsibilities focused on certain task but MO, HA, staff nurse, AHWs and ANM, all of them performed the ranges of tasks such as BP measurement, history taking, medicine prescription and adjustment, behavioral counseling, follow-up, referral, PEN registration and peer coaching. OPD related tasks like history taking, medicine prescription, behavioral counseling and referral were mostly carried out by MO followed by HA and AHW. BP measurement was done by almost all health workers in the PHCCs. Recording and reporting were mostly done by HA and AHW. Community counseling and health promotion were more commonly carried out by paramedics like HA, AHW, and ANM. Lab related works like blood sugar measurement, urine protein test, and urine ketone test were mostly carried out by lab assistant.

Table 7. Task sharing by health personnel in the PHCCs (n=34)

Tasks	Task sharing in PHCCs (Weighted %)						
	Doctor	HA	Staff nurse	AHW	ANM	Lab assistant	Not performed
PEN registration	7.3	9.9	2.6	17.7	5.2	0.0	79.7
Initial assessment (BMI and WC)	17.7	27.2	7.6	44.4	12.8	6.4	47.5
BP measurement	86.8	70.7	49.9	90.8	75.4	9.5	0.0
History taking	86.8	55.8	12.8	66.2	22.5	3.3	0.0
CVD risk estimation	25.8	14.7	1.9	19.6	0.0	0.0	60.3
Blood Sugar Measurement	31.7	16.3	5.7	24.8	12.3	87.9	2.8
Urine protein test	25.8	10.9	2.6	17.0	9.2	87.9	2.8
Urine ketone test	22.7	10.9	2.6	20.1	9.2	76.6	14.2
Medicine prescription and adjustment	86.8	48.9	6.4	51.8	10.2	0.0	0.0
Medicine dispensing and counseling	63.4	51.3	13.5	73.5	32.9	5.4	4.7
Behavioral counseling	84.4	57.0	10.9	68.3	29.6	3.3	0.0
NCD reporting	10.4	25.1	4.7	37.8	NA	0.0	55.3
Peer Coaching	24.1	12.1	4.5	13.5	7.1	0.0	71.4
Follow up	75.2	52.3	5.2	64.3	18.4	0.0	6.4
Referral	89.1	41.6	8.3	53.9	13.2	0.0	0.0
Community counseling	10.4	25.5	13.0	46.1	32.2	5.9	29.8

HA: Health Assistant
AHW: Auxiliary Health Worker
ANM: Auxiliary Nurse Midwife

Almost all health workers available in the HPs shared each other's responsibilities. BP measurement, history taking, medicine prescription and adjustment, behavioral counseling, medical dispensing, follow-up, referral and community counseling, and health promotion were all carried out by all health workers available in the HPs. Reporting in HPs was done by HAs and AHWs. Tests like blood sugar measurement, urine protein test, and urine ketone tests, if present, were performed by lab assistants otherwise carried-out by the available HA, AHW or ANM. (Table 8).

Table 8. Task sharing by health personnel in the HPs (n=71)

Tasks	Task sharing in HPs (Weighted %)				
	HA	AHW	ANM	Lab assistant	Not performed
PEN registration	14.2	24.3	16.6	1.4	75.2
Initial assessment (BMI and WC)	25.0	37.4	33.3	1.5	53.8
BP measurement	58.6	88.4	86.5	2.8	0.0
History taking	57.1	80.1	63.9	0.0	1.5
CVD risk estimation	11.6	19.2	13.1	0.0	76.1
Blood Sugar Measurement	14.6	19.5	16.9	15.6	62.2
Urine protein test	6.5	11.7	8.7	14.0	74.4
Urine ketone test	6.0	10.4	7.4	9.7	79.9
Medicine prescription and adjustment	53.3	73.2	30.5	1.4	7.1
Medicine dispensing and counseling	57.0	82.7	45.3	1.4	1.3

Tasks	Task sharing in HPs (Weighted %)				
	HA	AHW	ANM	Lab assistant	Not performed
Behavioral counseling	56.8	85.6	63.4	1.4	0.0
NCD reporting	22.7	28.7	NA	0.5	67.3
Peer Coaching	11.0	9.3	9.3	0.0	81.8
Follow up	54.3	68.7	50.1	1.4	12.7
Referral	57.6	73.2	47.0	0.0	8.0
Community counseling	19.0	49.3	44.0	0.0	33.3

HA: Health Assistant
AHW: Auxiliary Health Worker
ANM: Auxiliary Nurse Midwife

PEN DIAGNOSTIC TESTS AND PROCEDURES

Protocol-1 related diagnostic test and procedures: Table 9 presents the availability of PEN protocol-1 related diagnosis and procedures. Only 35 percent of the health facilities had blood sugar test and 17 percent had urine ketone test available. Only 7 percent had lipid profile test available. Blood sugar test was available in 89 percent of the PHCCs and 32 percent of HPs. CPR and foot examination was reported to be available in less than 20 percent of the health facilities and manual ventilation was performed in only 43 percent of the health facilities. More proportion of PHCCs had availability of diagnostic tests and procedures compared to health posts.

Table 9. Protocol-1 related diagnostic tests and procedures (n=105)

Background Characteristics	Availability of PEN Protocol-1 diagnosis and procedures (Weighted %)						
	Blood sugar test	Urine protein test	Urine ketone test	Lipid profile test	CPR (BLS)	Manual ventilation	Foot examination
Facility type							
HPs	31.8	22.0	14.2	4.2	11.9	41.0	2.0
PHCCs	88.9	86.7	56.7	41.1	48.2	69.7	48.0
Ecological region							
Mountain	16.9	31.6	9.5	0.0	22.1	39.1	48.3
Hill	43.5	32.9	25.0	8.4	25.0	54.8	29.0
Terai	30.7	19.6	11.1	5.7	4.5	33.7	7.5
Area							
Rural	31.3	24.9	16.2	4.7	12.7	44.2	17.9
Urban	40.4	27.1	17.4	8.9	16.0	40.8	20.3
Province							
Province 1	47.5	47.5	32.1	11.2	11.2	36.0	27.0
Madesh	17.1	8.7	5.5	4.9	0.6	23.3	4.9
Bagmati	14.8	13.8	8.5	13.8	19.5	67.6	9.1
Gandaki	64.2	29.0	19.1	0.0	17.9	64.2	31.5
Lumbini	36.0	11.6	11.6	2.0	3.0	20.1	2.0
Karnali	35.5	43.3	25.6	2.4	41.3	41.3	56.9
Sudurpaschim	79.6	79.6	25.9	5.6	20.4	100.0	5.6
National average	**35.2**	**25.8**	**16.8**	**6.5**	**14.1**	**42.7**	**18.9**

CPR (BLS): Cardio Pulmonary Resuscitation (Basic Life Support)

Protocol-3 related diagnostics and procedures: Peak flow test and x-ray were available in only 6 percent and 4 percent of the health facilities, respectively. Spirometry was available in 7 percent of the PHCCs and none of the health posts. Chest rehabilitation was available in 2 percent and administration of oxygen was available in 34 percent of the health facilities. Compared to HPs, these tests and procedures were more common in PHCCs. (Table 10).

Table 10. Protocol-3 related diagnostic tests and procedures (n=105)

Background characteristics	Availability of PEN Protocol-3 diagnosis and procedures (Weighted %)				
	Peak flow test	X-ray	Spirometry	Chest rehabilitation	Administration of oxygen
Facility type					
HPs	5.4	0.0	0.0	1.3	28.2
PHCCs	8.0	59.1	5.7	14.2	82.4
Ecological region					
Mountain	0.0	0.0	0.0	0.0	9.5
Hill	7.1	3.1	0.8	4.6	64.5
Terai	5.1	4.2	0.0	0.3	12.7
Area					
Rural	9.2	2.1	0.0	3.6	39.7
Urban	0.8	5.4	0.8	0.0	26.3
Province					
Province 1	25.0	6.1	1.0	0.0	17.6
Madesh	0.0	0.6	0.0	0.0	15.5
Bagmati	0.0	3.7	0.0	1.9	69.8
Gandaki	0.0	2.5	0.0	12.4	66.7
Lumbini	0.0	3.0	0.0	1.0	11.6
Karnali	2.4	3.6	1.2	0.0	26.8
Sudurpaschim	22.2	11.1	0.0	0.0	37.0
National average	**5.6**	**3.5**	**0.3**	**2.1**	**33.9**

Protocol-4 related diagnostic tests: Cryotherapy and mammogram were not available in any health facilities. VIA service was available in 9 percent of the health facilities and Pap smear test was available in almost none of the health facilities (Table 11).

Table 11. Protocol-4 related diagnostics and procedures (n=105)

Background characteristics	Availability of PEN Protocol-4 diagnosis and procedures (Weighted %)			
	Cryotherapy	VIA	Pap smear test	Mammogram
Facility type				
HPs	0.0	8.3	0.0	0.0
PHCCs	0.0	18.2	2.6	0.0
Ecological region				
Mountain	0.0	0.0	0.0	0.0
Hill	0.0	18.8	0.4	0.0
Terai	0.0	2.1	0.0	0.0
Area				
Rural	0.0	9.4	0.3	0.0
Urban	0.0	8.1	0.0	0.0
Province				
Province 1	0.0	20.9	0.0	0.0

Background characteristics	Availability of PEN Protocol-4 diagnosis and procedures (Weighted %)			
	Cryotherapy	VIA	Pap smear test	Mammogram
Madesh	0.0	0.0	0.0	0.0
Bagmati	0.0	0.0	0.0	0.0
Gandaki	0.0	31.5	1.2	0.0
Lumbini	0.0	1.0	0.0	0.0
Karnali	0.0	0.0	0.0	0.0
Sudurpaschim	0.0	33.3	0.0	0.0
National average	**0.0**	**8.9**	**0.2**	**0.0**

VIA: Visual Inspection of Cervix with Acetic Acid

MEDICINES AND EQUIPMENT

Protocol-1 Medicines: Table 12 illustrates the availability of medicines included in the PEN protocol-1. Amlodipine and metformin were available in half of the health facilities surveyed. Compared to these two drugs, the availability of atorvastatin was very low (10%). The availability of these drugs varied based on the health facility type and area. All these three drugs were more common in PHCCs compared to HPs. Metformin was available in 89 percent of the PHCCs and 60 percent of the health facilities in urban area compared to 48 percent in HPs and 43 percent of the health facilities in rural area.

Table 12. Availability of Protocol-1 related medicines in the health facilities (n=105)

Background characteristics	Availability of Protocol-1 medicines (Weighted %)				
	Amlodipine	Atorvastatin	Metformin	Furosemide	Hydrochlorothiazide
Facility type					
HPs	45.4	7.5	47.7	61.7	1.0
PHCCs	84.2	50.8	88.7	81.8	17.3
Ecological region					
Mountain	19.2	100	16.9	75.9	0.0
Hill	56.3	8.9	54.3	79.4	2.5
Terai	44.4	12.11	50.9	48.2	1.6
Area					
Rural	47.4	9	43	66.9	0.3
Urban	48.2	11.4	59.7	57.5	3.9
Province					
Province 1	92.9	34.7	92.9	63.3	2.0
Madesh	28.1	5.5	24.3	64.5	0.6
Bagmati	61	1.9	67	55.0	5.4
Gandaki	12.4	12.4	30.3	100.0	0.0
Lumbini	46.7	2	70.8	39.4	2.0
Karnali	14.8	0	33.5	69.1	0.0
Sudurpaschim	79.6	5.6	79.6	51.9	0.0
National average	**47.7**	**10**	**50.2**	**62.9**	**1.9**

Protocol-1 related equipment: Table 13 illustrates the availability of equipment necessary in the PEN protocol-1. BP apparatus and weighing machine were available in 96 percent and 90 percent of the health facilities, respectively. The availability of other equipment included in the PEN protocol-1 was low. Glucometer was available in 43 percent, strips were available in 26 percent, and urine ketone test strips were available in 17 percent of the health facilities. The equipment and supplies were available more commonly in PHCCs compared to health posts.

Table 13. Availability of Protocol-1 equipment and supplies in the health facilities (n=105)

Background characteristics	Availability of Protocol-1 Equipment (Weighted %)					
	BP apparatus	Glucometer	Glucometer test strips	Urine protein strips	Urine ketone test strips	Weighing scale
Facility type						
HPs	95.9	41.2	27.8	22.0	14.2	90.0
PHCCs	100.0	70.92	53.7	86.8	56.7	98.0
Ecological region						
Mountain	100.0	24.2	24.2	31.6	9.5	92.6
Hill	92.7	52.3	40.5	32.9	25.0	89.3
Terai	98.5	37.8	21.2	19.6	11.1	90.4
Area						
Rural	96.2	38.4	30.2	24.9	16.2	91.5
Urban	100.0	49	28.3	27.1	17.4	88.3
Province						
Province 1	100.0	15.8	13.3	47.5	32.1	92.9
Madesh	95.5	47.1	15.6	8.7	5.5	85.3
Bagmati	92.9	80.8	29.6	13.8	8.5	84.3
Gandaki	100.0	90.1	54.3	29.0	19.1	100
Lumbini	100.0	55.3	27.4	11.6	11.6	85.9
Karnali	100.0	54.5	53.3	43.3	25.6	100.0
Sudurpaschim	100.0	31.5	25.9	79.6	25.9	79.6
National average	**96.2**	**43.0**	**29.4**	**25.8**	**16.8**	**90.1**

Protocol-3 drugs and equipment: The availability of drugs and equipment related to Protocol-3 is shown in Table 14. Salbutamol was available in majority (81%) of the health facilities surveyed whereas less than 1 percent of health facilities had beclomethasone. Stethoscope was available in almost all health facilities (99%), peak flow meter in only 12 percent, and nebulizer was available in 43 percent of the health facilities.

Table 14. Availability of Protocol-3 drugs and equipment in the health facilities (n=105)

Background characteristics	Availability of Protocol-3 drugs (Weighted %)					
	Salbutamol	Beclomethasone	Hydro-cortisone	Stethoscope	Peak flow meter	Nebulizer
Facility type						
HPs	81.0	0.0	27.5	98.57	11.7	40.0
PHCCs	77.3	12.8	80.4	100.0	16.8	91.5
Ecological region						
Mountain	70.7	2.3	17.2	100.0	9.5	26.6
Hill	85.6	0.4	41.5	100.0	20.7	66.0
Terai	78.3	0.9	23.7	97.0	5.5	26.9
Area						
Rural	80.7	0.7	33.8	100.0	15.0	44.8
Urban	81.0	0.8	26.4	97.0	8.1	40.6
Province						
Province 1	69.4	0.0	34.4	100.0	27.0	31.1

Background characteristics	Availability of Protocol-3 drugs (Weighted %)					
	Salbutamol	Beclomethasone	Hydro-cortisone	Stethoscope	Peak flow meter	Nebulizer
Madesh	73.7	0.6	25.4	100.0	0.0	24.6
Bagmati	82.4	0.9	40.9	100.0	0.0	55.0
Gandaki	100	1.2	38.9	100.0	0.0	87.7
Lumbini	92.4	1.0	19.1	92.1	0.0	28.4
Karnali	71.3	1.2	14.8	100.0	48.7	37.9
Sudurpaschim	77.8	0.0	74.1	100.0	48.2	77.8
National average	**80.81**	**0.8**	**30.6**	**98.7**	**12.0**	**43.0**

Protocol-4 equipment: The availability of equipment necessary to provide the services related to the protocol-4 of the PEN program is shown in the table 15. Examination table was available in majority (81%) of the health facilities surveyed whereas none of the health facilities had cryotherapy units. Speculum was available in more than half (63%) of the health facilities. The availability of speculum varied widely between PHCCs (94%) and HPs (61%).

Table 15. Availability of Protocol-4 equipment in the health facilities (n=105)

Background characteristics	Availability of Protocol-4 Equipment (Weighted %)			
	Examination table	Speculum	Acetic acid	Cryotherapy unit
Facility type				
HPs	92.0	60.7	14.9	0.0
PHCCs	100.0	94.1	85.1	0.0
Ecological region				**0.0**
Mountain	100.0	77.9	22.1	0.0
Hill	96.7	86.0	27.2	0.0
Terai	88.3	42.5	4.4	0.0
Area				
Rural	91.4	67.5	20.2	0.0
Urban	93.9	56.3	7.9	0.0
Province				
Province 1	92.9	53.1	28.3	0.0
Madesh	83.3	22.4	5.5	0.0
Bagmati	100.0	16.7	24.8	0.0
Gandaki	100.0	100.0	16.7	0.0
Lumbini	81.4	42.6	0.0	0.0
Karnali	100.0	92.2	7.8	0.0
Sudurpaschim	100.0	79.6	31.5	0.0
National average	**92.5**	**62.7**	**15.0**	**0.0**

INFECTION CONTROL

Table 16 presents the distribution of infection control consumables in health facilities. Sanitizer was available in 100 percent, medical masks in 89 percent and disposable gloves in 86 percent of the health facilities, respectively. Running water was available in 90 percent of the health facilities but only 70 percent of the health facilities had soap. Spirit was available in less than half (48%) of the health facilities. Both gown and eye protection were available in 68 percent of the health facilities.

Table 16. Availability of standard precautions consumables for infection control (n=105)

Characteristics	Running water	Soap	Sanitizer	Disposable gloves	Medical mask	Gown	Eye protection	Spirit
Facility type								
HPs	89.5	70.1	100.0	85.7	89.0	66.8	68.2	47.4
PHCCs	96.2	67.6	96.7	94.1	93.9	95.0	73.8	54.9
Area								
Rural	90.0	66.9	100.0	93.1	96.3	83.6	75.5	37.0
Urban	89.7	74.0	99.5	77.0	79.9	48.3	59.2	62.4
Ecological region								
Mountain	100.0	85.3	100.0	100.0	100.0	100.0	85.3	77.9
Hill	100.0	63.7	99.5	96.7	96.2	82.5	85.7	44.9
Terai	80.7	73.1	100.0	76.3	82.6	53.6	53.0	46.6
Province								
Province 1	100.0	7.1	99.0	92.9	84.7	71.4	73.2	49.5
Madhesh	61.2	100.0	100.0	85.4	78.5	28.5	35.3	22.8
Bagmati	100.0	100.0	100.0	99.1	100.0	94.7	95.6	0.9
Gandaki	100.0	56.8	100.0	100.0	100.0	59.9	83.3	72.2
Lumbini	81.4	65.6	100.0	46.3	77.0	57.7	36.0	85.9
Karnali	100.0	92.2	100.0	100.0	100.0	100.0	92.2	77.8
Sudur-paschim	100.0	100.0	100.0	77.8	100.0	100.0	100.0	57.4
National average	**89.9**	**70.0**	**99.8**	**86.2**	**89.3**	**68.4**	**68.5**	**47.9**

Table 17 presents information on availability of the equipment for infection control in the health facility. Sharp container (96%) and autoclave (87%) were available in higher proportion of the health facilities compared to other infection control equipment. Both chlorine solution and labeled waste bucket were available in 73 percent of health facilities. Needle destroyer and waste basket were available in only 35 percent and 36 percent of the health facilities, respectively. Glutarladehyde (4%) was the least available equipment in the health facilities. The availability of these infection control equipment was comparatively higher in PHCCs than in HPs. Needle destroyer was available in 72 percent of the PHCCs but only in 33 percent of the HPs.

Table 17. Availability of standard precautions equipment for infection control (n=105)

Characteristics	Pedal waste bucket	Labeled waste bucket	Sharp container	Chlorine solution	Autoclave	Glutaralde-hyde	Waste basket/ bags	Needle destroyer
Facility type								
HPs	66.3	72.2	95.7	73.0	85.9	3.1	33.7	33.4
PHCCs	81.6	89.8	100.0	85.8	100.0	10.6	63.1	71.9
Area								
Rural	65.3	68.5	95.1	79.2	89.0	0.5	31.3	37.0
Urban	69.6	79.6	97.1	65.8	83.9	7.6	41.0	34.0
Ecological region								
Mountain	68.4	83.3	100.0	85.3	100.0	0.0	26.4	24.2
Hill	64.9	76.0	100.0	93.8	96.7	8.1	46.1	46.6
Terai	68.8	69.8	92.3	56.1	77.4	3.6	28.1	28.5
Province								
Province 1	51.3	75.3	100.0	71.4	92.9	7.1	32.4	63.0

Characteristics	Pedal waste bucket	Labeled waste bucket	Sharp container	Chlorine solution	Autoclave	Glutaralde-hyde	Waste basket/ bags	Needle destroyer
Madhesh	63.8	45.1	83.3	41.5	53.1	0.0	12.5	11.1
Bagmati	74.2	66.7	100.0	94.7	100.0	0.9	31.1	17.3
Gandaki	69.1	90.1	100.0	98.8	100.0	14.8	33.3	74.7
Lumbini	64.6	79.7	93.8	50.5	79.7	0.0	51.8	27.4
Karnali	82.0	92.2	100.0	92.2	100.0	1.2	57.7	30.1
Sudur-paschim	100.0	94.4	100.0	100.0	100.0	0.0	53.7	31.5
National average	**67.2**	**73.2**	**96.0**	**73.5**	**86.8**	**3.6**	**35.4**	**35.7**

PEN GUIDELINES

Eighteen percentage of health facilities have PEN guideline available. The guideline was more common in PHCCs (34%) compared to HPs (17%). The availability of the guideline varied based on the ecological and provincial location of the health facilities. The guidelines were more commonly available in Province-1; whereas no health facilities in Bagmati had the guideline (table 18).

Table 18. Availability of guidelines for the management of NCDS in health facilities, disaggregated by background characteristics (n=105)

Background Characteristics	Availability of PEN Manual (weighted %)
Facility type	
HPs	17.1
PHCCs	34.8
Ecological region	
Mountain	35.7
Hill	6.4
Terai	0.0
Geographical region	
Rural	17.6
Urban	18.8
Province	
Province 1	36.2
Madhesh	6.8
Bagmati	0.0
Gandaki	26.5
Lumbini	3.0
Karnali	49.9
Sudurpaschim	11.1
National average	**18.1**

HEALTH MANAGEMENT AND INFORMATION SYSTEM

General HMIS: Table 19 presents HMIS recording and reporting system in health facilities. All health facilities reported to have HMIS recording register and regular reporting. Majority of the health facilities (82%) have designated reporting staff. Less than half (48%) had an online reporting system in place. Almost all (94%) health facilities had the HMIS report of the previous month available at the day of data collection.

