Original Article

Readiness of Primary Health Care System to combat Non-Communicable Diseases at Coastal District of Andhra Pradesh

Shaik Mohsina[1], M. Amarnath[2], J. Bharani Parusuram[3]

Post Graduate[1], Professor[2], Associate Professor[3]. Department of Community Medicine, Dr. Pinnamaneni Siddhartha Institute of Medical Sciences and Research foundation.

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Abstract

Background: Non-Communicable Diseases (NCD'S) kill 41 million people each year, which is 74% of all deaths globally. NCDs are estimated for 63% of all deaths in country, of which the cardiovascular diseases (27%) followed by chronic respiratory diseases (11%), cancers (9%), diabetes (3%) and others (13%). WHO offers guidance and aid to Member States to enhance NCD outcomes, advocating cost-effective measures for NCD prevention and management. It developed Package of essential non-communicable (PEN) disease interventions for primary health care in low-resource settings. These are cost-effective and can be delivered to an acceptable quality in resource-poor settings. GOI has launched National Program for Prevention and Control of Cancer Diabetes Cardiovascular Diseases and Stroke (NPCDCS) in the year 2010.

Objective: To Assess the accessibility of cardiovascular care infrastructure in primary level health care facilities.

Methodology: A cross-sectional study has been conducted among 38 Primary Health Centres (PHC) to assess their preparedness to handle NCD's using WHO - PEN criteria as standards, questionnaire was self-administered to Medical Officers (MO) at the facilities of district. Facilities were assessed for items and domains (equipment, drug supplies and laboratory services) with a main focus on management of hypertension and diabetes mellitus. Responses were collected from MO s and compared availability of an items across levels of primary care facilities.

Results: Only 62.5% of PHCs have a separate NCD clinic. Essential drugs dominate in all domains, with better availability in newly sanctioned PHCs, followed by equipment.

Conclusion: Primary health care facilities should gear up for comprehensive NCD prevention, early diagnosis, treatment, and management.

Keywords: Non communicable diseases, primary care, WHO-PEN.

Introduction

Non-Communicable Diseases (NCD'S) kill 41 million people each year, which is 74% of all deaths globally. NCDs pose a significant health challenge in country like India, and are contributing to a substantial portion of the country's disease burden.

Corresponding Author: Shaik Mohsina, Post Graduate, Department of Community Medicine, Dr. Pinnamaneni Siddhartha Institute of Medical Sciences and Research foundation.

E-mail: mohsinashaik56@gmail.com

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Cardiovascular diseases (CVD's), Hypertension, diabetes, cancer, chronic respiratory diseases account for over 80% of all premature NCD deaths**.** Lifestyle factors such as unhealthy diets, tobacco use, lack of physical activity play a pivotal role in the rise of NCDs. Of all NCD deaths, 77 % are in low- and middle-income countries[1]. In India Cardio-vascular diseases make up 29.6 % of male deaths and 25.8 % of female deaths, ranking among the top ten causes of mortality[2].

Among the age groups 30-69 Cardio Vascular Diseases constitute 36.3 % of cause of death in India[2]. India is facing the dual challenge of addressing infectious diseases while grappling with the increasing prevalence of NCDs, emphasizing the need for comprehensive public health strategies tailored to these diverse health concerns. To this as a response Government of India (GOI) has launched National Program for Prevention and Control of Cancer Diabetes Cardiovascular Diseases and Stroke (NPCDCS) in the year 2010, with focus on strengthening infrastructure, human resource development, health promotion, early diagnosis, management and referral[3]. This was renamed in 2023 as National programme for prevention and control of non-communicable diseases (NP-NCD)[4].

On the other hand, World Health organisation (WHO) offers guidance and aid to Member States to enhance NCD outcomes, advocating cost-effective measures for NCD prevention and management has designed a WHO Package of Essential Non-Communicable Disease (PEN) interventions to improve the coverage of appropriate services for people with NCDs services in primary care settings especially for low to middle income countries[5].