Table 19. Availability of general HMIS recording and reposting system in the health facilities (n=105)

Background characteristics	HMIS recording and reporting system (Weighted %)				
	HMIS recording register	Online reporting	Regular reporting	Record of last month report	Designated staff for reporting
Facility type					
HPs	100.0	46.0	100.0	93.9	82.6
PHCCs	100.0	77.3	100.0	96.7	73.8
Ecological region					
Mountain	100.0	26.4	100.0	100.0	68.4
Hill	100.0	82.3	100.0	88.9	73.5
Terai	100.0	23.2	100.0	97.4	90.4
Geographical region					
Rural	100.0	49.0	100.0	94.7	82.7
Urban	100.0	46.3	100.0	93.1	81.2
Province					
Province 1	100.0	75.3	100.0	84.7	74.2
Madhesh	100.0	4.9	100.0	100.0	85.8
Bagmati	100.0	65.4	100.0	84.3	86.8
Gandaki	100.0	69.1	100.0	100.0	75.3
Lumbini	100.0	10.6	100.0	100.0	100.0
Karnali	100.0	68.9	100.0	100.0	60.1
Sudurpaschim	100.0	59.3	100.0	100.0	94.4
National average	**100.0**	**47.9**	**100.0**	**94.0**	**82.1**

NCD recording and reporting: Table 20 illustrates the availability of the recording and reporting tools for the PEN program. Only 20 percent of the health facilities had NCD registers, 15 percent had NCD monthly reporting form, and 18 percent had OPD card. Availability of these tools varied between ecological region and provinces. More health facilities in the hill region (41%) had NCD register compared to the mountain (8%) and terai (6%) regions. NCD register was available in 60 percent of the health facilities of the Karnali province, whereas none of the health facilities from Gandaki and Lumbini province had NCD registers.

Table 20. Availability of PEN recording and reporting tools in the health facilities (n=105)

Background characteristics	PEN recording and reporting tools (Weighted %)		
	NCD register	NCD monthly reporting form	NCD OPD card
Facility type			
HPs	20.2	15.4	17.7
PHCCs	19.9	2.4	17.4
Ecological region			
Mountain	7.5	0.0	9.7
Hill	40.6	35.3	37.4
Terai	5.5	0.0	3.2
Geographical region			
Rural	17.8	14.2	17.7
Urban	23.3	15.1	17.7

Background characteristics	PEN recording and reporting tools (Weighted %)		
	NCD register	NCD monthly reporting form	NCD OPD card
Province			
Province 1	49.0	46.9	42.9
Madhesh	16.2	0.0	9.3
Bagmati	1.9	0.0	9.4
Gandaki	0.0	0.0	0.0
Lumbini	0.0	0.0	0.0
Karnali	59.9	47.5	61.1
Sudurpaschim	20.4	0.0	20.4
National average	**20.2**	**14.6**	**17.7**

REFERRAL SYSTEM

Table 21 presents the information on referral services and provision at the health facilities. Majority of health facilities (84%) could arrange ambulance for referral. Referral forms were available in less than half (45%) of the health facilities, and referral guidelines were followed in 19 percent of health facilities. Overall, our survey findings also showed that the health facilities were also less likely to send reminders and recall clients for follow-up visits.

Table 21. Availability of referral and follow-up services in health facilities, disaggregated by background characteristics (n=105)

Background characteristics	Availability of referral and follow-up services (Weighted %)				
	Reported availability of referral form	Follow referral guideline	Can arrange ambulance for referral	Send reminder for follow-up visits	Contact clients when missed appointment
Facility type					
Health posts	43.6	18.2	83.0	17.0	22.9
PHCCs	56.5	25.3	95.3	16.1	13.7
Ecological region					
Mountain	48.5	0.0	90.5	0.0	85.1
Hill	57.3	37.9	80.7	32.6	39.5
Terai	34.9	5.7	85.3	6.6	9.7
Rural	41.6	24.4	87.4	22.0	25.3
Urban	49.5	10.9	78.8	10.2	18.4
Province					
Province 1	35.2	27.3	73.0	20.7	27.0
Madesh	49.5	0.6	76.6	0.0	11.8
Bagmati	26.4	4.7	100.0	22.3	17.6
Gandaki	48.8	47.5	66.7	48.8	61.7
Lumbini	48.4	9.6	87.6	14.1	16.8
Karnali	75.5	39.9	100.0	0.0	0.0
Sudurpaschim	46.3	5.6	74.1	5.6	46.3
National average	**45.0**	**18.6**	**83.7**	**16.9**	**22.4**

Inter Quartile Range

MONITORING AND SUPERVISION

Overall, the monitoring and supervision visits in the health facilities from all three levels of government were low. Fifteen percent of health facilities reported supervision from local government and 2 percent reported supervision from provincial government within a year prior to data collection. (Table 22).

Table 22. Monitoring and supervision visits in health facilities from different levels of government (n=105)

Background characteristics	Monitoring and supervision visits (Weighted %)		
	Federal government	Provincial government	Local government
Facility type			
Health posts	0.0	19.2	14.9
PHCCs	16.1	27.2	10.6
Ecological region			
Mountain	0.0	0.0	0.0
Hill	3.6	2.8	10.9
Terai	0.0	28.2	19.3
Area			
Rural	1.9	0.0	16.1
Urban	0.0	53.3	12.8
Province			
Province 1	0.0	0.0	0.0
Madesh	0.0	0.0	0.6
Bagmati	2.9	0.0	30.2
Gandaki	0.0	0.0	25.3
Lumbini	0.0	65.4	25.7
Karnali	0.0	10.7	10.0
Sudurpaschim	0.0	0.0	0.0
National average	**1.2**	**2.0**	**14.7**

FINANCING

Table 23 presents the information on major funding sources other than the government of Nepal for the PEN program. Some of the health facilities (7%) received financial support from non-governmental organizations, service charge (5%) and social health insurance (3%). Social health insurance is not implemented at HPs level; 41 percent of the PHCCs reported that they have received financial support from the insurance. Service charge was a funding source in 95 percent of PHCCs compared to 3 percent in HPs (Table 23).

Table 23. Funding sources for PEN program implementation in primary health care facilities (other than the government of Nepal) (n=105)

Background characteristic	Funding sources other than government (Weighted %)		
	NGO/INGO	Service charge	Social Health Insurance
Facility type			
Health posts	6.7	2.7	0.0
PHCCs	5.2	94.5	41.4
Ecological region			
Mountain	0.0	7.5	0.0
Hill	16.1	8.4	1.4
Terai	0.0	2.4	3.6
Area			
Rural	9.2	4.2	1.2
Urban	3.2	6.6	4.2
Province			
Province 1	7.1	4.1	5.1
Madesh province	0.0	0.0	0.0
Bagmati province	15.7	6.3	2.8
Gandaki province	17.9	14.8	2.5
Lumbini province	0.0	2.0	2.0
Karnali province	0.0	3.6	2.4
Sudurpaschim province	0.0	25.9	0.0
National average	**6.7**	**5.2**	**2.5**

NGO: Non-Government Organization; INGO: International Non-Government Organization

PART II: HSPS' ADHERENCE TO PEN PROTOCOLS (1, 2 AND 3)

Adherence to PEN protocols (1, 2, and 3) was separately assessed: therefore, the number of observations varied based on the sample selection criteria. The findings of observations have been presented under the following headings:

PEN PROTOCOL 1 OBSERVATION

Distribution of the observed clients by provisional diagnosis

To ascertain adherence to PEN Protocol 1, we observed a total of 136 NCD clients. Out of 136 observed cases, the majority were provisionally diagnosed to have HTN (84), followed by diabetes (29) and both HTN and diabetes (19) (Figure 3).

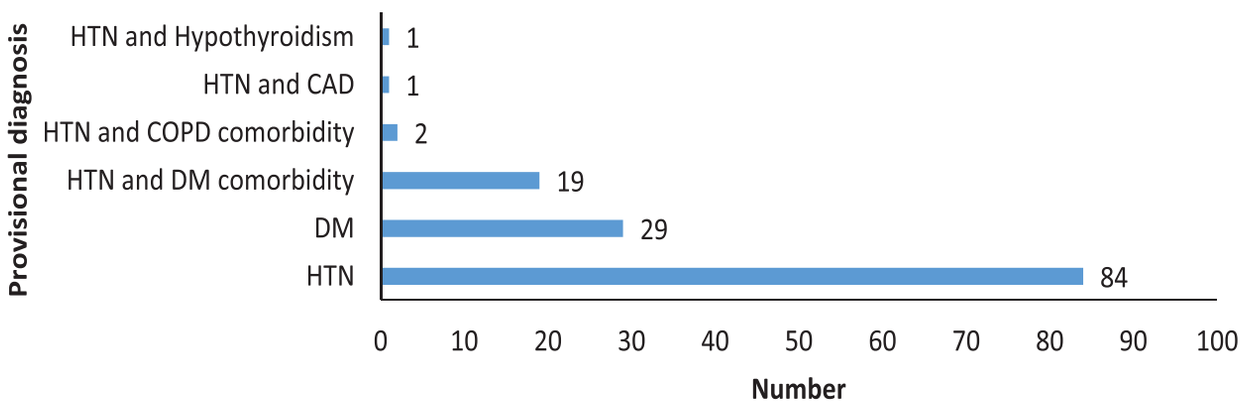

Figure 3. Provisional diagnosis of clients eligible for Protocol 1 assessment

Assessment of signs and symptoms of NCD clients and 10-year CVD risk estimation

PEN trained HSP examined NCD-related symptoms in 80 percent of the clients observed, compared to 77 percent of the clients by untrained health service providers. Family history of NCD assessment was low in both groups. PEN trained HSP assessed family history in 3 percent of the clients compared to 1 percent of clients by untrained HSP. Lifestyle assessment was done among less than a third of clients. PEN trained HSP assessed 31 percent of the clients about their lifestyle compared to 15 percent by untrained HSP. PEN trained HSP measured blood pressure of 81 percent of clients compared to 66 percent by untrained HSP. PEN trained HSPs measured waist circumference, but among 2 percent of the observed clients. CVD risk estimation was conducted by only PEN trained HSPs, however only on 8 percent of the clients (Table 26).

Among diabetes clients, feet examination was done among 14 percent of clients examined by PEN trained HSP and 7 percent of clients seen by untrained HSPs. Oral examination was done for 5 percent of clients examined by PEN trained and 4 percent of the clients examined by untrained HSPs, respectively. Five percent of diabetes cases seen by the PEN trained health personnel (5%) were prescribed urine ketone tests. Majority of diabetic clients were prescribed oral hypoglycemic drugs by PEN trained (86%) and untrained (78%) HSPs. Foot care was advised in 19 percent and 7 percent of NCD clients seen by PEN trained and untrained HSPs, respectively. About 10 percent and 4 percent of NCD clients were advised for oral care by PEN trained and untrained HSPs, respectively (Table 24).

Table 24. Assessment of NCD-specific signs and symptoms, and 10-year CVD risk estimation (n=136)

Procedures	Patients managed by	
	PEN Trained (n=65)	PEN Untrained (n=71)
Ask		
Prior history of NCDs[1]	37.5	42.4
NCD specific symptoms[2]	80.0	71.8
Lifestyle behaviors[3]	30.8	15.5
Family history of NCDs	3.1	1.4
Physical examination		
Waist circumference	1.5	0.0
Blood pressure	81.5	66.2
Auscultation of heart	1.5	4.2
Auscultation of lungs	12.3	4.2
Estimate		
CVD risk estimation	7.7	0.0
Tests		
Blood sugar (FBS/RBS/PP)	24.6	15.5
Urine sugar	3.1	0.0
Urine protein	4.6	2.8
Prescription of drugs	(n=51)	(n=55)
Anti-hypertensive drugs	88.2	65.5
Diabetes care	(n=21)	(n=27)
Urine ketone	4.8	0.0
Oral examination	4.8	3.7
Feet examination	14.3	7.4
Anti-diabetic medicine	85.7	77.8
Advise for oral care	9.5	3.7
Advise for foot care	**19.1**	**7.4**

[1] Diagnosed heart disease, stroke/transient ischemic attack, diabetes mellitus and kidney disease
[2] Angina, breathlessness, numbness or weakness of limbs, loss of weight, increased thirst, polyuria, delay in wound healing, puffiness of face, frothy urine, swelling of feet, passing of blood in urine, current medication of client, new onset of symptoms
[3] Tobacco use in last twelve months, alcohol consumption in last twelve months, type of occupation (sedentary or active), engagement in physical activity for at least 30 minutes for 5 days in week
CVD: Cardiovascular Diseases

FBS/RBS/PP: Fasting Blood Sugar/Random Blood Sugar/Post-Prandial Blood Sugar

PEN PROTOCOL 2 OBSERVATION

Provisional diagnosis of clients receiving counseling sessions

A total of 182 clients receiving counseling sessions were observed. Among the observed, hypertension (86) was the most common provisional diagnosis, followed by diabetes (33) and both hypertension and diabetes (19) (Figure 4).

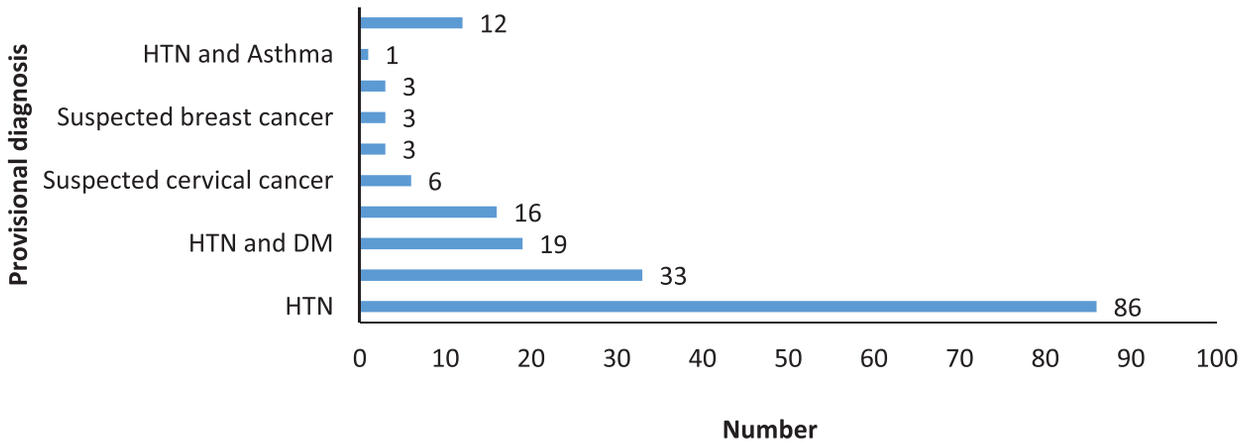

Figure 4. Provisional diagnosis of clients receiving counseling sessions (n=182)

Assessment of unhealthy behaviors and counseling for healthy behaviors among clients with NCDs and other risk factors

In table 25, unhealthy dietary behaviors were the most commonly assessed risk factors in NCD clients by the PEN trained (27%) and untrained (16%) HSPs. Assessment of tobacco consumption done among PEN trained HSPs (17%) compared to untrained HSPs (12%). The assessment of alcohol intake was higher in NCD clients seen by PEN trained HSPs compared (17% vs. 9%) to untrained HSPs. Nevertheless, the assessment of physical activity was slightly lower for PEN trained HSPs (8%) compared to untrained HSPs (10%). Counseling on salt restriction was substantially higher (41% vs. 21%) in PEN trained HSPs. NCD clients seen by the PEN trained staff (62%) were frequently instructed in taking NCD drugs compared to clients examined by untrained staff (33%). NCD clients were poorly advised to increase the consumption of fruits and vegetables by both PEN trained (3%) and untrained HSPs (1%).

Table 25. Assessment of unhealthy behaviors and counseling for healthy behaviors among clients with NCDs and other risk factors (n=182)

Procedures	Patients managed by	
	PEN Trained (n=92)	PEN Untrained (n=90)
Assessment of unhealthy behaviors		
Unhealthy diet	27.2	15.6
Physical activity	7.6	10.0
Tobacco consumption	17.4	12.2
Alcohol consumption	17.4	8.9
Counseling for health behaviors		
Moderate physical activity	17.4	8.9
Restriction of salt	41.3	21.1
Consumption of fruits and vegetables	3.3	1.1
Avoid consumption of tobacco	13.0	7.8
Avoid consumption of alcohol	9.8	7.8
Medication instruction	62.0	33.3
Follow up date	68.5	42.2

PEN PROTOCOL 3 OBSERVATION

We observed a total of 23 clients with CRDs while receiving NCD services from the health facilities. A higher proportion of PEN trained HSPs asked for the presence of CRD-specific symptoms such as cough (73% vs. 63%) and chronic breathlessness (87% vs. 13%) compared to untrained HSPs. Auscultation of

the lungs was carried out in 60 percent and 37 percent of CRD clients examined by PEN trained and untrained HSPs. Contrary to this, PEN trained HSPs assessed oxygen saturation in only 7 percent of the CRD clients whereas PEN untrained HSPs assessed oxygen saturation in 25 percent of the CRD clients. None of the HSPs, PEN trained or untrained, performed Peak Expiratory Flow Rate (PEFR) tests in CRD clients. Higher proportion of CRD clients managed by the PEN trained HSPs received advice compared to the clients attended by the untrained HSPs. Forty percent of the CRD clients examined by the PEN trained HSPs received advice from HSPs on avoidance of factors triggering CRD exacerbation whereas only 25 percent of the clients managed by untrained staff received such advice (Table 26).

Table 26. Management of chronic respiratory diseases (CRDs) (n=23)

Procedures	Patients managed by	
	PEN trained (n=15)	PEN untrained (n=8)
Ask for		
Cough	73.3	62.5
Chronic breathlessness	86.7	12.5
Wheezing	26.7	37.5
Assess		
Oxygen saturation	6.6	25.0
PEFR-1st reading	0.0	0.0
PEFR-2nd reading	0.0	0.0
Auscultate lungs	60.0	37.5
Advice		
Avoidance of factors triggering exacerbation of CRDs	40.0	25.0
MDI/DPI use	40.0	25.0

PEFR: Peak Expiratory Flow Rate
MDI/DPI: Metered Dose Inhaler/Dry Powder Inhaler

PART III: MONTHLY TREND IN NCD MORBIDITIES IN PEN-IMPLEMENTED AND NON-IMPLEMENTED DISTRICTS

Figure 5 presents monthly trend of reported hypertension cases (per 100,000 population) in PEN-implemented and non-implemented districts reported from Jul/Aug 2016 to Jun/Jul 2021 (FY 2073/74 to 2077/78). There was no difference in trend of reported hypertension prevalence between PEN-implemented and non-implemented districts until Aug 2018, then reported cases were higher in PEN-implemented districts. This might be because PEN was widely scaled out from 2018 covering all districts included in this analysis; before that PEN was implemented in only seven districts included in this analysis. The reported hypertension cases decreased during COVID-19 first wave (March 2020) and second wave (April 2021).

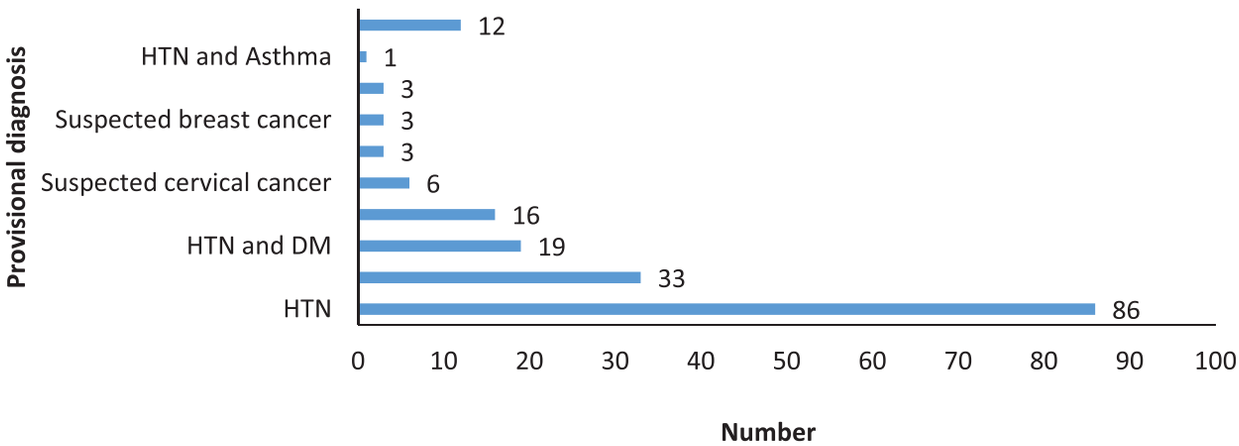

Figure 5. Monthly trend of reported hypertension cases per 100,000 population in PEN-implemented and non-implemented districts from Jul/Aug 2016 to Jun/Jul 2021

Figure 6 presents monthly trend of reported diabetes mellitus cases (per 100,000 population) in PEN-implemented and non-implemented districts reported from Jul/Aug 2016 to Jun/Jul 2021 (FY 2073/74 to 2077/78). The reported prevalence of diabetes mellitus cases increased for PEN-implemented districts from May/Jun 2018 (Jestha 2075) as compared to PEN non-implemented districts. During the COVID-19 first wave (March 2020) and second wave (April 2021), there was a decreasing trend in reported diabetes mellitus cases in both PEN-implemented and non-implemented districts. Reported diabetes mellitus prevalence was slightly higher in PEN implemented districts compared to non-implemented districts since April 2018. This might be because PEN was widely scaled out from 2018 covering all districts included in this analysis; before that PEN was implemented in only seven districts.

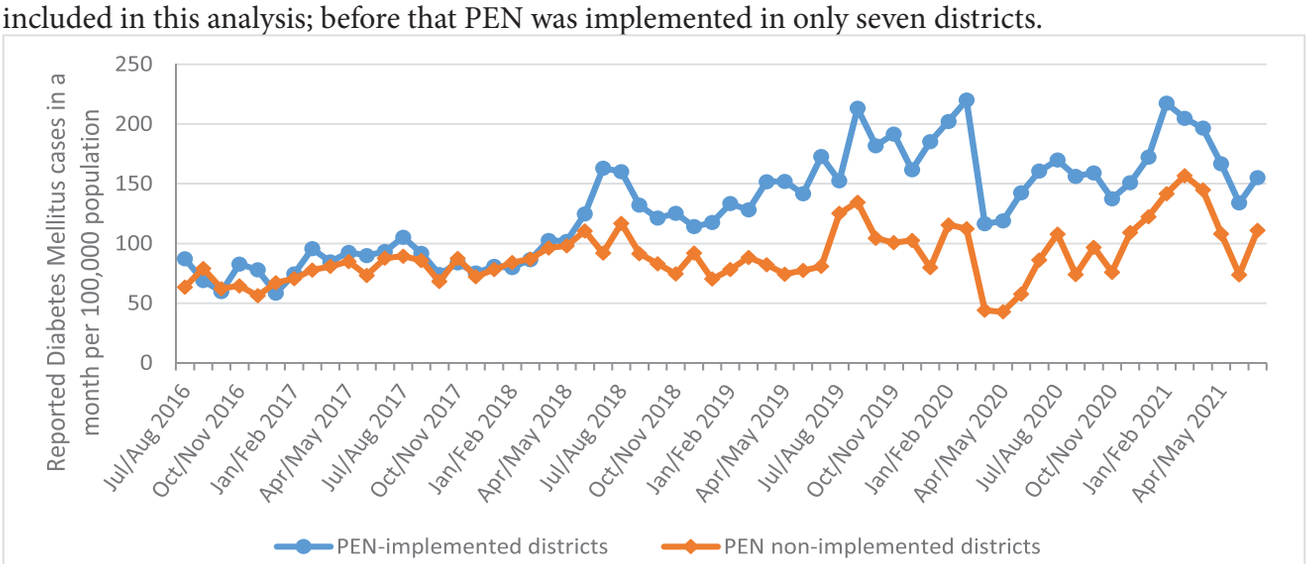

Figure 6. Monthly trend of reported diabetes mellitus (per 100,000 population) in PEN-implemented and non-implemented districts From Jul/Aug 2016 to Jun/Jul 2021 (FY 2073/74 to 2077/78)

Figure 7 compares monthly trend of reported COPD cases (per 100,000 population) in PEN-implemented and non-implemented districts reported from Jul/Aug 2016 to Jun/Jul 2021 (FY 2073/74 to 2077/78). There was not much difference in reported cases of COPD per 100,000 population between PEN-implemented and non-implemented districts. There was slightly higher reporting from October 2018 to August 2019, then after the reporting was not different between PEN implemented and non-implemented districts. Around the first (March 2020) and second (April 2021) COVID-19 wave in Nepal, we observed a decreasing trend in reported COPD cases in both PEN-implemented and non-implemented districts.

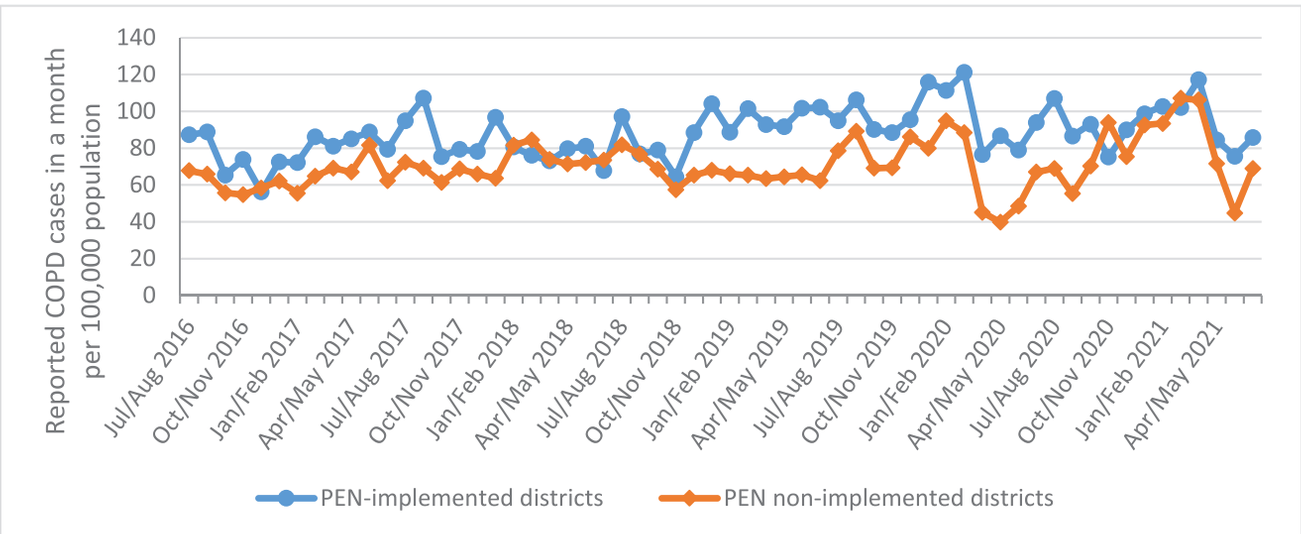

Figure 7. Monthly trend of COPD cases per 100,000 population in PEN-implemented and non-implemented districts From Jul/Aug 2016 to Jun/Jul 2021

Figure 8 compares five years monthly trend of reported asthma cases (per 100,000 population) in PEN-implemented and non-implemented districts reported from Jul/Aug 2016 to Jun/Jul 2021 (FY 2073/74 to 2077/78). Throughout this period, the reported asthma cases were slightly higher among PEN-implemented districts as compared to non-implemented districts. Around the first (March 2020) and second (April 2021) COVID-19 wave in Nepal, we observed a decreasing trend in reported asthma cases in both PEN-implemented and non-implemented districts.

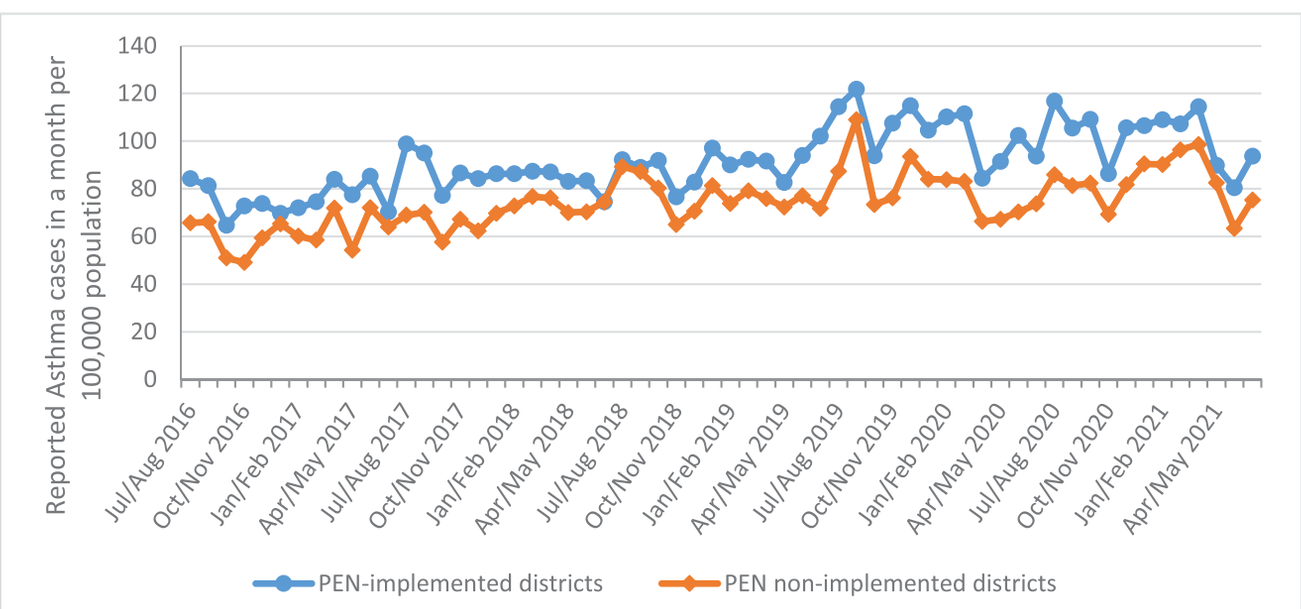

Figure 8. Monthly trends in asthma cases per 100,000 population in PEN-implemented and non-implemented districts From Jul/Aug 2016 to Jun/Jul 2021

Figure 9 compares five years monthly trend of reported suspected cervical/uteri cancer cases (per million women) in PEN-implemented and non-implemented districts reported from Jul/Aug 2016 to Jun/Jul 2021 (FY 2073/74 to 2077/78). Mainly, PEN non-implemented districts reported a higher number of cases as compared to PEN-implemented districts. During this time period, among the PEN-implemented districts, most cases of suspected cervical/uteri cancer cases were reported from Chitwan and Kaski. Among non-implemented districts, mostly Lalitpur reported higher suspected cervical/uteri cancer cases, which might be due to a screening program in Lalitpur. In non-implemented districts, around the first (March 2020) and second (April 2021) COVID-19 wave, we observed a decreasing trend in reported suspected cervical/uteri cancer cases.

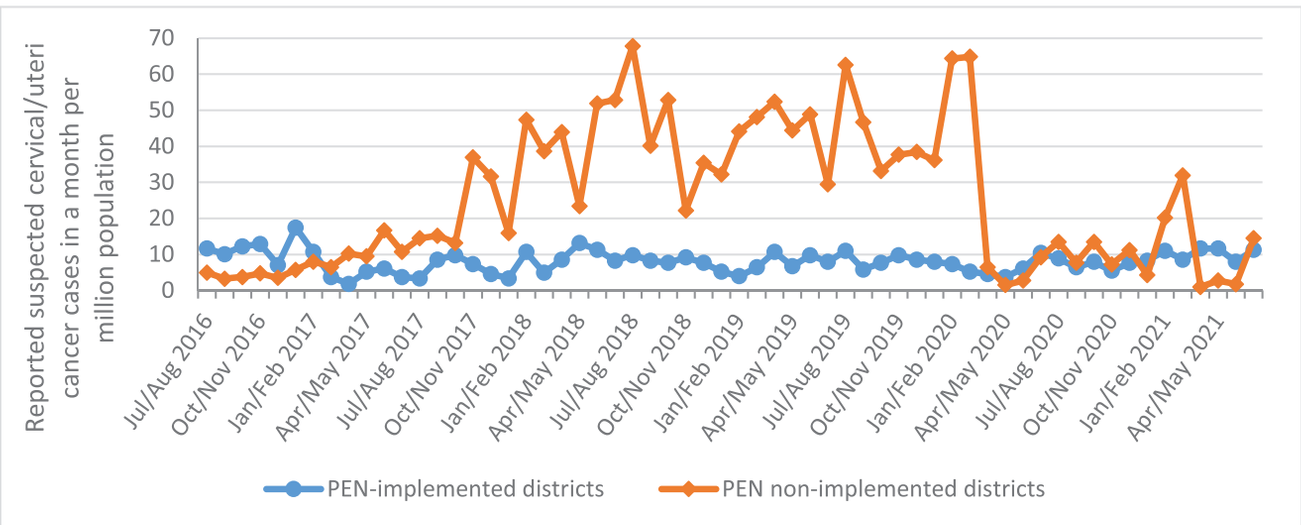

Figure 9. Monthly trend in reported suspected cervical/uteri cancer per million female population in PEN-implemented and non-implemented districts From Jul/Aug 2016 to Jun/Jul 2021 (FY 2073/74 to 2077/78)

Figure 10 compares five years monthly trend of reported suspected breast cancer cases (per million women) in PEN-implemented and non-implemented districts reported from Jul/Aug 2016 to Jun/Jul 2021 (FY 2073/74 to 2077/78). There was not much difference in reported cases of suspected breast cancer between PEN implemented and non-implemented districts, except in June 2019 that shows a peak in reported cases in PEN non-implemented districts which was much higher than PEN implemented districts. This might be due to reporting from Lalitpur district, that reported 88 percent of suspected breast cancer cases from non-implemented district.

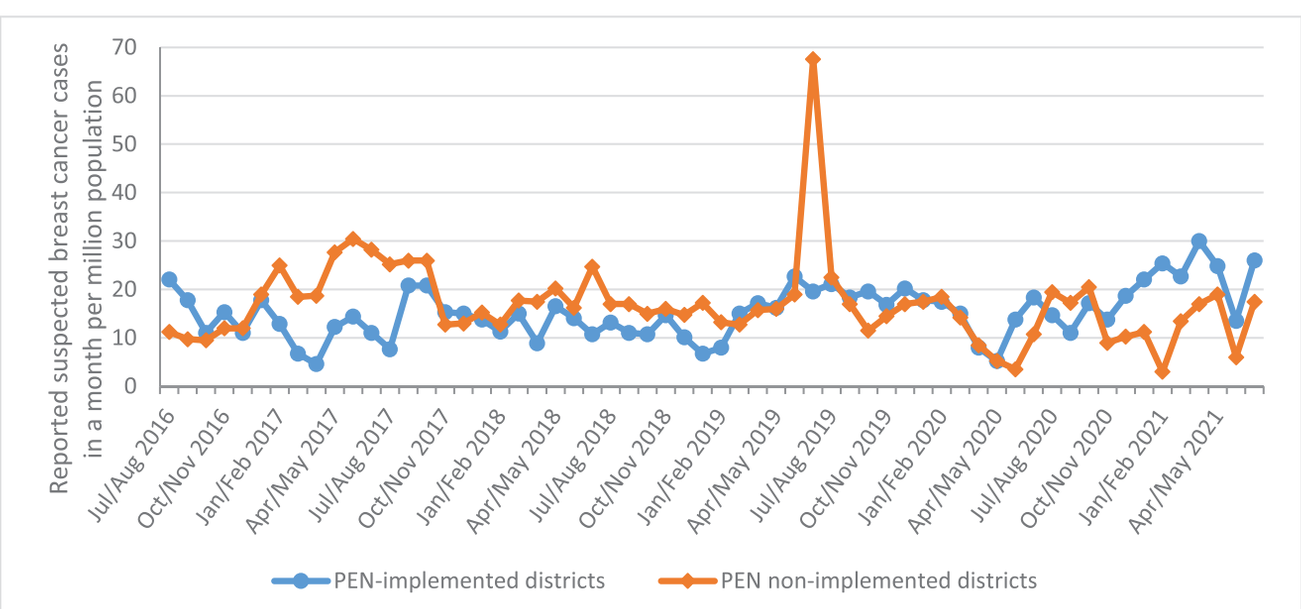

Figure 10. Monthly trend in reported suspected breast cancer cases per million female population in PEN-implemented and non-implemented districts From Jul/Aug 2016 to Jun/Jul 2021

PART IV: FACILITATORS AND BARRIERS TO IMPLEMENTING PEN PROGRAM AT PRIMARY HEALTHCARE AND COMMUNITY LEVELS

FACILITATORS AND BARRIERS TO PEN IMPLEMENTATION: HA'S AND HSPS' PERSPECTIVE

Facilitators to PEN implementation

Social health insurance: Many health authorities and service providers expressed that the social health insurance scheme improves availability of services in primary health care centers, specifically free laboratory services for diabetes patients. In addition, health insurance also improves the availability of medicine by ensuring regular supply of essential medicine and purchasing other necessary medicines, all of which are then made available free of cost to the NCD clients. Health authorities, therefore, emphasized to scale up the insurance program to health posts for improving PEN implementation.

> *"Health insurance ensures availability of drugs, HSPs and increases service utilization among the patients."* (HA21, PHO, Department of Health Services)

> *"In order to fulfill NCD patients' demands for medicines, we have liaised with the insurance board. Considering the high burden of hypertension, the insurance board now reimburses the cost of amlodipine tablets in our municipality."* (HA1, PHO, Municipality Office)

Peer discussion sessions: Some PEN-trained HSPs mentioned that peer discussion with their fellow health workers improved communication and support to deliver PEN protocols and enhanced a shared responsibility towards delivering PEN programs in their health facilities. Some of the health care providers mentioned that after the discussion, those who are not trained in PEN have also started delivering PEN services by self-learning; and orienting female community health volunteers (FCHVs) on PEN have also helped disseminate about the PEN program in the community. These discussions could be done in either formal or informal settings.

> "*Peer discussion has allowed untrained staff to provide PEN services even in the absence of PEN-trained HSPs.*" (HSP39, Health Assistant, HP)

> "*During our monthly meeting sessions, the health facilities in-charge orient the Female Community Health Volunteers (FCHVs) about NCD prevention and control. The FCHVs further educate the mothers' group about NCDs and the PEN program. In this way convey our message to the larger communities.*" (HA19, Health Coordinator, Municipality Office)

Decentralization of power to the local government: Many participants said federalization supported PEN implementation because the local governments could purchase essential medicines and supplies needed for their health facilities, when there is a supply shortage in the health system. Some health authorities reported federalization had delegated capacity building, logistics, and monitoring responsibilities to the local level, making the health system more responsive to the needs of the people. Several HSPs cited support from the local government as one reason for the increased availability of medicines in their health facilities. Some of them mentioned having better availability of diagnostic equipment to manage NCD patients, particularly in the PHCCs post-federalization.

> "*After federalization, the provincial and local governments are no longer dependent on the central government for training logistics, recording and reporting tools, NCD reporting, and service scale-up. The programmatic responsibilities of these units of government can make services people-centered and more apt to the present condition.*" (HA21, PHO, Department of Health Services)

Availability of a standard guideline as a reference: Some HSPs shared availability of standard protocols for NCD patient management has made notable differences in clinical practice. One HSP mentioned he found the CVD risk estimation chart in PEN protocol 1 helpful in outlining the treatment plans.

However, during our visit printed copies of CVD risk estimation charts were not available in most health facilities. Some motivated HSPs said they found a digital copy of CVD risk prediction charts, printed and laminated it, and used it.

> "*As the CVD risk estimation chart has been universally accepted to identify CVD risk in low-resource settings, I've been using it to calculate CVD risk in 60-70% of all patients visiting the outpatient department of the health facility.*" (HSP9, MO, PHCC).

> "*Everything is clearly mentioned in the Nepali language. Whenever I have any confusion, I consult the manual.*" (HA11, Health Officer, District)

Existence of other NCD related programs: Several participants said organizing community awareness campaigns specific to NCD such as: "Mukhya Mantri, Jestha Karyakram" and "Ma Swasthya, Mero Desh Swasthya", have helped raise awareness about NCDs, and pooling resources to screen and detect NCD patients in the community, hence, positively supporting PEN implementation.

> "*Our PHCC runs outreach clinics through which we offer blood pressure monitoring and blood sugar tests to the communities. We also counsel NCD patients for the adoption of healthy behavior and raise awareness in the communities by mobilizing our FCHVs.*" (HSP16, Sr. ANM, PHCC)

> "*Every year we allocate a budget for the senior citizenship program and conduct door-to-door screening for HTN and DM and counseling to the senior citizens. For marginalized and vulnerable groups, we conduct various screening camps for TB. In addition to microscopical examination of sputum, we provide counseling services for COPD patients.*" (HSP33, Health Assistant, HP)

PEN training: Several HSPs said receiving PEN training motivated them to provide NCD services. Some of them described how they conducted health education and screening campaigns in the communities by applying the skills learned during training. (HSP14, Sr. AHW, PHCC).

> "*On the occasion of World Health Day, PEN-trained HSPs organized screening campaigns in Khadhbari municipality where nearly 350 people were screened for raised blood pressure and diabetes.*" (HA9, PHO, Health Office)

Barriers to PEN implementation

Inadequate medical supplies: Several participants identified inadequate medicines and equipment as a major challenge to the smooth implementation of the PEN program. They said equipment used for general health checkups such as BP set, and weighing machine were available, but NCD-specific equipment such as glucose meters, blood glucose, urine test strips, and peak flow meters were not. A major reason for inadequate supply was lack of logistics planning during PEN training. Another reason for inadequate medical supplies was lack of communication between different level of governments, for example, one PHO reported that the medicine supplies through the federal government run out within months and are not replenished by local or federal government due to poor coordination between them.

> "*Health facilities have run out of test kits. Initially, medicines and equipment were supplied by the central government, but now in the new federal structure, medicines are procured at all levels of government. There is poor coordination between these tiers of government.*" (HA15, Sr. PHO, Health Office)

> "*There are many cases of HTN and DM in our community, but we don't have enough medicines to dispense to these patients. As a result, NCD patients' flow in our health facility has declined.*" (HSP46, Sr. AHW, HP)

> "*The Provincial supply center is unable to provide medicine on time. Although the local government also has certain funds allocated to purchase medicines, the budget is insufficient to run all the programs.*" (HA19, Health Coordinator, Municipality Office)

Inadequate human resource: Many participants mentioned inadequate human resources for PEN service delivery. First, there is inadequate human resources in general due to unfilled positions. And second, even though the government strategically trained at least one health service provider from each facility to be trained in PEN, transfer of PEN trained health service providers to other institutions has contributed to inadequate trained HSPs.

> "*Medical officers and other paramedics don't like to stay at rural health facilities. Poor staff retention is one of the main reasons behind unfulfilled sanctioned posts … to deliver the PEN program.*" (HSP44, Sr. AHW, PHCC)

> "*All the health assistants working in our district, who were originally from the east, got transferred … Nearly 60 out of 78 health facilities reported turnover of staff after federalization.*" (HA2, PHI, Health Office)

> "*Due to high staff turnover after federalization, our health centers lack trained human resources and NCD services are being provided by the untrained AHW and ANMs.*" (HA20, Public Health Inspector, Municipality Office)

The participants felt insufficient numbers of PEN health workers were trained on PEN, emphasizing the need to train nursing staff as well to ensure sufficient staff to provide NCDs services.