Table 1: Checklist for quick assessment of the facility[5]

Domain	**Observation points**
How are NCD's managed now?	Flow of patients in the facility, Where is BP taken How are NCD's managed?
What NCD's are covered? Patient care services	Is there a separate NCD clinic? NCD treatment guidelines available?
Staff	Dedicated staff for NCDs? Staff trained in NCD diagnosis and treatment?
Equipment	BP apparatus, Glucometer, weighing machine, height measuring tape
Laboratory services	Urine for albumin, sugar, ketones, blood sugar, cholesterol.
Medicines	Are essential NCD drugs available? (metformin, amlodipine, etc.)
Records and reports	Unique ID Number for patients separate NCD register? Computerized records?
Referral system	Nearest referral centers.

Table 2 WHO essential technologies and tools for implementing essential NCD interventions in primary care

Technologies	Tools:
Thermometer	WHO/IHD risk prediction chart
Stethoscope	Evidence based clinical protocols
Blood pressure measurement device	Flow charts with referral criteria
Measurement tape	Patient clinical record
Weighing machine	Medical information register
Peak flow meter	Audit tools
Spacers for inhalers	
Glucometer	
Blood glucose test strips	
Urine protein test strips	
Urine ketones test strips	
And when resources permit	
Nebulizer	
Pulse oximeter	
Blood cholesterol assay	
Lipid profile	
Serum creatinine assay	
Troponin test strips	
Urine microalbuminuria test strips	
Tuning fork	
Electrocardiograph (if training to read and interpret electrocar diograms is available)	
Defibrillator	

Health care delivery system in India is provided by both public and private sector system, public sector health services in India are organized as a three-tier hierarchical system, comprising primary (subcentres and PHCs), secondary (CHCs, taluka and district hospitals) and tertiary (medical colleges and teaching hospitals). At the primary level, a sub-centre (SCs) established to serve a population of 3000 – 5000, primary health centre (PHCs) for a population of 20 000 – 30 000, community health centre (CHCs) for a population of 80 000 – 120 000, CHC's acts as First Referral Units (FRUs)[6].

Research Gap: Non-communicable diseases (NCDs) are a major public health concern in India, yet there is limited region-specific evidence on the readiness of primary healthcare (PHC) systems in Andhra Pradesh to manage them. Most existing studies focus on tertiary care, disease prevalence, or specific interventions rather than a comprehensive assessment of PHC preparedness, highlighting the need for research to inform evidence-based strengthening of the system.

Need of the study: Given India's resource constraints, periodic assessments of the healthcare system are essential**,** the study aimed to evaluate cardiovascular care accessibility in primary healthcare facilities, focusing on NCDs like Hypertension and Diabetes, using the Package of Essential Noncommunicable Disease (PEN) Interventions criteria. This assessment emphasized understanding the facility's capacity and resources for managing NCDs.

Materials and Methods

Study setting:

Andhra Pradesh is an 8th largest state in India with 26 districts[7], holding a population of 8.64 crores, (as per 2011 census)[8]. Nellore District situated in the South Eastern portion of the state with a coastal length of 163 Km bounded by Bay of Bengal on the East with 10 CHC's, 2 area Hospitals and 54 PHCs.

The World Health Organization's Package of Essential NCD Interventions (WHO PEN)[5] outlines vital technologies necessary for low-resource settings. It includes a list of essential technologies and drugs crucial for primary care, prioritizing simpler tools that must be available and allowing for additional resources to expand capabilities. However, the WHO-PEN doesn't specify human resource needs or differentiate between levels of primary care facilities, focusing primarily on the necessary medical tools and medications.

The questionnaire has been categorized into five domains: Human resources, equipment, point-of-care supplies, laboratory-based tests, and drugs, focusing on hypertension and diabetes. The questionnaire

included four essential drugs for hypertension (ACEI/ ARB, Beta blockers, CCB, and Thiazide diuretics) and four commonly used drugs for diabetes (Metformin, Glibenclamide, Glimepiride, and Insulin). Responses were expected as Yes, no, or available in working condition not available. We grouped key facilities necessary for managing these conditions, aiming to assess the public health system's readiness. To ensure accurate reporting and protect participants from potential administrative consequences related to system deficiencies, we opted not to collect any personal identifiers (such as respondent names or facility names) for this study. Institutional ethics clearance was secured.