> "*Most of the available HSPs in their health facility are nursing staff (staff nurse and ANM), and lack of training for nursing staff has negatively impacted the NCD care in their health facility.*" (HSP1, PHI, HP)

> "*I think most of my colleagues haven't received PEN training. If every health service provider provides PEN training then it will be easy for us to provides PEN services.*" (HSP46, Health Inspector, Health Office)

Excessive workload of existing human resources: The HSP mentioned there is a growing demand for NCD services but the health facilities are unable to provide the services due to the current workload of the existing staff. Several of them complained of being overburdened from overseeing multiple programs including PEN, maternal and newborn health, and other communicable diseases (e.g. tuberculosis, leprosy). Some mentioned about the overburden due to clinical and administrative responsibilities. One HSP pointed out that although nursing staff received PEN training they mostly provide reproductive health services. In one health facility HSP mentioned that he already forgot what he learned during PEN training as he hasn't got the opportunity to manage NCD patients in his practice due to workload of other health programs. (HSP38, Health Assistant, PHCC).

> "*In …. PHCC, the HSPs have to provide services to over 150 patients coming to OPDs every day and they are providing ongoing services… there is no time for providing additional services.*" (HA1, PHO, Municipality Office)

> "*I'm responsible for delivering OPD services and have to oversee all administrative works. This can be very confusing and I feel overburdened.*" (HSP38, Health Assistant, PHCC).

Inadequate NCD recording and reporting tools: Several HSPs reported not receiving PEN-specific recording and reporting tools such as the NCD register, NCD OPD card, and NCD reporting form. Some HSPs, even those who were trained on PEN were not aware of separate recording and recording requirements. One HSP said that they had some NCD OPD cards lying around but confessed to having "forgotten" to use them due to irregular supply. Several participants wished for a regular supply of recording and reporting tools as they believed a good recording and reporting system would inform program implementation.

> *"I think many of our health service providers have seen these recording and reporting forms and formats of PEN program like PEN register, NCD monthly reporting form and NCD OPD card only*

during the PEN training period. After the training, these tools were never supplied in their health facilities. Due to this we couldn't implement the PEN program effectively." (HA15, Sr. PHO, Health Office)

"PEN specific separate recording and reporting tools are not available; instead we use general HMIS recording and reporting forms to report NCD data. I have requested for PEN specific recording and reporting tools several times but they haven't supplied yet." (HSP06, HA, PHCC)

During training, we were told that recording and reporting tools would be supplied after the training but till date we haven't got any of those tools. For samples; we have 1-2 NCD opd cards but we don't even know how to use them as we have never used them. (HSP24, Sr. AHW, PHCC)

Double reporting: Some HCP mentioned that PEN recording and reporting tools were cumbersome as it required reporting twice. They emphasized the need to integrate PEN recording and reporting into the HMIS system.

"*I'm already overburdened with other general recording and reporting tasks. Using the NCD register, NCD OPD card, and NCD monthly reporting form is like reporting the same thing twice, and doing so is almost impossible.*" (HSP9, MO, PHCC)

"*We don't have a separate system for keeping records of NCD data. However, health officers are keeping records of hypertension and diabetes in the morbidity section of HIMS.*" (HA11, Health Officer, District)

"*We have a separate NCD register and we maintain the recording and reporting using NCD tools. However, keeping a separate record of NCD data is of no use until and unless we integrate it in HMIS.*" (HA8, Health Coordinator, Municipality

Low priority and insufficient budget: Many health authorities and health care providers felt that the NCDs were not prioritized, and having low budget allocation for the PEN program was an indication of low priority to NCD. Many reported insufficient budget to implement the PEN program, specifically for providing PEN training and logistical support to health facilities. Furthermore, some reported that the already insufficient funds for NCDs were diverted to COVID-19 management during the pandemic.

"*If we see the budget breakdown, we can easily observe that NCDs are not prioritized.*" (HA5, NCD Field Coordinator, Karnali Province)

"*Nearly 5 to 10 lakhs Nepalese rupees are allocated for the purchase of the medicine, we have to limit our expenses within this budget.*" (HA11, Health Officer, District)

Effect of COVID-19: COVID-19 negatively affected PEN service provision. Fear of getting COVID-19 and government induced lock-down discouraged clients to visit the health facilities for getting care and refilling medicines. Many mentioned COVID-19 pandemic delayed planning, monitoring, and implementation of the PEN program as the budget and human resources were used to transfer to combat COVID-19. Health authorities particularly stated that COVID-19 delayed PEN training due to inadequate funding.

"COVID-19 has highly impacted the PEN program….During the last quarter of the fiscal year the government released funds for program implementation and training of the health service providers. But due to COVID, funds were not available and we couldn't scale up the PEN program to the new districts." (HA5, PEN Field Coordinator, WHO)

"This year the budget available for the procurement of these supplies was used in COVID related activities and thus we couldn't procure necessary medicines and other logistics (for the PEN program)." (HA5, PEN Field Coordinator, WHO)

"*I have noticed a decrease by more than half in the flow of patients after the COVID. Most of them did not come for the follow-up visits due to the fear of contracting COVID. I guess they had bought medicines from somewhere else.*" (HSP19, Public Health Inspector, HP)

Inadequate PEN/NCD specific monitoring and supervision: Almost all participants reported not having monitoring and supervision (M&S) visits for PEN program. The provincial authority stated that they are planning to conduct monitoring and supervision after all the PEN training is completed and agreed no systematic monitoring and supervision is currently planned or conducted.

"*M&S visits are mostly conducted targeting other health programs (not PEN) program, like family planning, nutrition, maternal and child health, tuberculosis, etc. Some health authorities shared future plans for monitoring and supervision of PEN.*" (HSP14, Sr. PHO, PHCC)

"*We are still in the training phase of PEN implementation. We are processing the procurement of essential medicines and equipment for PEN. We will conduct monitoring and supervision visits after conducting some batches of training sessions and distributing medical supplies to health facilities… We have even allocated a separate budget for monitoring and supervision.*" (HA3, Sr. Province Officer, Provincial Office)

Inadequate community engagement for PEN/NCD services and awareness: Many health service providers mentioned about not conducting PEN/NCD-specific community level programs resulting in low awareness regarding PEN in the community. Some mentioned organizing awareness programs in school and providing hypertension and diabetes screening and counseling services through outreach clinics sometimes.

"*We don't organize any special awareness/community engagement programs- but usually provide health education and counseling to the patients visiting OPD. Sometimes, we conduct a health education program in the schools.*" (HSP1, PHI, Health Assistant)

Health illiteracy: Some stated low health literacy among the patients as a major barrier to NCD service utilization resulting in poor adherence to treatment regimen and follow-up plans by NCD patients.

"*NCD patients are not aware that they have to take medicines for the long term. They discontinue the treatment and don't come for follow-up visits.*" (HA3, Sr. Provincial Officer, Provincial Office)

"*NCD patients in our communities have poor knowledge regarding their disease condition. They avoid taking NCD medicines due to the fear of taking them for a lifetime. They also have misconceptions regarding the side effects and organ damage that medicines can cause in the long run. Even patients who need to initiate medicine therapy opt for lifestyle management.*" (HSP12, Sr. ANM, HP)

Table 1: Socio-demographic characteristics of participants (n=35)

Characteristics	Frequency (percent)
Age (Mean ± SD)	61.3 ±13
Sex	
Female	19 (54.3)
Male	16 (45.7)
Education level	
No formal education	16 (45.71)
Basic Literacy	10 (28.57)
Primary education	1 (2.85)
Secondary education	6 (17.14)
Higher education	2 (2.85)
Family structure	
Nuclear family	10 (28.5)
Joint/extended family	25 (71.4)
Health facility visited	
Primary Health Care Center	11 (31.42)
Health Post	24 (68.57)
Type of NCDs	
Hypertension	22 (62.9)
Diabetes Mellitus	6 (17.1)
COPD	2 (5.7)
Hypertension and Diabetes	3 (8.6)
Hypertension and COPD	2 (5.7)

Facilitators to service utilization by clients

Acceptability: Acceptance and satisfaction were reported as main facilitators of NCD service utilization. Most of the participants who are receiving NCD services expressed acceptance and satisfaction with the service they have received from their respective health facilities. The major reasons that were reported for satisfactory services were free consultation and free medicines. While some felt the services were not as good as they were in the past because of the periodical medicine shortages in the health facilities.

> *"They are knowledgeable... and we are happy with the services received from them. After the health post was built in our village, it has been very easy and helpful for us."* (Pt6, 66 years, female, HTN, Health post)

> "*Health services and medicines are available at free cost, therefore, I am satisfied with them.*" (Pt11, 50 years, Female, DM, PHCC)

> "*When the medicines were available in the health post, the service was okay.*" (Pt12, 66 years, Male, HTN, HP)

Accessibility: Geographical and financial access were important factors for NCD service utilization. Clients visit health facilities regularly when it is near and geographically easy to reach such as having good roads or bridges. Free consultation and free medicines were another major facilitator as clients reported to use the health services when they are available at low cost or no cost. For example, clients from primary health care centers (PHCs) specifically mentioned that health insurance coverage allows them to have free consultation, medicine, and laboratory tests in PHCs. However, NCD services were limited to blood pressure screening and medicines at health post, where social health insurance is not

implemented. They are mostly referred to higher centers for laboratory investigations and medicines, which need additional cost for transportation and travel.

> "*The health post comes under our ward/municipality and also, it is near my house so when I have free time I can come here because it is near, we are receiving health services from here.*" (Pt18, age missing, Male, DM, HP)

> "*It is good to have some service rather than nothing…we have to take this medicine on a daily basis, and we have been saving 1000-1200 rupees per month.*" (Pt18, age missing, Male, DM, HP)

> *"I come to the HF for refilling my medicines whenever my medicines finish.*" (Pt15, 71 years, Male, HTN & COPD, HP)

Accessibility and availability of medicine and services: Availability of free medicines, free health checkups, screening of health conditions are the prime factors for patients to seek the treatment from the health facilities. Provision of medicines and presence of health care providers motivated the NCD patients to visit the health facility. Subsidized laboratory services at the PHCCs and coverage of medicines and treatment cost through social health insurance have contributed to motivating NCDs for the utilization of the NCD services. Availability of medicine was a key factor for patients to visit the health post. Few patients cited service providers and medicines are usually available in the health facilities, and in cases when medicines run out they are informed when the supply will be resumed. However, most said they get medicines for 1 to 3 months depending on availability of medicine in the health facilities. The fact that the patients were able to access NCD services such as hypertension screening, health education and counseling, laboratory tests (when available), medicines for hypertension and diabetes, and referral to tertiary health facilities motivate patients to seek care from their health facility.

> *"Yes, it is accessible. We don't have to pay for the checkups. And also, we get medicine for free. But, if we go to the nursing home, we have to pay the doctor's fee….. In comparison to other medicines, it is expensive. Sometimes, when the medicines run out, they (health workers) inform us and let us know the date of arrival.*" (Pt18, age missing, Male, DM, HP)

> *"Medicine is available here, it has been one year I have been taking medicine from here, and previously I used to buy medicines from outside.*" (Pt17, 52 years, Female, HTN & DM, HP)

> *"The health post which is close to my home doesn't have doctors so I utilize health services from this facility due to the availability of doctors.*" (Pt11, 50 years, Female, DM, PHCC)

Less waiting time: One of the factors that facilitated NCD service utilization was reasonable and practical waiting time of about 30 minutes per visit for clients. Several clients from both PHC and health post reported that they do not have to wait for a long time to receive services – getting consultation, health examination and medicine dispensing – that motivated them to continue to receive service at the health facility.

> "*HSPs provide the emergency services timely and regular.*" (Pt4, 63 years, Male, DM, HP)

> *"I get the services on time, I don't have to wait, they respond immediately. Services are provided timely, there have not been times when I had to return without getting checkups, someone is always available.*" (Pt5, 92 years, Male, HTN, PHCC)

> *"The services are provided timely. Even when the health post is closed, I go to their room which is in the same building and get the medicines. They provide medicine for 3 days and ask to come visit every 3 days. I come here every 3 days.*" (Pt8, 67 years, Male, HTN & COPD, HP)

Positive experience in Interaction with service providers: Another factor in motivating patients to the services utilization was the positive behavior of service providers such as being friendly, polite and supportive. These behaviors helped them feel comfortable and build trust with their service providers.

Many clients also shared that they felt better and motivated to use service when they received advice on medicine, regular checkup, eating healthy, and avoiding alcohol and tobacco from HSPs after being diagnosed.

> "*The HSPs provide advice to avoid oily and spicy foods, fatty meats. They helped me to be updated about my health. If my blood pressure reading is high, they suggest the dos and don'ts to improve our health and encourage me to take medicine.*" (Pt6, 66 years, Female, HTN, Health post)

> *"When I have a high BP, they suggest I come to health post daily. If the reading is high, they ask me to rest well, like for an hour or so, in the facility so that I won't faint on the way.*" (Pt27, 61 years, HTN, Female, HP)

> *"The service providers provide advice like avoid oily and spicy foods, fatty meats. The health service providers help me to be updated about my health status. If my reading is high, they suggest the do's and don'ts to improve our health and encourage me to take medicine."* (Pt6, 66 years, Female, HTN, HP)

> *"They are very helpful, respond nicely. They do not behave rudely. Doctor is very good here.*" (Pt29, age missing, Female, HTN, HP)

Most patients frequented the health facilities as they were satisfied with the NCD services. The main reason was close distance and well behaved HSPs, who listened to their concern. Similarly, another motivating factor for seeking NCD care from the health facility was availability of the social health insurance scheme that covers cost of care and availability of medicine adequately.

> "*HSPs' behavior, counseling sessions, and available services all are satisfactory.*" (Pt4, 63 years, Male, DM, HP)

> "*It feels like treatment/services will help me get better, I can rely upon the services available here. I am confident with the services provided from the health posts.*" (Pt5, 92 years, Male, HTN, PHCC)

Improvement in health condition: Experience of improvement in health after following the health provider's advice contributed positively to the utilization of services. Clients relate improvement in health to regular consultation, medicine adherence and following lifestyle modification recommendations. Many participants mentioned that they like to revisit health facilities when they receive dietary advice and lifestyle modification recommendations. Participants value the information from service providers and gain knowledge on the management of disease. Some mentioned that when their health care providers' advices work, they do not mind paying for medicines.

> "*The medicines from the doctor have improved my health and also, the counseling and advice on a diet like healthy foods, adding white meat instead of red meats, eggs, and more fluids, and avoiding hot spicy foods… I like coming back and consulting.*" (Pt7, Missing age, Female, HTN, PHCC)

> "*For 3 years, I have been taking medicine regularly. I adhere to the regular checks/follow as per the advice of HSPs.*" (Pt4, 63 years, Male, DM, HP)

> *"I do not smoke because I had a very bad cough when I used to smoke. Now, I have stopped smoking and eating tobacco.*" (Pt14, 76 years, Male, COPD, HP)

Self-Efficacy: Self efficacy contributed to adherence to NCD medication and behavior modification. Clients perceived susceptibility due to fear of complication and its consequences such as disability, vital organ failure, paralysis, or early deaths were motivating factors to NCD service utilization. Some cited that the perceptions and motivations for medicine adherence were also shaped by experiences with family members living with NCDs, taking care of them, or dying of NCDs. Family and peer support also added up positivity on the patients for management and improving their condition.

"I was told that once you start your medication you have to continue taking the medicine. If discontinued, it may cause you some disability or something like that. That's why I have been taking the medicine regularly." (Pt5, 92 years, Male, HTN, PHCC)

"When I am inactive, it gets boring and I get myself busy by doing household activities, i.e, cutting grasses. My sons ask me to take rest but involving myself in physical activities makes my body feel lighter." (Pt7, age missing, Female, HTN, PHCC)

Patient's symptoms: Majority of the clients described that the symptoms influence their decision to seek medical help to improve the utilization of services. The most common reported symptoms were dizziness, heartache, headache, breathlessness, fatigueness, difficulty breathing and walking, loss of appetite, tingly sensation in the body. Some patients identified no symptoms of NCDs and their disease was diagnosed while they visited the health facility for the treatment of their family members or through suggestions from their friends.

"I felt sick and went to the hospital for a checkup and then started medicine. I came to know about my condition after a checkup in the hospital." (Pt11, 50 years, Female, DM, PHCC)

"Because of the symptoms, I suspect that I might have high blood pressure, so I went to Beni District Hospital for a checkup, did ECG and confirmed high BP and started medication." (Pt3, 45 years, Female, HTN, HP)

"Dizziness, loss of appetite, body aches, headache, so I had gone for checkups experiencing all these symptoms." (Pt26, 46 years, Female, HTN, HP)

"When I came to know that I have high blood pressure, I was kind of scared of what it would be like. I have quitted drinking tea, tea escalates gastritis that's why I have quitted tea and now, it's been 3-4 years that i have not drank tea." (Pt7, age missing, Female, HTN, PHCC)

Patient's experience: Negative experience of family members suffering from extreme conditions propelled patients for the management of their disease, increasing the service utilization.

"I myself have experienced it, I have taken care of my grandmother for the past 12 years. I had to carry her inside and outside of the room/house. Once she fainted and she could not move half of her body."(Pt6, 66 years, Female, HTN, HP)

Knowledge of disease consequence and management: Knowledge about disease consequence was another key factor of service utilization. The basic knowledge of patients about their disease condition and impacts of the disease like aggravated symptoms after diagnosis (like being more stressful, a sense of discomfort) has encouraged them to utilize services. From the patient's perspective, development of fear of further complications like paralysis, kidney failure, disability or death, reflected an understanding of the need of regular monitoring, treatment and follow ups and medical adherence and lifestyle modification.

"My brother died from paralysis and I remember what he had to go through. One of my sisters-in-law, also, is suffering from paralysis. I think HTN leads to paralysis. I'm scared that I might die from paralysis too." (Pt2, age missing, female, PHCC)

"I was afraid that something bad would happen or I might be disabled so, I thought I had to take medicine and started taking medicine." (Pt7, age missing, female, HTN, PHCC)

Self-awareness: Patients, being aware of their own disease was a key factor to influence them to adhere to medication and health care and visit health facilities for regular follows. Avent of NCD related symptoms steered some participants to start taking care of themselves and become health conscious. Several participants were conscious about their health and committed to adhering to the recommendations of service providers, like adhering to medicine, healthy food consumption, and doing physical activity, thus, greatly facilitated in accessing the utilization of services from the health facilities.

"I have noted that my blood pressure increases if I get stressed out when there is conflict at home." (Pt10, Female, HTN & DM, PHCC)

"*We might get affected negatively if we do not take medicines on time.*" (Pt11, 50 years, Female, DM, PHCC)

"*If we are advised to get checked, we should follow the advice and go check at the health post and adhere to medication. If we don't follow the instructions of HSPs that's our loss. While they do not call us for follow-ups and remind us, we ourselves should take an interest and visit health facilities regularly. We should not eat which is not good for our health and does not help improve our health condition.*" (Pt6, 66 years, Female, HTN, PHCC).

Support from peers and family members: Moral support from the family members, friends and neighbours motivated patients to initiate treatment and start medication. Their support was not limited but for adherent behaviour, bringing or refilling medicines, reminding them to take medicines, and preparing meals and covering household chores. The aid and encouragement were identified as being beneficial for participants to adhere to the recommendations to manage their condition.

"*My husband took me to the Nepalgunj Hospital for treatment, got medicine, and after taking the medicine, it felt better. He always takes me to the health facilities for checkups.*" (Pt2, age missing, Female, HTN, PHCC)

"My daughter asked me to come to her place and get checked-up, where they measured my pressure and then, I was diagnosed with high BP. My daughter also motivated me to take medicine. My neighbours are supportive and they ask about health, what I eat and how I am doing. My children ask me to take care of myself, keep myself cool, eat timely, and refill medicines on time." (Pt2, 66 years, Female, HTN, PHCC)

"My friends are supportive too. They advise what I should do and what I should not do. Many of my friends have been suffering from high blood pressure, so we share information with each other. We go for morning walks together, play badminton which has been helpful to manage my health." (Pt18, age missing, Male, DM, HP)

Barriers to NCD service utilization by clients

Unavailability of medicine and services: The unavailability of medicines at the health facilities was among key factors mentioned as barriers for NCD service utilization. Majority participants shared the problems created with the unavailability of necessary NCD medicines and screening services. Patients who depended on free medicines expressed serious concerns with the irregular supply of medicines. Interruption in the regular supply of medicines was a major concern for the patients suffering from co-morbidities. Such situations compelled patients to purchase NCD medicines from private pharmacies making NCD management unaffordable to most patients and families. This also caused patient dissatisfaction. Some patients also mentioned the reasons for not seeking and discontinuing care were lack of lab facilities and skilled health workers and cost of care in the health facilities. Unavailability of health insurance schemes or difficulty of receiving care through the scheme were also reported reasons for poor utilization of services. Provision of medicines in the health center was highly appealed by the patients.

"*My brother passed away due to a lack of medicine; unavailability of medicine. Medicines for HTN are unavailable at this health post. The medicine is not available at the health post. I have to buy it.*" (Pt8, 67 years, Male, HTN & COPD, HP)

"*Unavailability of medicine in the health post. They say that they don't have the medicine for HTN, so I buy my medicine from the local pharmacy (medical store). They provide the prescription and I take it to buy the medicines.*" (Pt2, age missing, Male, HTN, HP)

"*We have been getting our medicines through an insurance scheme from Gandaki Hospital but we are old and cannot go there. Therefore, I have come here to ask if it is possible to get the medicines from this health post.*" (Pt5, 92 years, Male, HTN, PHCC)

"*Lab services like blood tests for DM (sugar) are not available at this health post, so we have to go to Beni Hospital. Medicine is not available easily and you have to travel long distances for it.*" (Pt4, 63 years, Male, DM, HP)

Inaccessibility & affordability: Inaccessibility was another factor that participants reported as a reason to least utilization of services. Patients cited difficult geographical terrain, long travel time, cost of travel made health care inaccessible in the remote areas depriving them from receiving proper treatment. Moreover, patients did not want to go under medication for several reasons such as expensive medicines, and unavailability or irregular supply of medicine. However, they also shared that geographical difficulties were the reasons for the unavailability of medicines.

"*It takes an hour to reach Beni Hospital. It takes an hour for locals and 2 hours or more for those who are not from around. It takes a whole day to reach Beni and it costs Rs. 200. That's a lot for us; bus fare, medicine costs, lunch expenses; the trip is very costly for us.*" (Pt4, 63 years, Male, HTN, HP)

"*During the monsoon/rainy season, due to heavy rain the roads are blocked.*" (Pt8, 67 years, Male, HTN & COPD, HP)

Lack of awareness: Amongst the majority of the patients lack of awareness about NCD related programs or PEN programs was a major barrier to service utilization. No information on the available services prevented many patients from utilizing the available NCD services in the facility. Several patients reflected the scantiness of education on their disease and its management. Patients complained of no knowledge about the disease and their condition discouraged them from being adherent to the recommendations from service providers or in some cases demotivated to visit the health facility or treatment.

"*There have not been any community programs or home clinics on NCDs to my knowledge. I am unaware of the PEN Program and PEN services.*" (Pt4, 63 years, Male, HTN)

"*I have had the symptoms for the disease almost 3-4 years ago. I did not have much information on the disease, so I got nervous earlier and avoided visiting the health facility earlier.*" (Pt18, age missing, Male, DM, HP)

Misconceptions about disease and treatment: Many participants were concerned about lifetime dependency on medicine and starting medication only after exhausting all other possible alternatives; traditional medicines and herbs. They lacked perceptions about the possible complications and severe effects of the disease delaying the treatment and medicine adherence. Because of the lack of perceived necessity of the medicine few patients reported discontinuing medication after symptoms got better. Few expressed fears of the side effects of medication demotivated them to continue taking medication.

"I didn't know about the drug information/medication, that the medicine I was given is for high blood pressure. If I had known that medicine for high blood pressure should be taken for lifelong, I think I would not have started it. Now, I cannot discontinue the medication, that's why I have been taking it." (Pt4, 63 years Male, DM, HP)

"*I came across my HTN condition 12/14 years back. I could not get cured with Dhami-Jhakri.*" (Pt13, 76 years, Male, HTN, HP)

Inadequate health information from service providers: Communication gaps between patient and health service providers were recognized as a barrier to NCD service utilization. There were some negative experiences mainly concerned with the limited time availability of doctors, inadequate information of their health conditions, especially in the PHCCs. Patients seemed frustrated that the service providers

did not provide adequate knowledge about the diseases or any counseling related to disease management. On the other hand, several others reported their service providers did not educate them on medication and lifestyle modification. Lack of follow ups or reminders to come for follow up visits from their service providers seemed to be another barrier to access health care services.

> "*It happened at night time, there was no doctor, Sister (nurse) attended and took care of me. They said nothing but wrote prescription medicine and we bought it. No, there have not been any counseling sessions from Health Service Workers.*" (Pt4, 63 years, Male, DM, HP)

> *"No information, I share about my difficulties and then give me medicine and I write it down. That's it. While sharing the symptoms and difficulties with the HSP, nobody gave information on the actual cause of high BP or cause of Asthma. I don't know what caused me to have HTN and Asthma, if HTN leads to Asthma or Asthma leads to HTN. There has not been much counseling on my health conditions from the health service providers. When they don't share about our health conditions, how can we know what happened to us.*" (Pt8, 67 years, Male, HTN & COPD, HP)

> "*I have not received any suggestions from HW for my condition (sugar, pressure). Doctors do not give much time for suggestions. They only ask what the reason is for our visit and write prescriptions. They do not talk much...*" (Pt17, 53 years, Female, HTN & DM, HP)

> "*No, counseling for follow-ups nor reminder or follow-up calls from the HSPs.*" (Pt8, 67 years, Male, HTN & COPD, HP)

Poor adherence to the advice from HSPs: Most patients faced difficulty in changing their lifestyles. Those advised to reduce oil, salt intake and consume less spicy diets struggled to change as it was difficult to adjust the way food is cooked at home just for one person, family members were not willing to compromise on taste. An older patient confessed to drinking alcohol a peg only in the night and believed it would not do badly when taken in small amounts.

> "*The advice during counseling sessions is not feasible to follow and I'm not following it. Modification practices are not possible to follow in time when you are the only person suffering from NCD, like food restrictions.*" (Pt4, 64 years, Male, DM, HP)

Impact of COVID-19: A few participants shared Covid-19 pandemic and lockdown contributed to unavailability of medicines, as patients feared contacting COVID virus during visit to the health facility.

> "*I could not get medicine earlier due to COVID. I was asked to visit HF for a follow-up visit in 2-3 months, however, I have not gone there. This is because at that time corona cases were high, so I did not want to visit the hospital due to the fear of contracting coronavirus.*" (Pt17, 52 years, Female, HTN & DM, HP)

POTENTIAL BIAS AND LIMITATIONS

The study has some limitations that need to be acknowledged. One of the limitations of this study is it only includes 31 PEN-implemented districts by FY 2018/19 (FY 2075/76 BS) and does not cover the districts where the PEN program has been implemented recently. Another limitation can be a recall or information bias, as some of the measurements/data in this study are based on recall and self-reports.

CONCLUSION AND RECOMMENDATION

The overall implementation of the PEN program in the primary health care setting was found to be deficient in terms of human resources, medical supplies, health information systems, service delivery, financing, and governance. Nearly 30 percent of the health facilities PEN trained HSPs were not available at all. Common NCDs drugs like amlodipine and metformin were available only in 47 percent and 10 percent of the health facilities. More than half of the health facilities didn't have glucometers and only one-quarter of them had urine protein strips available. Although the PEN program has a separate recording and reporting system, due to its unavailability, most of the health facilities were still using the general recording and reporting tools to report NCD data. Only one in five health facilities had an NCD register and even less (15%) had NCD monthly reporting form. Basic NCD diagnostic services like blood sugar tests and urine protein tests were unavailable in 65 percent and 74 percent of these health facilities respectively. The COVID-19 pandemic and restructuring of the governmental structure have greatly affected the program planning, implementation, monitoring, and evaluation. The alarmingly low monitoring and supervision visits from the higher authorities also aided the poor uptake of the PEN program by the health facilities. From the health authorities and health service provider's perspective, facilitating factors for PEN included: (a) Social health insurance (b) peer discussion sessions (c) decentralization of power to the local government (d) availability of a standard guideline as a reference (e) existence of other NCD related programs and (f) PEN training. The major barriers included: (a) inadequate medical supplies (b) inadequate human resource (c) excessive workload of existing human resources (d) inadequate NCD recording and reporting tools (e) double reporting (f) low priority and insufficient budget (g) effect of COVID-19 (h) inadequate PEN/NCD specific monitoring and supervision (i) inadequate community engagement for PEN/NCD services and awareness and (j) health illiteracy. From the patient's perspective, the major facilitators for PEN service utilization were: (a) acceptability (b) accessibility (c) accessibility and availability of medicine and services (d) less waiting time (e) positive experience in interaction with service providers (f) improvement in health condition (g) self-efficacy (h) client's symptoms (i) knowledge of diseases consequence and management (j) self-awareness and (k) support from peers and family members. The major barriers included: (a) unavailability of medicine and services (b) inaccessibility and unaffordability (c) inadequate health information from service providers (d) poor adherence to the advice from HSPs (e) misconception about disease and treatment (f) lack of awareness and (g) impact of COVID-19.

RECOMMENDATIONS

HUMAN RESOURCES

- About a third of primary health care facilities do not have PEN trained human resource. Therefore, government need to keep the track of health facility-wise PEN training and provide training to alternative human resources in case of transfer of PEN-trained staff. A self-paced online training platform for PEN implementation with additional motivation to complete the training program would help sustain the PEN knowledge.
- In addition to PEN, health workers need to be provided with more focused trainings on some clinical procedure such as cervical cancer screening and chest physiotherapy; as many reported that the regular PEN training is not sufficient to build these skills.
- Regular peer coaching and discussion sessions on PEN protocols should be conducted within the health facility level.
- A major barrier to NCD management was high workload of the current staff, creating a cadre of community health care worker (similar to village health worker for immunization, midwives for maternal health) is strongly encouraged. These community health care workers not only provide support to health facilities by sharing workload (such as counselling, monitoring blood pressure, lifestyle, medicine adherence, recording/ reporting, medicine adherence), will also serve as liaison between health care and community.

DIAGNOSTIC TESTS AND SUPPLIES

- Availability of diagnostic tests and procedures for Protocol-1, 3 and 4 are poor. The government needs to build these capacities at primary health care center and ensure regular supplies by integrating PEN supplies into logistic management information system and logistic division at MoHP.
- Expanding social health insurance to Health posts level can be a support for ensuring these facilities.

GUIDELINES

- Only 18 percent of the health facilities have PEN guidelines. PEN protocols in the form of wall mounted posters in all health facilities might enhance the use of protocol during patient management.

NCD INFORMATION SYSTEM

- Only 20 percent of the health facilities had NCD registers, 15 percent had NCD monthly reporting form, and 18 percent had OPD card. NCD forms and formats need to be integrated in national HMIS systems with the usual deadlines to prepare indicator wise reporting and submitting to higher institutions.
- PEN indicator needs to be presented and discussed in all levels of health facilities meeting during submission of HMIS reporting and online DHIS-2 reporting platform.
- PEN indicator needs to be presented and discussed in all health system review meetings.
- Referral forms should be supplied, and health workers should be trained on referral system and guidelines.

MONITORING AND SUPERVISION

- PEN program monitoring and supervision was poor from higher authorities found in the survey. Strong monitoring, supervision and feedback system should be introduced
- Internal evaluation and supervision should be performed regularly by the health facility in-charge to ensure the adherence of all staffs to the standard treatment guidelines (PEN guidelines).
- Separate budgets and timelines, at least every six months, need to be allocated for supervision and monitoring
- Local government health and/or social security section should monitor and supervise NCD care use and service delivery

FUNDING

- External sources of funding other than the Ministry of Health and Population (MoHP) for the PEN program were almost non-existent.
- Local government and provincial government should be systematically oriented regarding NCD disease burden and impact in Nepal and importance of PEN
- MoHP should partner with the other government programs such as health insurance program
- MoHP should partner with local and provincial government to advocate for prioritizing PEN program at local level.
- Local government should bridge the gap by funding programs to ensure availability of services, medicines, and equipment; as well as for monitoring and supervision.
- Local government can also fill the vacant sanctioned posts of human resources on contract basis.

COMMUNITY PARTICIPATION AND ENGAGEMENT

- Health facilities should increase community engagement activities targeting NCDs clients screening, lifestyle modification, and management.
- These awareness program should be part of the routine program delivery, rather than one- or two-time mass campaigns.
- FCHVs can be oriented and trained to deliver NCD related messages regularly in the community.

REFERENCES

1. World Health Organization. Non communicable diseases [Internet]. [cited 2022 Jun 24]. Available from: https://www.who.int/news-room/fact-sheets/detail/noncommunicable-diseases

2. World Health Organization. The global burden of disease : 2004 update. 2008 [cited 2022 Jul 13];146. Available from: https://apps.who.int/iris/handle/10665/43942

3. Bloom DE, Cafiero E, Jané-Llopis E, Abrahams-Gessel S, Bloom LR, Fathima S, et al. The Global Economic Burden of Noncommunicable Diseases [Internet]. PGDA Working Papers. Program on the Global Demography of Aging; 2012 Jan [cited 2022 Jun 19]. (PGDA Working Papers). Report No.: 8712. Available from: https://ideas.repec.org/p/gdm/wpaper/8712.html

4. Nepal Health Research Council (NHRC), Ministry of Health and Population, Monitoring Evaluation and Operational Research (MEOR). Nepal Burden of Disease 2017: A Country Report based on the Global Burden of Disease 2017 Study [Internet]. Kathmandu, Nepal: NHRC, MoHP, and MEOR; 2019. Available from: http://nhrc.gov.np/wp-content/uploads/2019/04/NBoD-2017_NHRC-MoHP.pdf

5. Mishra SR, Neupane D, Bhandari PM, Khanal V, Kallestrup P. Burgeoning burden of non-communicable diseases in Nepal: a scoping review. Global Health. 2015 Jul 16;11:32.

6. M D, Kb K, Sk S, Kk A, N S, A P, et al. Prevalence of Selected Chronic Non-Communicable Diseases in Nepal. Journal of Nepal Health Research Council [Internet]. 2019 Nov 14 [cited 2022 Jul 17];17(3). Available from: https://pubmed.ncbi.nlm.nih.gov/31735938/

7. Jha AK, Chapagain S, Dhimal M, Subedi R, Kafle U, Thakur C, et al. Population Based Cancer Registries at Kathmandu, Bhaktapur, Lalitpur, Siraha, Saptari, Dhanusha, Mohattari, West rukum and East Rukum Districts, Nepal-2018. Nepal Health Research Council; 2018.

8. Bista B, Dhimal M, Bhattarai S, Neupane T, Xu YY, Pandey AR, et al. Prevalence of non-communicable diseases risk factors and their determinants: Results from STEPS survey 2019, Nepal. PLoS One. 2021;16(7):e0253605.

9. Cecchini M, Sassi F, Lauer JA, Lee YY, Guajardo-Barron V, Chisholm D. Tackling of unhealthy diets, physical inactivity, and obesity: health effects and cost-effectiveness. Lancet. 2010 Nov 20;376(9754):1775–84.

10. Ss L, T V, Ad F, G D, K S, H AR, et al. A comparative risk assessment of burden of disease and injury attributable to 67 risk factors and risk factor clusters in 21 regions, 1990-2010: a systematic analysis for the Global Burden of Disease Study 2010. Lancet (London, England) [Internet]. 2012 Dec 15 [cited 2022 Jun 3];380(9859). Available from: https://pubmed.ncbi.nlm.nih.gov/23245609/

11. Beaglehole R, Bonita R, Horton R, Adams C, Alleyne G, Asaria P, et al. Priority actions for the non-communicable disease crisis. Lancet. 2011 Apr 23;377(9775):1438–47.

12. He FJ, Jenner KH, Macgregor GA. WASH-world action on salt and health. Kidney Int. 2010 Oct;78(8):745–53.

13. Warburton DE, Charlesworth S, Ivey A, Nettlefold L, Bredin SS. A systematic review of the evidence for Canada's Physical Activity Guidelines for Adults. Int J Behav Nutr Phys Act [Internet]. 2010 May 11 [cited 2022 Jun 3];7:39. Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3583166/

14. Hall JN, Moore S, Harper SB, Lynch JW. Global variability in fruit and vegetable consumption. Am J Prev Med. 2009 May;36(5):402-409.e5.

15. Asaria P, Chisholm D, Mathers C, Ezzati M, Beaglehole R. Chronic disease prevention: health effects and financial costs of strategies to reduce salt intake and control tobacco use. The Lancet [Internet]. 2007 Dec 15 [cited 2022 Jun 3];370(9604):2044–53. Available from: https://www.sciencedirect.com/science/article/pii/S0140673607616985

16. Ginsberg GM, Lauer JA, Zelle S, Baeten S, Baltussen R. Cost effectiveness of strategies to combat breast, cervical, and colorectal cancer in sub-Saharan Africa and South East Asia: mathematical modelling study. BMJ [Internet]. 2012 Mar 2 [cited 2022 Jun 3];344:e614. Available from: https://www.bmj.com/content/344/bmj.e614

17. Kivimäki M, Shipley MJ, Ferrie JE, Singh-Manoux A, Batty GD, Chandola T, et al. Best-practice interventions to reduce socioeconomic inequalities of coronary heart disease mortality in UK: a prospective occupational cohort study. Lancet. 2008 Nov 8;372(9650):1648–54.

18. World Health Organization. Tackling NCDs: "best buys" and other recommended interventions for the prevention and control of noncommunicable diseases [Internet]. World Health Organization; 2017. Available from: https://apps.who.int/iris/bitstream/handle/10665/259232/WHO-NMH-NVI-17.9-eng.pdf

19. World Health Organization. Global status report on noncommunicable diseases 2010 [Internet]. World Health Organization; 2011 [cited 2022 Jun 3]. Available from: https://apps.who.int/iris/handle/10665/44579

20. Department of Health Services, Ministry of Health and Population, Government of Nepal. Annual Report- 2074/75 (2017/18) [Internet]. 2019. Available from: https://dohs.gov.np/wp-content/uploads/2019/07/DoHS-Annual-Report-FY-2074-75-date-22-Ashad-2076-for-web-1.pdf

21. Department of Health Services, Ministry of Health and Population, Government of Nepal. Annual Report- 2075/76 (2018/19) [Internet]. 2020. Available from: https://dohs.gov.np/wp-content/uploads/2020/11/DoHS-Annual-Report-FY-075-76-.pdf

22. Government of Nepal. Multisectoral Action Plan for the Prevention and Control of Non Communicable Diseases (2014-2020) [Internet]. Government of Nepal; 2014. Available from: https://www.who.int/docs/default-source/nepal-documents/multisectoral-action-plan-for-prevention-and-control-of-ncds-(2014-2020).pdf?sfvrsn=c3fa147c_4

23. World Health Organization. Country Office for Nepal. [Package of essential non communicable disease (PEN) intervention at primary health service setting: PEN training trainee's manual] [Internet]. World Health Organization. Country Office for Nepal; 2019 [cited 2022 Jun 3]. Available from: https://apps.who.int/iris/handle/10665/310930

24. Department of Health Services, Ministry of Health and Population, Government of Nepal. Annual Report FY 2077/78 (2020/21) [Internet]. [cited 2022 Jul 17]. Available from: https://dohs.gov.np/annual-report-fy-2077-78-2019-20/

25. Aryal BK, Daud M, Thapa A, Mahotra A, Ale Magar S, Malla CK. Assesssment of Health Facilities for Implementation of Non-communicable Disease Package. J Nepal Health Res Counc. 2018 Jul 3;16(2):149–55.

26. Schoonenboom J, Johnson RB. How to Construct a Mixed Methods Research Design. Kolner Z Soz Sozpsychol. 2017;69(Suppl 2):107–31.

27. Cochran, W. G. Sampling Techniques. 2nd ed. New York: John Wiley and Sons, Inc; 1963.

28. Health system building blocks [Internet]. [cited 2022 Jul 13]. Available from: https://extranet.who.int/nhptool/BuildingBlock.aspx

29. Hennink MM, Kaiser BN, Marconi VC. Code Saturation Versus Meaning Saturation: How Many Interviews Are Enough? Qual Health Res [Internet]. 2017 Mar 1 [cited 2022 Jun 12];27(4):591–608. Available from: https://doi.org/10.1177/1049732316665344

30. Green EC, Murphy EM, Gryboski K. The Health Belief Model. In: The Wiley Encyclopedia of Health Psychology [Internet]. John Wiley & Sons, Ltd; 2020 [cited 2022 Jun 16]. p. 211–4. Available from: https://onlinelibrary.wiley.com/doi/abs/10.1002/9781119057840.ch68

ANNEX

ANNEX 1: LIST OF PEN IMPLEMENTING DISTRICTS BY THE FY 2018/19 (2075/76 BS)

Provinces	Districts implementing PEN (FY 2018/19)	Sampled districts
Province 1	Illam, Jhapa, Solukhumbu	Ilam, Jhapa
Madhesh	Rautahat, Mahottari, Parsa	Parsa, Mahottari
Bagmati	Makwanpur, Chitwan, Dhading, Nuwakot, Bhaktapur, Sindhuli	Chitwan, Nuwakot
Gandaki	Baglung, Myagdi, Gorkha, Kaski, Tanahun	Kaski, Myagdi
Lumbini	Palpa, Bardiya, Kapilvastu, Rolpa	Kapilvastu, Bardiya
Karnali	Surkhet, Jumla, Jajarkot, Dolpa, Humla	Surkhet, Jumla
Sudurpaschim	Kailali, Achham, Bajura, Baitadi, Kanchanpur	Bajura, Kanchanpur

ANNEX 2: METHODS USED TO COLLECT DATA FROM DIFFERENT TYPES OF RESPONDENTS

Data collection technique	Respondents	Level/Designation	Number of respondents
KIIs	HAs	Central (3): NCD and Mental Health Section Chief, WHO NCD and Mental Health Field Coordinator and Public Health Officer (PHO), EDCD	22
		Provincial (4): Sr. PHO, Sr. Nursing Officer, PEN focal person	
		District (11): District Health Officers	
		Municipality (4): Health coordinators	
IDIs	HSPs	Medical Officer (MO) (6)	47
		Public Health Inspector (PHI) (4)	
		Health Assistant (14)	
		Sr. Auxiliary Health Worker (AHW) (12)	
		AHW (5)	
		Sr. Auxiliary Nurse Midwife (ANM) (3)	
		ANM (3)	
	NCD Patients	Hypertension (HTN) (22)	35
		Diabetes Mellitus (DM) (6)	
		COPD (2)	
		HTN & COPD comorbidity (2)	
		HTN & DM comorbidity (3)	
Total			104

ANNEX 3: HEALTH FACILITY ASSESSMENT FORM (QUANTITATIVE SURVEY)

Health facility assessment form

GENERAL INSTRUCTION

ALL WRITING SHALL BE IN ENGLISH

ALL DATES SHALL BE IN AD (DD/MM/YYYY)

FILL THE FORM USING PENCIL

(Please find the manager-the person in-charge of the facility or the most senior health worker responsible for the client service who is present at the facility. Read the consent form, cross-check if the information is well understood and get the informed consent signed. Start the interview after the consent form is signed)