A cross-sectional study has been conducted among 38 primary health Centres (PHCs) in the district to assess their preparedness to handle NCD's using WHO – PEN[6] criteria as standards, questionnaire was self-administered to Medical Officers (MO) at the facilities of district. Facilities were assessed for items and domains (equipment, drug supplies and laboratory services) with a main focus on management of hypertension and diabetes mellitus. Responses were collected from MO s and compared availability of the items across levels of primary care facilities. The data was processed and analysed using Microsoft Excel to derive percentages and proportions.

Results

The facility-based assessment of PHC's is categorized into two main groups. The one category assesses readiness for handling diabetes, while the other evaluates hypertension management capabilities. Among the 38 PHC's surveyed, about 23 (60.5%) had NCD clinic separately. Twenty-eight (73.7%) PHC 's has computerised records of NCD patients. In equipment domain, sphygmomanometer is present in working condition in almost all PHC's. Minimum laboratory services for diagnosing diabetes i.e., glucometer is present in 76.3% of PHC's. 18.4% i.e., 7 PHC's reported that it is in not working condition (fig 2). and urine tests for sugar and ketone bodies are present in only 34 (89.5%) and 13 (34.2%) respectively (table 3).

Table 3: showing availability of laboratory services domain

Domain	Variable			Primary health centre
		Total (n=38)	Available (n)	Percentage (%)
Point of care testing supplies	Urinary protein	38	37	97.4 %
Laboratory tests	Urine ketone bodies	38	13	34.2%
	Plasma Glucose estimation	38	38	100 %
	Serum cholesterol/ lipid profile	38	0	0 %

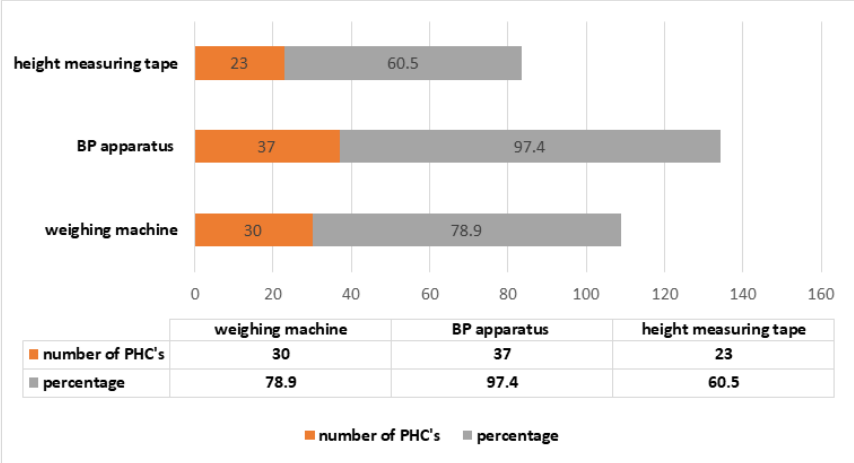

Fig 1 showing availability of basic equipment measuring BMI and BP

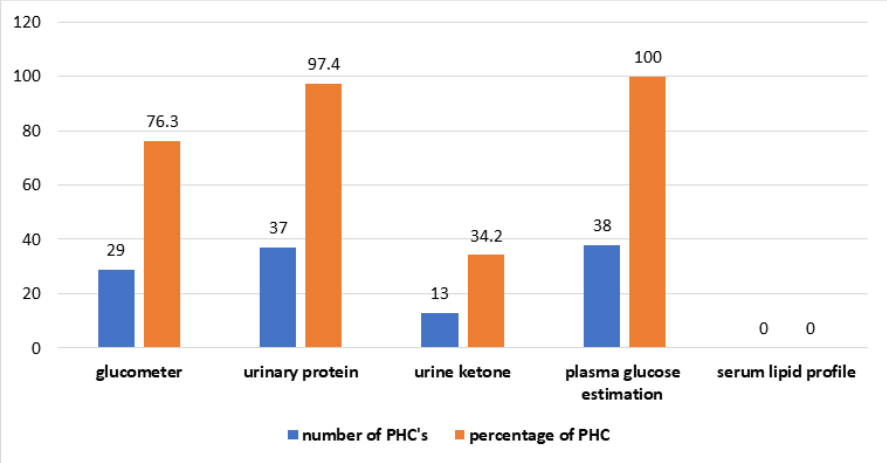

Fig 2: showing availability of laboratory services to diagnose any complications.