Section 1: Health facility background Information			
S.N	**Facility identification**		**Code**
100	Name of the health facility		
101	Province		
102	District		
103	Municipality name		
104	Rural/Urban area	Rural	1
		Urban	2
105	Ward number		
106	Type of facility	Primary Health Center	1
		Health Post	2
107	Health facility code no:		
S.N	**Interviewer visit**		**Code**
108	Visit Number		
109	Date in AD (DD / MM/ YYYY)		
110	Result of the Visit	Completed	1
		Respondent not available	2
		Postponed	3
		Refused	4
		Closed / Not functional	5
		others (Specify)	96

Section 2: General Service

Target population in catchment area: If target population is not provided then estimate based on the proportion obtained from municipality and/or district level data

S.N.	What is the target population in the catchment area of this facility in the following category?	
200	Total	
201	Male	
202	Female	
203	Total 18 years and older (HTN screening)	
204	18 years and older (Male)	
205	18 years and older (Female)	
206	Total 30 years and older (CVD risk assessment and cancer screening)	
207	30 years and older (Male)	
208	30 years and older (Female)	

S.N	Basic client amenities	Options	Code	Skip
209	Do you have a bed where you can stabilize a very ill patient before transferal to a referral institution?	Yes	1	
		No	0	
210	Is there a room with auditory and visual privacy available for the patient consultation?	Auditory privacy only	1	
		Visual privacy only	2	
		Both auditory and visual privacy	3	
		No privacy	0	
211	On average, how many hours per day is this health facility open?			
212	Is there a health worker present at the facility at all times or officially on call for the facility at all times (24 hours a day) for emergencies?	Yes	1	
		No	0	Go to 215

S.N	Basic client amenities	Options	Code	Skip
213	Is there a duty schedule or call list for 24 hour staff coverage?	Yes	1	
		No, duty schedule not maintained	0	Go to 215
214	May I see the duty schedule or call list for 24 hour staff coverage?	Observed	1	
		Not observed	0	
215	Does this facility have a landline telephone that is available to call outside at all times client services are offered?	Yes	1	
		No	0	Go to 218
216	May I see the landline telephone?	Observed	1	
		Reported not seen	0	
217	Is it functioning? (Accept reported response)	Yes	1	
		No	0	
218	Does this facility have a cellular telephone, or private cellular phone that is supported by the facility?	Yes	1	
		No	0	Go to 221
219	May I see either the facility-owned cellular phone or the private cellular phone that is supported by the facility?	Observed	1	
		Reported not seen	0	
220	Is it functioning? (Accept reported response)	Yes	1	
		No	0	
221	Does this facility have a computer?	Yes	1	
		No	0	Go to 224
222	May I see the computer?	Observed	1	
		Reported not seen	0	
223	Is it functioning? (Accept reported response)	Yes	1	
		No	0	
224	Is there access to email or internet via computer and/or mobile phone within the facility? ACCEPT REPORTED RESPONSE	Yes	1	
		No	0	Go to 226
225	Is the email or internet routinely available for at least 2 hours on days that clients' services are offered? ACCEPT REPORTED RESPONSE	Yes	1	
		No	0	

S.N.	Source of water	Options	Code	Skip
226	What is the most commonly used source of water for the facility at this time? *(Observe that water is available from source or in the facility on the day of the visit, check that the pipe is functioning)*	Piped into facility	1	
		Piped onto facility grounds	2	
		Public tap	3	
		tube well / borehole	4	
		Well	5	
		Tanker Truck	6	
		Bottled water	7	
		Others (Specify)	96	
227	Is a water outlet from this source available onsite, within 500 meters of the facility or beyond 500 meter of the facility? *(Accept reported response)*	Onsite	1	
		Within 500 meters	2	
		Beyond 500 meters	3	
228	Is there routinely a time of year when the facility has a severe shortage or lack of water?	Yes	1	
		No	0	

S.N.	Power supply	Options	Code	Skip
229	Is this facility connected to the national electricity grid?	Yes	1	
		No	0	
		Don't know	88	
230	During the past 7 days, was electricity (excluding any back-up generator) available during the times when the facility was open for services, or was it ever interrupted for more than 2 hours at a time? *(Consider electricity to be always available if interrupted for less than 2 hours at a time)*	Always Available	1	
		Sometimes interrupted	2	
		Don't know	88	
231	Does this facility have other sources of electricity, such as a generator or solar system?	Yes	1	
		No Other Source	0	Go to 237

S.N.	Power supply	Options	Code	Skip
232	What other sources of electricity does this facility have? *(Probe for answers and circle all that apply)*	Fuel-Operated Generator	1	Go to 233
		Battery - operated generator	2	Go to 233
		Solar system	3	Go to 235
		Inverter	4	Go to 236
233	Is the generator functional? *(Accept reported response from knowledgeable respondent)*	Yes	1	
		No	0	
		Don't Know	88	
234	Is fuel (or a charged battery) available today for the generator? (Accept reported response from knowledgeable respondent)	Yes	1	
		No	0	
		Don't Know	88	
235	Is the solar panel for generating electricity functional? *(Accept reported response from knowledgeable respondent)*	Yes	1	
		No	0	
		Don't Know	88	
236	Is Inverter functional? *(Accept reported response from knowledgeable respondent)*	Yes	1	
		No	0	
		Don't know	88	

S.N.	Adequate sanitation		Code	Skip
237	Is there a toilet/latrine on premises in functioning condition that is accessible for general outpatient client use? If yes please indicate the type of toilet. *(If multiple toilets are available, consider the most modern type of toilet (latrine that is accessible. Also observe that the toilet (latrine) is accessible.)*	Flush toilet	1	
		Ventilated improved pit	2	
		Pit latrine with slab	3	
		Compost toilet	4	
		Bucket type	5	
		No latrine on premises	6	Go to 239
		Others	96	
238	What is the distance between the water source and the toilet?	.....(meters)		

S.N.	Health center waste management		Code	Skip
239	Does this facility have any guidelines or standard guidelines for health facility waste management? *(If yes, ask to see the document)*	No	0	
		Yes observed	1	
		Reported Yes but not seen	2	
240	Now I would like to ask you a few questions about waste management practices for sharp waste such as needles or blades. How does this facility finally dispose of sharp waste such as needles or blades? *(multiple response)*	Burn incinerator	1	
		Open burning	2	
		Dumping without burning	3	
		Open pit	4	
		Remove offsite	5	
		Never has sharp waste	6	
		Others specify	96	
241	Now I would like to ask a few questions about waste management practices for medical waste other than sharps, such as bandages. How does this facility finally dispose of medical waste other than sharps such as used bandages? *(multiple response)*	Burn incinerator	1	
		Open burning	2	
		Dumping without burning	3	
		Open pit	4	
		Remove offsite	5	
		Never has non-sharp waste	6	
		Others (specify).....	96	

Section 3: Human resources and team coordination

300-302	How many of the following posts are sanctioned by MoHP according to the type of health facility?	Level									
		8th	6th	5th	5th	4th	5th/6th	4th	4th/5th		
	Sanctioned Posts by MoHP	Doctor	HA/ Sr.AHW	Staff Nurse	Sr. AHW/ AHW	AHW	Sr. ANM	ANM	Lab assistant	Supportive Staff	Total
300	No of staff in HP (Terai and valley)	-	1	-	2	1	1	1	-	1	7
301	No of staff in HP (Hilly and Himalayan)	-	1	-	1	1	1	1	-	1	6
302	No of staff in PHCC	1	1	1	-	2	-	3	1	3	11

303-308	How many of the following posts are sanctioned and filled?	Number of staff										
		Doctor	HA	Staff nurse	Sr AHW	AHW	Sr ANM	ANM	Lab assistant	Office assistant	FCHV	Remarks
303	Sanctioned post by local government											
304	Filled by MoHP (A)											
305	Filled by local government (B)											
306	Filled On Deputation (C) (Posted in another health facility, but currently working in this health facility)											
307	Filled by direct employment by facility (D)											
308	Total Filled posts (A + B + C + D)											

	How many of these filled staff are trained in the following services?	Doctor	HA	Staff nurse	Sr AHW	AHW	Sr ANM	ANM	Lab assistant	Office assistant	FCHV	Remarks
309	PEN program											
310	Chest physiotherapy											
311	Spirometry											
312	Basic life support (CPR)											

313	Electrocardiogram interpretation											
314	Visual inspection under acetic acid											
315	HPV testing											
316	Pap smear test											
	How many of the filled staff carry out the following activities?	**Doctor**	**HA**	**Staff nurse**	**Sr AHW**	**AHW**	**ANM**	**ANM**	**Lab assistant**	**FCHV**		**Remarks**
317	PEN registration											
318	Initial assessment (BMI, WC)											
319	Measurement of BP											
320	History taking (NCD)											
321	CVD risk estimation											
322	FBS/PP/RBS											
323	Urine Ketone											
324	Urine Sugar											
325	Urine protein											
326	Medicine prescription & adjustment (NCD)											
327	Medicine dispensing and counseling for NCD drugs (eg drug timing and dosage instruction)											
328	Behavioral counseling (for diet, physical activity, abstaining tobacco and alcohol consumption)											
329	Reporting of NCD											
330	Peer coaching											
331	Follow up advice											
332	Referral											
333	Community counseling and promotion of health seeking behavior for NCDs											

Section 4: NCD services

400-405	User fee	Options	Code	Skip
400	Does this facility have any routine fees or charges for client services, including charges for health cards and for client registration?	Yes	1	
		No	0	Go to 402
401	Are the official fees posted or displayed so that clients can see them? (Accept if displayed in wall or brochure available)	Yes	1	
		No	0	
402	Does the facility charge separate fees for different components of the services provided by the facility?	Yes	1	
		No	0	Go to 406
403	May I see the posted fees?	Seen	1	
		Reported posted but not seen	0	
404	Does the facility charge a fee for consultation apart from registration charge?	Yes	1	
		No	0	
405	What is the procedure if a client is unable to pay for any of the fees associated with health care provided in this facility? (Circle all that apply, probe to arrive at the appropriate response)	Fee exempted	1	
		Discounted	2	
		Payment expected later	3	
		Service not provided, asked to come back when able to pay	4	
		Accept payment in any kind	5	
		Other (Specify)	96	
406	Source of income	Options	Code	Skip
	From which sources did the health facility receive funding in the last fiscal year? (Multiple responses are possible)	Central Government (MoHP)	1	
		Provincial government (Ministry of social development)	2	
		Local government (Municipalities)	3	
		Service charge	4	
		Training colleges (Nursing and medical)	5	
		NGO/INGO	6	
		Overhead from insurance	7	
		Others (Specify)	96	

S.N.	Does this facility offer following investigations? (If yes, ask how continuously the service is offered. Ask cost per client for the service. Accept reported response)	No (0)	Yes, But not offered currently (1)	Yes, But some interruption occur (2)	Yes, available on a regular and continuous basis (3)	User Fee (In NRs) (Write 0 if no user fee)
407-415	Diagnosis of CVD, diabetes and kidney disease					
407	Fasting Blood Sugar					
408	PBS (Post prandial blood sugar)					
409	RBS (Random blood sugar)					
410	Lipid Profile					
411	Urine Sugar					
412	Urine Protein					
413	Urine Ketone					
414	Renal functional test					
415	Electrocardiogram					
416-418	Diagnosis of chronic respiratory disease					
416	Peak flow test					
417	X- ray					
418	Spirometry					
419-429	Diagnosis of cervical and breast cancer					
419	Visual Inspection under Acetic Acid (VIA)					
420	Cryotherapy					
421	Single visit approach					
422	HPV testing					
423	Pap smear test					
424	Colposcopy					
425	Endocervical curettage					
426	Histopathological examination					
427	Fine Needle Aspiration Cytology (FNAC)					
428	Biopsy					
429	Mammogram					

S.N.	Does this facility offer following NCD procedures?(If yes ask, how continuously is the service offered, ask cost per client for the service; Accept reported response)	No (0)	Yes, but not offered currently (1)	Yes, but some interruption may occur (2)	Yes, available on a regular and continuous basis (3)	User fee (In Nrs; write 0 if no user fee)
430	Administration of oxygen					
431	IV injection					
432	IM injection					
433	Subcutaneous injection					
434	Echocardiography					
435	Cardiopulmonary resuscitation (CPR)					
436	Ambu bag					
437	Visual acuity examination					
438	Examination of neuropathy with knee hammer/tuning fork					
449	Ophthalmoscopy					
440	Chest rehabilitation					
441	Foot examination					

S.N.	Health Insurance	Options	Code	Skip
442	Does this facility implement health insurance?	Yes	1	
		No	0	go to 500
443	Is there sufficient/dedicated staff for health insurance?	Yes	1	
		No	0	
444	How much of the cost reimbursement have you received by the health insurance in the last quarter?	All	1	
		Some	2	
		Not at all	0	
445	How was the reimbursement costs spent in the last fiscal year?	Human resources	1	
		Equipment	2	
		Amenities	3	
		Others	96	
446	Does this health facility sell free drugs?	Yes	1	
		No	0	
447	Have the enrolled members bought drugs outside the health facility pharmacy in the current fiscal year?	Yes	1	
		No	0	
448	Have the provider faced any difficulties related to health insurance?	Yes	1	
		No	0	

Section 5: Essential medical supplies and its maintenance

S.N.	Supply chain	Options	Code	Skip
500	Who is the principal person responsible for managing the ordering of medical supplies at this facility?	Medical officer	1	
		Health assistant	2	
		Staff nurse	3	
		AHW	4	
		ANM	5	
		Lab assistant	6	
		Office assistant	7	
		Other (specify).....	96	
501	How are the facility supply quantities determined?	Formula (any calculation)	1	
		Gross estimation	2	
		Don't know	88	
		Other means (Specify).....	96	
502	What is the main source of pharmaceutical commodity supplies? By this I mean who is the direct supplier to your facility? (Multiple response)	Central medical stores	1	
		Provincial medical stores	2	
		Municipal medical stores	3	
		NGO/Donors	4	
		Private sources	5	
		Others (Specify).....	96	

S.N.	Who is responsible for transporting products from medical stores to your facility?	Options	Code	
503	local supplier delivers (Municipality)	Yes	1	
		No	0	
504	Higher level delivers (District/province)	Yes	1	
		No	0	
505	This facility collects (PHC/HP)	Yes	1	
		No	0	
506	Other (Specify).....			
507	For the most recent order, how long did it take between ordering and receiving products?	Less than 2 weeks	1	
		2 weeks to 1 months	2	
		Between 1 and 2 months	3	
		More than 2 months	4	

	Equipment	Not present (0)	Reported, Not Seen (A)	Observed but not functional (B)	Observed BUT some interruption in the functioning of the item (C)	Observed and functional on regular basis (D)	Total Present (A + B + C + D)	Comments
508 -521	Protocol 1 (WHO essential equipment)							
508	Thermometer							
509	Stethoscope							
510	Digital BP measurement device							
511	Aneroid BP measurement device							
512	Measuring tape (For measuring WC)							
513	Aneroid Adult Weighing Scale							
514	Digital Adult Weighing Scale							

515	Stadiometer (for measuring height)							
516	Ambu bag (for adult)							
517	Glucometer							
518	Blood glucose test strips							
519	Urine protein test strips							
520	Semmes - Weinstein 10g monofilament							
521	Urine Ketones test strips							
522-523	Protocol 2 (WHO essential equipment)							
522	Peak flow meter *							
523	Spacers for inhalers							
524-534	When resources permit							
524	Nebulizer							
525	Pulse oximeter							
526	Blood cholesterol assay or analyzer							
527	Lipid profile analyzer							
528	Serum creatinine analyzer							
529	Troponin Test strips or analyzer							
530	Urine microalbuminuria test strips or analyzer							
531	Tuning fork							
532	Electrocardiograph (if trained to interpret)							
533	Defibrillator							
534	Lancets							

535-547	Additional equipment for cervical cancer screening and treatment of minor lesions	Not present (0)	Reported, Not Seen (A)	Observed but not functional (B)	Observed BUT some interruption in the functioning of the item (C)	Observed and functional on regular basis (D)	Total Present (A + B + C + D)	Comments
535	Examination tables							
536	Instrument trays/trolleys or similar surfaces							
537	Metal speculum in the screening clinic							
538	Sponge/ring forceps							
539	Gallipots							
540	Clean examination gloves/loose gloves							
541	Bright white light source							
542	Timer							
543	Clean cotton balls/cotton swabs							
544	3–5% acetic acid							
545	Cryotherapy unit							
546	Cryotherapy tips							
547	Carbon dioxide or nitrous oxide gas tanks with appropriate fittings							

548-566	Equipment for infection prevention and control	Not present (0)	Reported not seen (A)	Observed but not functional (B)	Observed but some interruption in functioning of item (C)	Observed and functional on regular basis (D)	Total present (A+B+C+D)	Comment
548	Running Water (piped; bucket with tap or pour pitcher)							
549	Soap/ liquid hand wash							
550	Alcohol-based sanitizer							
551	Waste Bucket (pedal bin with a lid)							
552	Labelled waste bucket (eg red, green yellow, blue)							
553	Sharp container (Safety Box)							
554	0.5% chlorine solution (Virex solution)/Chlorine compound							
555	Disposable Latex Gloves/Clean gloves							
556	Autoclave							
557	Containers to store sterilized instruments (eg Gauze drum containing instruments)							
558	Medical Masks							
559	Gown							
560	Eye Protection (goggles or face protection)							
561	Steam-based high-level disinfection (eg pressure cooker)							
562	2–4% glutaraldehyde							
563	70–90% ethyl or isopropyl alcohol (Spirit)							
564	Containers to store HLD instruments							
565	Normal and hazardous waste bags and baskets							
566	Needle Destroyer							

Section 6: Essential Medicines availability and its costs

S.N.	Are there any of the following medicines available in the service site today? (Check to see if at least one of each medicine is valid (not expired))?	Observed available		Not observed			Number of valid drugs in stock (based on register)	Cost per unit tab for user	Stock out in the last three months (Code 1 for Yes, 0 for No)	Comments
		At least one valid (4)	Available non valid (3)	Reported available but not seen (2)	Not available today (1)	Never available (0)				
600-618	Free essential medicines of MOHP									
600	Amoxicillin									
601	Aspirin									
602	Calcium channel blockers (Amlodipine)									
603	Dextrose infusion									
604	Diazepam									
605	Epinephrine/Adrenaline									
606	Furosemide									
607	Hydrocortisone									
608	Ibuprofen									
609	Metformin									
610	Paracetamol									
611	Prednisolone									
612	Promethazine									
613	Salbutamol									
614	Sodium chloride infusion (Normal Saline)									
615	Thiazide diuretic (Hydrochlorothiazide)									
616	Statin (Atorvastatin)									
617	Azithromycin									
618	ACE inhibitor (Enalapril)									

S.N.	Are there any of the following medicines available in the service site today? (Check to see if at least one of each medicine is valid (not expired))?	Observed available		Not observed			Number of valid drugs in stock (based on register)	Cost per unit tab for user	Stock out in the last three months (Code 1 for Yes, 0 for No)	Comments
		At least one valid (4)	Available non valid (3)	Reported available but not seen (2)	Not available today (1)	Never available (0)				
619-632	Essential medicines not under MOHP									
619	Beclomethasone									
620	Codeine									
621	Erythromycin									
622	Glibenclamide									
623	Glucose injectable solution									
624	Glyceryl trinitrate									
625	Heparin									
626	Insulin									
627	Isosorbide dinitrate									
628	Magnesium sulphate									
629	Morphine									
630	Oxygen									
631	Senna									
632	Spironolactone									

Section 7 - PEN guidelines

S.N.	PEN guidelines	Options	Code	Skip
700	Do you have any guidelines or WHO/ISH risk prediction chart for diagnosing and managing CVD risk available in this service area?	Yes	1	
		No	0	Go to 703
701	May I see the guidelines? (WHO/ISH risk prediction chart (book, displayed)	Observed	1	
		Reported, Not Seen	0	
702	Do the providers in this facility diagnose and manage CVD risk using WHO/ISH risk prediction chart?	Yes, Diagnose only	1	
		Yes, Treat only	2	
		Yes, diagnose and treat	3	
		No	0	
703	Do you have any guidelines to diagnose and manage hypertension in this service area?	Yes	1	
		No	0	Go to 706
704	May I see the guidelines? (HTN management guidelines in book or chart)	Observed	1	
		Reported, Not Seen	0	
705	Do the providers in this facility manage hypertension using the guidelines?	Yes, Diagnose only	1	
		Yes, Treat only	2	
		Yes, diagnose and treat	3	
		No	0	
706	Do you have any guidelines for diagnosis and management of diabetes?	Yes	1	
		No	0	Go to 709
707	May I see the guidelines? (DM management guidelines in book or chart?	Observed	1	
		Reported, Not Seen	0	
708	Do the providers in this facility manage DM using the guideline?	Yes, Diagnose only	1	
		Yes, Treat only	2	
		Yes, Diagnose and treat	3	
		No	0	
709	Do you have any guidelines for diagnosis and management of asthma?	Yes	1	
		No	0	Go to 712
710	May I see the guidelines (Asthma management guidelines in book or chart)?	Observed	1	
		Reported, Not Seen	0	

S.N.	PEN guidelines	Options	Code	Skip
711	Do the providers in this facility manage asthma using the guideline?	Yes, Diagnose only	1	
		Yes, Treat only	2	
		Yes, Diagnose and treat	3	
		No	0	
712	Do you have any guidelines for diagnosis and management of COPD?	Yes	1	
		No	0	Go to 715
713	May I see the guidelines (COPD management guidelines in book or chart)?	Observed	1	
		Reported, Not Seen	0	
714	Do the providers in this facility manage COPD using the guideline?	Yes, Diagnose only	1	
		Yes, Treat only	2	
		Yes, Diagnose and treat	3	
		No	0	
715	Do you have guidelines for cervical cancer screening and management/referral?	Yes	1	
		No	0	Go to 718
716	May I see the guidelines?	Observed	1	
		Reported, Not seen	0	
717	Do the providers in this facility screen and/ or manage cancer using the guideline?	Yes, Diagnose only	1	
		Yes, Treat only	2	
		Yes, Diagnose and treat	3	
		No	0	
718	Do you have any guidelines for breast cancer screening and management/ referral?	Observed	1	Go to 800
		Reported, Not Seen	0	
719	May I see the guidelines?	Observed	1	
		Reported, Not Seen	0	
720	Do the providers in this facility screen/ or manage breast cancer using the guideline?	Yes, Diagnose only	1	
		Yes, Treat only	2	
		Yes, Diagnose and treat	3	
		No	0	

Section 8: Health Management Information System

800-809	General HMIS recording system	Options	Code	Skip pattern
800	Does this facility use an HMIS recording register?	Yes	1	
		No	0	
801	Does this facility have an electronic health record system in place?	Yes	1	
		No	0	
802	Does this facility practice electronic /online reporting?	Yes	1	
		No	0	
803	Does this facility use HMIS form 9.3 for HMIS reporting?	Yes	1	
		No	0	
804	May I see a copy of this health facility's HMIS report for the last completed calendar month?	Reported observed	1	
		Reported not seen	0	
805	Does this facility regularly report HMIS monthly reports to the government unit?	Yes	1	
		No	0	
806	How frequently are these reports compiled?	Monthly or more often	1	
		Every 2-3 months	2	
		Every 4-8 months	3	
		Less often than every 6 month	4	
807	Does this facility have a designated person who is responsible for health services data reporting in this facility?	Yes	1	
		No	0	
808	Does this facility organize patient files by serial no.?	Yes	1	
		No	0	Go to 810
809	Does this facility retrieve client files on each visit to the health facility?	Yes	1	
		No	0	

810-818	PEN specific recording system	Options	Code	Skip
810	Does this health facility have an NCD OPD card?	Yes	1	
		No	0	Go to 813
811	May I see the NCD OPD card?	Reported observed	1	
		Reported not seen	0	
812	Are the NCD OPD cards sufficient for the next three months? (Accept service provider reported response)	Yes	1	
		No	0	
813	Does this health facility have an NCD register?	Yes	1	
		No	0	Go to 816
814	May I see the NCD register?	Reported observed	1	
		Reported not seen	0	
815	Is the NCD register in use?	Yes, completely updated	2	
		Yes, but with some interruption	1	
		No	0	
816	Does this health facility use NCD monthly reporting form for reporting NCDs?	Yes	1	
		No	0	Go to 818
817	May I see a copy of this NCD monthly report for the last completed calendar month?	Yes	1	
		No	0	
818	Does this health facility have audit tools?	Yes	1	
		No	0	

Section 9: Health service utilization and referral by health facility

900-906	Health service utilization	Options	Code	Skip
900	What is the total number of visits to the health facility for outpatient services last month?	.....		
901	Total no of visits to the health facility for outpatient services in the day before (Please refer to master register)	.....		
902	How many of the patient's visits were there in OPD on the day before?			
903	No of visits made for CVD	.....		
904	No of visits made for diabetes	.....		
905	No of visits made for chronic respiratory disease	.....		
906	No of visits by cancer patients	.....		
907-918	**Referral mechanism**	**Options**	**Code**	**Skip**
907	Can you refer patients to another facility in the event of an NCD emergency?	Yes	1	
		No	0	
S.N.	**How many kilometers (kms) from your facility is the nearest referral center for NCD management? (Please specify for each of the following NCDs under PEN)**			
908	Distance to the nearest referral center from health facility for CVD management	…….....(Km)		
909	Distance to the nearest referral center from health facility for diabetes management	.....(Km)		
910	Distance to the nearest referral center from health facility for chronic respiratory disease management	…….....(Km)		
911	Distance to the nearest referral center from health facility for cancer management	…….....(Km)		
912	What are your reasons for referring NCD patients to higher centers? (Multiple response)	Further management	1	
		Additional test and investigations	2	
		Second opinion from expertise	3	
		Others (Specify).....	96	

913	How often do you follow referral guidelines of PEN when referring NCD patients?	Always	1	
		Sometimes	2	
		Never	0	
914	Do you have referral forms? (Please observe for its availability)	Yes, observed	1	
		Yes, reported not seen	2	
		No	0	
915	Does your health facility have ambulance service for referral?	Yes observed	1	
		Yes reported not seen	2	
		No	0	
916	If the facility does not have an ambulance, can patient transfer by ambulance be arranged?	Yes	1	
		No	0	
917	What means of transportation is the most frequently used to transfer emergency patients at your facility? (Multiple response)	Commercial vehicle	1	
		Public transport	2	
		Private vehicle	3	
		Others (Specify).....	96	
918	Approximately how long does it take to transfer a patient to the nearest referral medical institution?	..... (in mins)		
		.....(in hours)		
		.....(in days)		

Section 10: Monitoring and supervision

1000-1001	Monitoring and supervision activities	Options		Code	Skip
1000	When was the last time when this health facility received a supervision visit for NCD services from the higher authority?	This month		1	
		In the last 3 months		2	
		More than 3 months ago		3	
		Never		0	Go to 1005
1001	From where do supervision visits come from? (Multiple response)	District Health Office		1	
		Municipal Health Office		2	
		Provincial Health Office		3	
		Central Office (EDCD)		4	
1002-1004	During the supervision visit, did the supervisor assess the following?	Yes (1)	No (0)		
1002	Pharmacy (e.g. drug stock out, expiry, records etc.)				
1003	Staffing (e.g. staff available and training)				
1004	Data (e.g. completeness, quality and timely reporting)				
1005-1006	Peer coaching	Options	Code		
1005	Does this health facility conduct peer coaching on PEN?	Yes	1		
		No	0		
1006	When was the last time when you received/provided peer coaching for PEN?				

Section 11: PEN training and IEC materials

	PEN training	Options	Code	Skip
1100	Have you received PEN training?	Yes, within 24 months	2	
		Yes, over 24 months ago	1	
		No training	0	Go to 1111
1101	Is the training duration adequate?	Yes	1	
		No	0	
1102	Does the training module cover the required aspects for early detection of NCD?	Yes	1	
		No	0	
		Don't know	88	
1103	Is the training provided by following all the protocols of the PEN training module?	Yes	1	
		No	0	
		Don't know	88	
1104	Do you think resources provided in the training are adequate?	Yes	1	
		No	0	
		Don't know	88	
1105	Does the training module deliver the content effectively?	Yes	1	
		No	0	
1106	Do you find the training practically focused?	Yes	1	
		No	0	
1107	Did you encounter any hindrances/obstacles during the training period?	Yes	1	
		No	0	
		Don't know	88	
1108	Do you see any need to modify or make changes in this training module?	Yes	1	
		No	0	
		Don't know	88	
1109	Do you think there is a need for refresher training?	Yes	1	
		No	0	Go to 1111
1110	If yes, how often refresher training should be provided?	.....months		

1111-1117	IEC materials: Are there any of the following IEC materials (related to NCD) displayed in health facilities for community awareness? (Check to see at least one of them is displayed or made accessible for the public. If it is in a readable format, then it is valid)	Observed available		Not observed		
		At least one valid (4)	Available non valid (3)	Reported available but not seen (2)	Not available today (1)	Never available (0)
1111	Poster					
1112	Flex print					
1113	Pamphlets					
1114	Booklet					
1115	Flipchart					
1116	Leaflet					
1117	Others (specify).....					

1118-1129	IEC materials: Are there any forms of IEC materials related to NCDs/ risk factors/healthy behavior displayed in health facilities for community awareness? (Check to see at least one of them is displayed or made accessible for the public. If it is in a readable format, then it is valid)	Observed available		Not observed		
		At least one valid (4)	Available non valid (3)	Reported available but not seen (2)	Not available today (1)	Never available (0)
1118-1122	NCDs					
1118	Hypertension					
1119	Diabetes					
1120	Chronic respiratory disease					
1121	Breast cancer					
1122	Cervical cancer					
1123-1129	IEC related to self-care					
1123	Smoking					
1124	Alcohol					
1125	Physical activity					
1126	Healthy diet					
1127	Chest rehabilitation					
1128	Breast self-examination					
1129	Others (specify).....					

1130-1131	Health statistics	Options	Code	Skip		
1130	Has the health facility displayed updated key health services data in the health facility premises in a visible place in the public?	Yes	1			
		No	0			
1131	Has the health facility displayed key NCD services related data in the health facility premises in a visible place in the public?	Yes	1			
		No	0			
1132	**IEC activities in community**	**Options**	**Code**	**Cost incurred by Health facility in IEC activities (if applicable)**		
1132	Which of the following activities has the health facility carried out to raise awareness in communities for NCDs? (Multiple response)	Television videos related to NCD displayed in waiting area	1			
		Radio program conveying key messages in NCDs	2			
		Role play	3			
		School health program	4			
		Mass health education	5			
		HTN screening	6			
		DM screening	7			
		Breast cancer screening	8			
		Cervical cancer screening	9			
		Others (specify).....	96			

Section 12: Reminder and recall

1200-1203	Reminder	Options	Code	Skip
1200	Do NCD patients registered in this health facility ever miss follow up visits?	Yes	1	
		No	0	
1201	Do you send reminders for those patients with non-communicable diseases (NCDs) for follow up?	Yes	1	
		No	0	Go to 1203
1202	How do you send reminder for follow up?(Multiple responses are allowed)	Text message	1	
		Call	2	
		Mobilize FCHV	3	
		Others (Specify).....	96	
1203	What do you do if NCD patients miss their scheduled visits? (Multiple responses are allowed)	Text message	1	
		Call	2	
		Send FCHV for home visits	3	
		Others (Specify).....	96	

Cabana Framework

Date:
Name of the health facility:
Health facility code:
Health service provider ID:
Designation of health service provider:
Health service provider phone no:

S.N	Statements	Strongly disagree (1)	Somewhat Disagree (2)	Neither agree nor disagree (3)	Somewhat Agree (4)	Strongly agree (5)
3000-3003	Familiarity					
3001	I am familiar with PEN protocol					
3002	I am familiar with the volume of information in the PEN protocol					
3003	The PEN guideline is accessible to me					
3004	I have enough time to read, understand and stay informed on the protocol					
	Awareness					
3005	I am aware of all of the information in the PEN protocol					
3006	I have enough time to be aware of the PEN protocol					
3007	I know where to access the Protocol					
3008-3009	Lack of motivation / Intertiaa of previous practice					
3008	I am habituated to use my previous practice, so less motivated to use the protocol					
3009	The PEN protocol do not fit into the routine practice PEN (Treatment guidelines are hard to implement in daily practice)					
	Lack of Self-Efficacy					
3010	I don't think that I can use the PEN protocol, it is clinically not relevant					
	Lack of Outcome Expectancy					
3011	Even if I follow PEN protocol, my NCD patients will not be benefitted					

S.N	Statements	Strongly disagree (1)	Somewhat Disagree (2)	Neither agree nor disagree (3)	Somewhat Agree (4)	Strongly agree (5)
	Lack of agreement with specific guidelines					
3012	I don't understand/ or disagree the evidences used to make this guideline					
3013	This protocol is not applicable to patients					
3014	This protocol is not cost beneficial - it makes patient spend a lot for less benefit					
3015	I dont have confidence on those who developed the protocol (WHO)					
	Lack of agreement with guidelines in General					
3016	There are too many things in this protocol to follow properly (Treatment guidelines are too complicated and it is difficult to find the necessary information)					
3017	The protocol is too rigid to apply					
3018	The protocol is biased					
3019	The protocol do not let me use my clinical decision making capacity					
3020	This guideline is not practical					
	External factors					
	Patient factors					
3021	Patients do not have ability to follow the protocol					
3022	Patients prefer to do their own way, not according to the protocol (Patients do not want doctors to conform to treatment guidelines)					
	Environmental factors					
3023	There is lack of time to use this guideline					
3024	There is lack of resources to use this protocol					
3025	We don't get paid additional fee to use this protocol					
3026	The protocol increases malpractice					
3027	There is organizational constraints to use this protocol					

ANNEX 4: OBSERVATION CHECKLIST TO ASSESS THE ADHERENCE TO THE PEN PROTOCOLS (1, 2, AND 3)

PEN Protocol 1: Prevention of heart attack, stroke and kidney disease through the integrated management of diabetes and hypertension

Basic form information	
Name of the health facility	
Health facility code no (DOHS provided code)	
Name of the district	
Questionnaire form no	
Date of the data collection	
Designation of health service provider performing clinical examination	Medical officer
	Health assistant
	Senior AHW
	Others (specify)……
Is the health service provider performing clinical examination PEN trained?	Yes
	No
When did the health service provider receive PEN training?	……(months ago)
Provisional diagnosis of the patient observed (Tick all that apply)	Diabetes mellitus ☐
	Hypertension ☐
	Stroke/TIA ☐
	Coronary Artery Disease ☐
	Kidney disease ☐
	Others……(specify) ☐
Patient type	New case screened
	Known case on follow up
	Referred in

PLEASE TICK MARK THE FOLLOWING ELIGIBILITY CRITERIA FULFILLED BY THE CLIENT
(Indicate if patient if patient aged 30 and over is not assessed for eligibility criteria)

☐ Age above 30 years

☐ History of tobacco use

☐ Overweight (Waist circumference >90 cm for females and WC>100cm in males, BMI >25 kg/m2)

☐ Known hypertension

☐ Known DM

History of premature death of CVD in first degree relatives

History of DM or/and kidney disease in first degree relative

Action 1	Ask about:	Options		Skip	Remarks
1400-1403	Did the health worker ask about the prior history of the following NCDs?	Yes	No		
1400	Diagnosed heart disease	☐	☐		
1401	Stroke /TIA	☐	☐		
1402	Diabetes mellitus	☐	☐		
1403	Kidney disease	☐	☐		
1404-1416	**Did the health worker ask about the prior history of the following symptoms?**	**Yes**	**No**		
1404	Angina	☐	☐		
1405	Breathlessness	☐	☐		
1406	Numbness or weakness of limbs	☐	☐		
1407	Loss of weight	☐	☐		
1408	Increased thirst	☐	☐		
1409	Polyuria	☐	☐		
1410	Delay in wound healing	☐	☐		
1411	Puffiness of face	☐	☐		
1412	Frothy urine	☐	☐		
1413	Swelling of feet	☐	☐		
1414	Passing of blood in urine	☐	☐		
1415	Current medication of client	☐	☐		
1416	New onset of symptoms	☐	☐		
1417-1419	**Did the health worker ask the following family history of NCDs?**	**Yes**	**No**		
1417	Premature heart disease in first degree relatives (parents and siblings)	☐	☐		
1418	Stroke in first degree relatives (parents and siblings)	☐	☐		
1419	DM in first degree relative(parents and siblings)	☐	☐		

1420-1423	**Did the health worker ask about the following lifestyle behavior?**	**Yes**	**No**		
1420	Current tobacco use in last twelve month	☐	☐		
1421	Alcohol consumption (current)	☐	☐		
1422	Type of occupation (sedentary or active)	☐	☐		
1423	Engagement in physical activity for at least 30 minutes for 5 days in week	☐	☐		
Action 2	**Assess**				
1424-1437	Did the health service provider perform following physical examination, blood and urine tests?	Yes	No		
1424	Waist circumference	☐	☐		
1425	Blood pressure	☐	☐		
1426	Edema (+/-) in feet	☐	☐		
1427	Urine protein	☐	☐		
1428	Urine sugar	☐	☐		
1429	Blood sugar (FBS/RBS/PP)	☐	☐		
1430	Feet examination	☐	☐	Go to 1433 if non diabetic	
1431	Oral examination	☐	☐		
1432	Urine ketone	☐	☐		
1433	Palpation of apex beat for heaving and displacement	☐	☐		
1434	Auscultation of heart	☐	☐		
1435	Auscultation of lungs	☐	☐		
1436	Examination of abdomen (palpation)	☐	☐		
1437	Total cholesterol (if available)	☐	☐		
Action 3	Use of WHO/ISH risk prediction chart	Yes	No		
1438	Did the health service provider estimate CVD risk using WHO/ISH risk prediction chart for Nepal?	☐	☐		

Action 4	**Referral criteria**				
1439-1440	Did the health service provider refer using referral criteria when necessary?	Yes	No		
1439	Urgent referral after emergency management	☐	☐		
1440	Planned referral	☐	☐		
Action 5	**Counseling and treatment as per protocol**				

1441-1444	Did the health service provider counsel for :	Yes	No		
1441	Physical activity	☐	☐		
1442	Smoking	☐	☐		
1443	Alcohol	☐	☐		
1444	Diet	☐	☐		
1445-1447	Drug therapy: Did the health service provider:	Yes	No		
1445	Initiate /continue/adjust drugs (Amlodipine/Statin/Metformin)	☐	☐		
1446	Prescription (drugs prescribed)				
1447	initiate/continue/adjust drugs (Amlodipine/ Statin/Metformin) as per the guideline	☐	☐		
1448-1449	Follow up	Yes	No		
1448	Did the health service provider advise patient for follow up visits?	☐	☐		
1449	Did the health service provider advise patient for follow up visits as per the protocol?	☐	☐		
1450-1451	Diabetic care	Yes	No		
1450	Did the health service provider advise patient for foot care?	☐	☐	Go to 1500 if pt is non diabetic	
1451	Did the health service provider advise patient for oral care?	☐	☐		

Comments:

PEN protocol 2: Health education and counseling on healthy behaviors

Basic form information	
Name of the health facility	
Health facility code no (DOHS provided code)	
Name of the district	
Questionnaire form no	
Date of the data collection	
Designation of health service provider performing clinical examination	Medical officer
	Health assistant
	Senior AHW
	Others (specify)……
Is the health service provider performing clinical examination PEN trained?	Yes
	No
If yes when did the health service provider receive PEN training?	……(months ago)
Provisional diagnosis of the patient observed	
Presence of unhealthy behavior in patient (Tick all that apply)	Smoking (Active/Passive) ☐
	Alcohol intake ☐
	Unhealthy dietary pattern ☐
	Physical inactivity ☐
	Loss to follow up ☐
Patient type	New case screened
	Known case on follow up
	Referred in

PLEASE OBSERVE HEALTH EDUCATION AND COUNSELLING SESSION OF ANY CLIENT AND TICK MARK THE FOLLOWING ACTIVITIES. INDICATE IF IT IS NOT APPLICABLE

5A model to help patients quit unhealthy behavior

S.N.	5A's		Options		Skip	Remarks
1500-1504	Ask	Did the health worker ask questions on:	Yes	No		
	1500	Unhealthy diet	☐	☐		
	1501	Physical inactivity	☐	☐		
	1502	Tobacco consumption	☐	☐		
	1503	Alcohol consumption	☐	☐		
	1504	Follow up	☐	☐		
1505-1518	Advise					
1505	Physical activity	Did the health service provider convey following key messages on physical activity?	Yes	No		
	1505	Perform moderate intensity physical activity to at least 30 minutes per day on 5 days of the week	☐	☐		
1506-1511	Heart healthy diet	Did the health service provider convey the following key messages on heart healthy diet?	Yes	No		
	1506	Restriction of salt consumption to no more than 5gms per day	☐	☐		
	1507	Avoid processed and fast food consumption (e.g. packed food; juice, canned food)	☐	☐		
	1508	Avoid products made from trans-fat as much as possible	☐	☐		
	1509	Replace red meat with chicken (without skin)	☐	☐		
	1510	Encourage consumption of 5 serving of fruits and vegetables daily	☐	☐		
	1511	Eat fish at least 2-3 times per week	☐	☐		
1512-1513	Abstaining from tobacco and alcohol consumption	Did the health service provider convey following key messages on abstaining from tobacco and alcohol consumption?	Yes	No		
	1512	Avoid consumption/exposure of any forms of tobacco	☐	☐		
	1513	Avoid consumption of any forms of alcohol	☐			
1514-1516	Adherence to treatment	Did the health service provider convey following key messages on adherence to treatment?	Yes	No		
	1514	Reasons for prescribing the medicine	☐	☐		
	1516	Advice on taking medication regularly as advised even in absence of apparent symptoms	☐	☐		
1517-1518	Attend regular medical follow up	Did the health service provider convey following key messages on medical follow up?	Yes	No		

	1517	Instruct for follow up date	☐	☐		
	1518	Inform about the importance of follow up	☐			
1519-1520	Assess	Did the health service provider assess for:	Yes	No		
	1519	Client willingness to make quit attempts for unhealthy behavior	☐	☐	Go to 1600 if pt does not have any unhealthy behavior	
	1520	Client self-confidence to quit unhealthy behavior	☐	☐		
1521-1522	Assist	Did the health service provider assistance for:	Yes	No		
	1521	Preparing a quitting plan	☐	☐		
	1522	Promoting motivation to quit	☐	☐		
1523-1524	Arrange	Did the health service provider guidance on:	Yes	No		
	1523	Referral	☐	☐		
	1524	Follow up	☐	☐		

5R model to increase motivation to quit

S.N.	5R's				Skip	Remarks
1525	Relevance		Yes	No		
	1525	Does the health service provider encourage the patient to indicate how quitting is personally relevant to him/her?	☐	☐	Go to 1600 if pt is motivated to quit on assessment	
1526	Risks		Yes	No		
	1526	Does the health service provider ask the patient to identify potential risks due to unhealthy behavior?	☐	☐		
1527	Rewards		Yes	No		
	1527	Does the health service provider ask the patient to identify potential benefits of quitting an unhealthy behavior?	☐	☐		
1528-1529	Road blocks		Yes	No		
	1528	Does the health service provider ask the patient to identify barriers or impediments to quitting an unhealthy behavior?	☐	☐		
	1529	Does the health service provider help the patient in addressing the barriers to quitting an unhealthy behavior?	☐	☐		
1530	Arrange		Yes	No		
	1530	Assess the client willingness to quit unhealthy behavior and arrange referral if required	☐	☐		

Comments:

PEN protocol 3.1: Management of asthma

Basic form information	
Name of the health facility	
Health facility code no (DOHS provided code)	
Name of the district	
Questionnaire form no	
Date of the data collection	
Designation of health service provider performing clinical examination	Medical officer
	Health assistant
	Senior AHW
	Others (specify)……
Is the health service provider performing clinical examination PEN trained?	Yes
	No
If yes when did the health service provider receive PEN training?	……(months ago)
Provisional diagnosis of the patient observed	
Exacerbation of symptoms?	Yes
	No
Patient type	New case screened
	Known case on follow up
	Referred in

PLEASE TICK MARK THE FOLLOWING S/S SEEN OR COMPLAINED BY THE CLIENT

- ☐ Cough
- ☐ Difficulty breathing
- ☐ Tight chest
- ☐ Wheezing

S.N.	Activities				Skip	Remarks
1600-1603	Ask	Did the health worker ask the following chronic respiratory disease symptoms?	Yes	No		
	1600	Previous diagnosis of asthma by a physician	☐	☐		
	1601	Age of onset of symptoms	☐	☐		
	1602	H/O hay fever/eczema/allergies	☐	☐		
	1603	Family history of asthma	☐	☐		
	1604	Presence of intermittence of symptoms with asymptomatic periods in between	☐	☐		
	1605	Worsening of the symptoms at night or early morning	☐	☐		
	1606	Triggering of symptoms by respiratory infection, exercise, weather changes or stress	☐	☐		
1604-1615	Assess	Did the health worker assess the patient for?	Yes	No		
	1607	Ability to complete the sentence in one breath	☐	☐		
	1608	Respiratory rate (counted breaths/minute)	☐	☐		
	1609	Auscultation of heart (for rate and rhythm)	☐	☐		
	1610	Auscultation of lungs for wheezes	☐	☐		
	1611	Mental status (Orientation to time, place and person)	☐	☐		
	1612	Accessory muscle use (Use of neck and inter-costal muscles while breathing)	☐	☐		
	1613	Poor respiratory effort	☐	☐		
	1614	Cyanosis (bluish coloration of lips and finger tips)	☐	☐		
	1615	SPO2 (Checked with pulse oxi meter)	☐	☐		
	1616	PEF meter 1st reading	☐	☐		
	1617	PEF meter 2nd reading	☐	☐		
1616-1617	Estimate	Did the health service provider estimate the severity of asthma for referral?	Yes	No		
	1618	Differentiate controlled and uncontrolled asthma (in pt card)	☐	☐		
	1619	Grade the severity of asthma in pt card (in asthma exacerbation)	☐	☐		
1618-1619	Treatment	Did the health service provider provide treatment based on severity?	Yes	No		

	1620	Step-wise approach management (in routine asthma pt)	☐	☐	Go to 1618 for acute exacerbation	
	1621	Emergency approach management (in exacerbation)	☐	☐		
	1622	Prescription				
1620-1623	Advice	Did the health service provider advise for:	Yes	No		
	1623	Counseling to prevent risk factors and allergens	☐	☐		
	1624	Counseling on importance to stay on medicines as prescribed	☐	☐		
	1625	Proper use of MDI/DPI/Spacer	☐	☐		
	1626	Avoiding occupation which increases risk of exposure	☐	☐		
	1627	instruct on what to do if the asthma deteriorates (self-care)	☐	☐		

Comments:

PEN protocol 3.2: Management of COPD

Basic form information	
Name of the health facility	
Health facility code no (DOHS provided code)	
Name of the district	
Questionnaire form no	
Date of the data collection	
Designation of health service provider performing clinical examination	Medical officer
	Health assistant
	Senior AHW
	Others (specify)……
Is the health service provider performing clinical examination PEN trained?	Yes
	No
If yes when did the health service provider receive PEN training?	……(months ago)
Provisional diagnosis of the patient observed	
Exacerbation of symptoms?	Yes
	No
Patient type	New case screened
	Known case on follow up
	Referred in

PLEASE TICK MARK THE FOLLOWING ELIGIBILITY CRITERIA FULFILLED BY THE CLIENT (MUST MEET AT LEAST ONE ELIGIBILITY CRITERIA FOR PROTOCOL 3.2)

☐ Productive cough

☐ Chronic exertional breathlessness

☐ Wheezing

S.N.	Activities		Options		Skip	Remarks
1700-1707	**Ask**	**Did the health worker ask for:**	**Yes**	**No**		
	1700	Previous diagnosis of COPD by a physician	☐	☐		
	1701	History of heavy smoking	☐	☐		
	1702	Onset of the symptoms	☐	☐		
	1703	Progression of symptoms	☐	☐		
	1704	History of productive cough	☐	☐		
	1705	Exercise intolerance	☐	☐		
	1706	Symptoms variation or persistence	☐	☐		
	1707	Presence of any other conditions that mimic COPD (e.g. Asthma, CHF, bronchiectasis, TB, lung cancer etc.)	☐	☐		
1708-1719	**Assess**	**Did the health worker assess for:**	**Yes**	**No**		
	1708	Barrel chest	☐	☐		
	1709	Use of accessory muscles of respiration (use of neck muscles)	☐	☐		
	1710	Auscultate lungs	☐	☐		
	1711	Cyanosis (Checked for bluish discoloration of lips and fingers)	☐	☐		
	1712	Swelling of legs/abdomen	☐	☐		
	1713	Oxygen saturation (Using pulse ox meter)	☐	☐		
	1714	Sputum AFB	☐	☐		
	1715	PEFR meter 1st reading	☐	☐		
	1716	PEFR meter 2nd reading	☐	☐		
	1717	Chest X-ray (if available)	☐	☐		
	1718	Heart rate (if available)	☐	☐		
	1719	Spirometry (if available)	☐	☐		
1720	**Estimate**	**Did the health service provider differentiate:**	**Yes**	**No**		
	1720	Whether it's acute exacerbation or the client on regular follow up?	☐	☐		

1721-1723	Treatment	Did the health service provider:	Yes	No		
	1721	Prescribe regular treatment regimen	☐	☐		
	1723	Manage exacerbation	☐	☐		
1724	**Chest rehabilitation**	**Did the health service provider:**	**Yes**	**No**		
	1724	Instruct patient on chest rehab	☐	☐		
1725-1731	**Advice**	**Did the health service provider advise to:**	**Yes**	**No**		
	1725	Prevent the exposure to risk factors	☐	☐		
	1726	Quit smoking and tobacco products	☐	☐		
	1727	Adhere to prescribed medication	☐	☐		
	1728	Use of MDI/DPI/Spacer properly	☐	☐		
	1729	Maintain adequate ventilation	☐	☐		
	1730	Nutrition	☐	☐		
	1731	Vaccinate against flu/pneumonia	☐	☐		
1732	1732	Prescription				

Comment:

ANNEX 5: SECONDARY DATA EXTRACTION GUIDE

Ask for an NCD reporting form from the staff. If available, click the pictures of all reported forms such that the numbers are clear. Fill on the spot or later based on your availability of time. If a report is not available, click the pictures of the NCD register and/or master register and/or outpatient register or send for photocopy if photocopy is possible.

CVD risk assessment in primary health facilities

Year	From Baisakh 2076- Chaitra 2076							
Months	< 10% CVD risk		10-20% CVD risk		20-30% CVD risk		Target population	
	New case	Follow up	New case	Old case	New case	Follow up	Male	Female
Baisakh								
Jestha								
Ashad								
Shrawan								
Bhadra								
Ashoj								
Kartik								
Mangsir								
Poush								
Magh								
Falgun								
Chaitra								

Hypertension screening and management in primary health facility

Year	From Baisakh 2076- Chaitra 2076							
	New case		Known case		Target population		Uncontrolled	
	Male	Female	Male	Female	Male	Female	Male	Female
Baisakh								
Jestha								
Ashad								
Shrawan								
Bhadra								
Ashoj								
Kartik								
Mangsir								
Poush								
Magh								
Falgun								
Chaitra								

Diabetes mellitus screening and management

Year	From Baisakh 2076- Chaitra 2076							
	New case		Known case		Target population		Uncontrolled	
	Male	Female	Male	Female	Male	Female	Male	Female
Baisakh								
Jestha								
Ashad								
Shrawan								
Bhadra								
Ashoj								
Kartik								
Mangsir								
Poush								
Magh								
Falgun								
Chaitra								

Chronic respiratory disease screening and management

Year	from Baisakh 2076-Chaitra 2076							
	New case		Known case		Target population		Unstable	
	Male	Female	Male	Female	Male	Female	Male	Female
Baisakh								
Jestha								
Ashad								
Shrawan								
Bhadra								
Ashoj								
Kartik								
Mangsir								
Poush								
Magh								
Falgun								
Chaitra								

Cancer screening and management

Year	from Baisakh 2076-Chaitra2076					
Month	Breast cancer			cervical cancer		
	Total screened	Referred	Total population	Total screened	Referred	Total population
Baisakh						
Jestha						
Ashad						
Shrawan						
Bhadra						
Ashoj						
Kartik						
Mangsir						
Poush						
Magh						
Falgun						
Chaitra						

ANNEX 6: KEY-INFORMANT INTERVIEWS (KIIS) GUIDES FOR HEALTH AUTHORITIES AND HEALTH SERVICE PROVIDERS

Interview Guide for Health Authorities

Objectives:

- To explore facilitators and barriers of the PEN program implemented in Nepal through the lens of health system building blocks.
- To examine the processes and results of health system performance, and highlight the gaps in terms of health system attributes and needs.
- To contribute to Nepal's health system strengthening through the identification of approaches and strategies.

General Information:
Name of health authority:
Designation:
Province/ District/Municipality:
Education:

Warm up questions (2 minutes)

1. What is your role in the PEN program?

Probe

- Planning
- Service delivery
- Monitoring

Acceptability (8 minutes)

Now I would like to hear your opinion on the PEN training sessions.

2. How useful were the PEN training sessions for health service providers?

Probe

- Why/ Why not?
- How well run were the PEN training sessions?
- What helped make it possible to conduct PEN training sessions in your setting?
- What made it hard to conduct PEN training sessions in your setting?

3. What changes have you observed in the clinical performance of health service providers after they participated in the PEN training sessions, if any?

Probe

- What positive changes have you observed in clinical performance, if any?

4. What difficulties do health service providers who were trained in PEN face in following the guidelines?

Health work taskforce (5 minutes)

5. How do you allocate human resources for PEN services?

Probe:

How do you make sure there are enough health service providers trained in PEN to deliver PEN services in your province/district/municipality?

6. Do you think there are any changes that have occurred in the health system delivery since the advent of federalism?

Probe:

- How is it different from the previous situation?
- Positive/ Negative Aspects

Medical supplies (8 minutes)

Now let us talk about availability of medical supplies for the delivery of PEN services in your province/ district/municipality.

7. How well equipped are the health facilities in terms of medical supplies needed for PEN services?

Probe

- Why? Why not?
- How do you meet demand from health facilities for essential medicines?
- Can you share your experience when you were able/unable to fulfill their demand?

8. What is the coordination process for supplies like?

Probe:

- How do you coordinate for supplies?
- Who do you reach out to : Province/District/Municipality?

Health service delivery (8 minutes)

9. What are the things that help you in implementing the PEN program?

Probe:

- What helps you the most in implementing the PEN program?

10. What challenges do you face in implementing the PEN program in your province/district/municipality?

Probe

- Of all the challenges you talked about, what were the greatest challenges?
- How do you handle challenges in delivering PEN services in your province/district/municipality?

11. How much do people with non-communicable diseases use PEN services in your PROVINCE/ DISTRICT/MUNICIPALITY?

Probe

- What are the reasons for high/low use of PEN services?
- What types of patients use PEN services the most? Why?
- What types of patients use PEN services the least? Why?
- Which PEN services are used most? Why?
- Which services are used least? Why?

Health Information System (8 minutes)

12. How do you manage PEN related data?

Probe

- How timely do the health facilities report NCD related data?
- What challenges do you face in maintaining NCD related data?
- How do you resolve these challenges?

13. How are you utilizing the generated data from PEN services?

Probe:

- Strengths of data collection
- Plans on improving the data quality

Leadership and governance (8 minutes)

14. How do you conduct monitoring and supervisory visits for the PEN program?

Probe

- How often do you conduct them? If any, what is included in the checklist?
- If not, why? What are the challenges for not doing it?

15. What kind of problems do you encounter during the monitoring and supervision visits for the PEN program?

Probe

- How do you resolve the problems reported to you?

Health financing (8 minutes)

16. How do you manage the expenses required to run the PEN program?

Probe

- What kind of financial support do you get to run the PEN program?
- What kind of difficulties do you face in financing the implementation of the PEN program?

Wrap up Questions (5 minutes)

I would now like to talk about the future of the PEN program.

17. How hopeful are you regarding scaling up of PEN to all districts?
18. How will you continue to monitor success/failure while delivering PEN ?
19. How can PEN service delivery be improved?

Probe:

- Prevention of heart attack, strokes and kidney disease through integrated management of diabetes and hypertension
- Health education and counseling on healthy behaviors
- Management of chronic respiratory disease
- Assessment of breast health and referral of women with suspected breast cancer
- Assessment and referral of women with suspected cervical cancer

We are now at the end of the conversation.

20. Do you have anything else you would like to share on the topics we discussed today?

"Great! Our discussion has been very helpful. Thank you so much for your time. Your experiences and opinions are very valuable for helping improve the delivery of the PEN program. [Stop recording]"

Interview Guide for Health Service Providers

Demographics

Name of the health service provider:

Designation:

Name of the health facility:

Health facility code no:

Province:

District:

Municipality (Rural/ Urban):

Ward no.:

Education:

Age:

Gender (observe):

Warm-Up Questions (2 minutes)

1. What is your role in the health center?

Probe

- What is your role in management of non-communicable diseases?

Acceptability (8 minutes)

Now I'd like to talk about the training for PEN program

2. How useful was the PEN training for preparing you to deliver PEN services?
3. How well organized was the PEN training?
4. How satisfied are you with the course content?

Probe

- Why? /Why not?
- Parts of the training satisfied with
- Parts of the training that need to be revised

5. How helpful would it be to have refresher training?

Probe

- Why?
- What specific topics should be covered in PEN refresher training?

Access to medical supplies (8 minutes)

Let us talk about the time when PEN was first introduced in your health facility.

6. How prepared was the health facility to deliver the PEN program?

Probe

- How equipped was the health facility in terms of medical supplies?

7. How is the present situation now?

Probe

- How does the health facility maintain the stock of essential medical supplies for PEN services?
- What type of support do you receive while procuring the medical supplies for PEN services?

- What is the coordination/collaboration process like?
- What challenges do you face while obtaining medical supplies for PEN services? How do you handle challenges?

Service delivery (8 minutes)

i. Accessibility

8. How accessible are PEN program services for NCD patients?

Probe:

- What are the reasons for ACCESSIBILITY/INACCESSIBILITY?

ii. Availability

9. How does a health facility ensure availability of PEN program services for patients?

Probe

- How does the health facility handle the problems of the unavailability of PEN services?

10. How does a health facility ensure quality services?

Probe

- How do you ensure timely health services to the patients?
- How does your health facility ensure inclusion of marginalized and vulnerable people in service provision?

11. How is the overall utilization of PEN services by the NCD patients in your health facility?

Probe

- What are the reasons for good or poor utilization?

Health workforce (5 minutes)

12. How well trained are the health workers in NCD management in your health facility?

Probe

- How often are PEN coaching sessions held by PEN trained health service providers?

Fidelity

Next I'd like to talk with you about the guidelines for the PEN program. We know that some health care providers are not able to follow the guidelines exactly. I'm very interested in hearing your personal experience on this.

13. When you deliver the PEN program, how much do you follow the PEN program guidelines?

Probe

- Which guidelines do you follow/not follow?
- What are the reasons for following/not following the program guidelines?

Health Information system (8 minutes)

14. How is recording managed for non-communicable diseases in your health facility?

Probe

- What makes it possible to record well?

15. How is reporting for non-communicable diseases carried out in your health facility?

- How do you ensure timely reporting?
- What challenges do you face while reporting data?

Leadership and governance (8 minutes)

16. How is monitoring and supervision carried out by the health authorities in your health facility?
17. What do you do if you run into a problem with the delivery of PEN in your health facility?

Probe

- How do you report the problems?
- Who resolves the problems?
- How well are the problems resolved?

Health financing (8 minutes)

18. How do you manage PEN expenses?

Probe:

- What kind of financial support do you receive to run the PEN program?
- Who provides you funds to run the PEN program?
- What financial challenges have you faced while running the PEN program, if any?

19. What do you think about the government's health insurance provided to the patients?

Probe:

- Positive/Negative Aspects of it to the PEN services

Wrap up Questions (5 minutes)

20. What other challenges did your facility face in delivering PEN Services?
21. What would help you provide quality PEN services in your health facility?
22. We are now at the end of conversation. Do you have anything else you would like to share on the topics we discussed today?

"Great! Our discussion has been very helpful. Thank you so much for your time. Your experiences and opinions are very valuable for helping improve the delivery of the PEN program. [STOP RECORDING]"

ANNEX 7: IN-DEPTH INTERVIEW (IDI) GUIDES FOR NON-COMMUNICABLE DISEASE CLIENTS

Interview Guide for NCD Service User/client

Objective: To explore facilitators and barriers to NCD service utilization from patient's perspective using Health Belief Model

General Information: (1 minute)

Province:

District:

Municipality (Rural/ Urban):

Ward no.:

Name of health facility:

Health Facility Code no.:

Patient of:

- Hypertension/CVDs
- Diabetes Mellitus
- COPD/Asthma
- Cervical/Breast Cancer

Introduction (Patient's details): (2 minutes)

1. Please tell us about yourself?

Probe: Name:

Age:

Gender (Observe):

Marital Status:

Education:

Occupation:

Family structure and members:

Family history of any NCDs:

Knowledge of disease and PEN program (10 minutes)

2. Would you kindly tell us something about your disease?

Probes:

- What is Hypertension/CVDs or Diabetes Mellitus or COPD/Asthma or Breast/Cervical Cancer?
- Is it a Communicable/ Non-communicable disease?
- Cause of your disease?
- Signs & Symptoms

Now I'm going to ask you questions on the diagnosis of your disease and treatment process.

3. How was your disease diagnosed? Explain briefly about it.

Probe:

- When was the first time you noticed symptoms?
- Where did you go for treatment?
- Where was the final diagnosis done?
- Can you sum up your treatment experiences? Experience after the diagnosis? (full process)

Now let's talk about the treatment process, place of treatment and health services.

4. Can you share your experience on the health services you received?

Probe:

- Where do you usually go for treatment and follow up on your disease?
- Have you ever been referred to any other facility for treatment?
- To where? For what purpose? Reason for referral?
- What was the referral process like?
- Where do you usually go for treatment and follow up on your disease now?
- Why do you prefer it there/here (health facility)? (Access: cost and distance)
- Follow-up intervals
- Do other patients with the same condition visit the facility?

Now, let's talk about the treatment cost.

5. Can you tell me about the treatment cost for your disease?

Probe:

- Monthly treatment cost (On an average)
- Counselling/ Doctor's visit
- Lab test
- Medicines
- Transportation
- Others

6. How do you manage the cost?

Probe:

- Out of Pocket/Self Paid
- Various government schemes; Bipanna nagarik kosh (Medical Treatment for Deprived Citizens)/ Schemes for NCDs/ Private institutions/ hospitals/ other schemes or discounts
- National health insurance/ Private
- Are you registered in the national insurance scheme?

*Source of information

- Process
- Access (Easy/Difficult)
- Services covered by schemes

Now let's discuss the satisfaction of health services that you have received.

7. What do you think about the PEN services provided by this health facility?

Probe:

- What do you know about the PEN Program?
- Are you satisfied with the services received from this facility?
- Healthcare workers' attitude (health service providers, doctors, nurses and others)
- Opening hours
- Waiting time
- Opportunity for feedback
- How easy/difficult it is to access the health services?

Perceived Susceptibility (6 minutes)

8. What do you think could increase the chances of a person to develop …[DISEASE]?

Perceived Severity (6 minutes)

Now let's discuss how this disease has made an negative impact on you

9. How has your condition impacted your life?

Probes:

- Negative Impacts? Or any changes it has brought in your life in a negative way?
- What are the challenges to it? How do you face them?
- What do you think is the chance of cure of your disease?

Perceived benefits (6 minutes)

Now, let's discuss the positive impacts.

10. What do you think are the benefits of NCD services/PEN program?

Probes:

- Can you share any positive changes it has brought in your life?
- In your view, as a patient how important is it to have NCD services/PEN program?
- Do you think this program helps to diagnose and treat (NCDs) at an early stage?
- Can you explain to me how PEN program can be helpful to a patient?

Perceived barriers (6 minutes)

Now let's talk about the barriers that you are facing in accessing PEN services

11. What makes it hard to access NCD services?

Probe:

- How accessible are the NCD medications?
- How easily are all the necessary services available? (Consultancy, diagnosis, lab, emergency services, necessary drugs)
- What is the attitude of service providers like?
- What is the greatest challenge in accessing the services?

Perceived facilitators (6 minutes)

12. What factors support NCD patients to access PEN services easily in this health facility?

Probe:

- How does your health service provider help you for follow-up visits?
- How does your health service provide help to manage your disease?

Cues to Action (6 minutes)

13. What prompts you to visit the health facility for NCD Care?

Probes:

- Whom do you reach out and seek support from, in family and health facility/service providers?
- How supportive are they while you are seeking NCD care?
- What is your family/ peer support like, while you are seeking and adhering to the NCDs services?

Self-efficacy (6 minutes)

14. How confident are you on the quality of NCD care received from this health facility?

Probe: to follow the instructions for managing (DISEASE)

15. How practical and helpful were the counseling services provided by your health service provider for the management of NCDs?

Probes:

- Counseling on tobacco cessation
- Counseling on alcohol cessation
- Counseling to increase physical exercise
- Counseling to eat a healthy diet

Wrap up questions (5 minutes)

16. Overall, how was your experience while receiving the services from the health facility?
- How do you think we can improve the NCD services and care in Nepal?
- How would you like the quality of services at health facilities to be so that you would be interested in seeking PEN services?

17. Now, we are at the end of our conversation. Do you have anything else to add to our discussion today?

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