Table 4: showing the availability of drugs for HTN and DM in PHC

Domain	Variable	Total (n=38)	Primary health centre	
			Available(n)	Percentage (%)
Drugs for Hypertension	Beta blocker (atenolol)	38	38	100 %
	CCB (amlodipine)	38	38	100 %
	ARB's telmisartan	38	37	97.4 %
	ACEI enalapril	38	35	92.1 %
	Thiazide diuretics	38	29	76.3 %
	Furosemide	38	35	92 %

Domain	Variable			Primary health centre
Drugs for Diabetes mellitus		Total (n=38)	Available (n)	Percentage (%)
	Metformin	38	38	100 %
	Glibenclamide	38	22	57.9 %
	Glimepiride	38	38	100 %
	Insulin	38	26	68.4 %
	Any statin (Atorvastatin)	38	35	92.1 %

All facilities have drugs for both conditions, with metformin and glimepiride dominating the anti-diabetic medications (Table 4). Medications such as telmisartan, amlodipine, and atorvastatin instead of simvastatin (which is a core list medicine in statins as per WHO-PEN standards) are predominant across all forms, while thiazide drugs are less commonly present (Table 4).

This current study on facility assessment reveals strength in medicine availability and human resources but challenges exist with insufficient laboratory services. The study indicated that patients are frequently referred to larger facilities for basic lab services such as cholesterol and ketone bodies testing, putting strain on both tertiary care facilities and patients.

Limitations: This study is limited by potential response bias from medical officers and a sample size that may not be representative of the entire healthcare system.

Discussion

In order to achieve universal health coverage primary health care is the most cost-effective way

that every country can afford[9]. Long-term investment in evidence-based NCD prevention and control can enhance health system strength[10]. A systematic review on public sector capacity for Noncommunicable Disease prevention and control in twelve low- and middle-income countries, based on WHO-PEN standards, revealed readiness index scores ranging from 13.5% to 51% among countries[11]. The present facility assessment highlights significant deficiencies in essential components crucial for managing NCDs at the primary care level. Similar study done in Uganda found resource gaps in all facilities in screening and management of NCD services[12]. Primary health care centres exhibited greater deficiencies compared to CHCs in a similar study conducted in Madhya Pradesh[13].While human resources meet requirements in our study, laboratory services are insufficient to diagnose NCDs effectively, sustaining their adequacy and availability remains essential, and availability of necessary drug classes, equipment, supplies, and enhancing point-of-care testing capabilities needed. There is significant variability in in rural to urban facilities in a survey done by Krishnan et al[14] which raises concerns about quality of health services and health outcomes in rural areas, also raises questions about equity in health care access, our study was limited to only public facilities.

Conclusion

In conclusion, this assessment serves as a vital step in recognizing the existing gaps and provides a roadmap for targeted interventions and policy enhancements to strengthen the primary healthcare system's capacity in managing NCDs effectively. This study's findings should guide strategic planning and resource allocation to improve the readiness of primary health centres in combating the increasing burden of Non-Communicable Diseases. Regular evaluations of primary health centers are crucial to ensure they meet minimum standards in serving rural populations. Additionally, providing basic lab services at the primary health level can help reduce the burden of non-communicable diseases (NCDs). Changes are necessary to enhance adequacy and expand lab services appropriately to effectively address NCD's.

Consent to participate: Before conducting the facility assessment verbal informed consent was taken from the medical officers assuring them that their identity will be kept confidential. Necessary permission was taken from district administration.

Ethical approval: The research protocol for the study was reviewed and approved by the institutional ethical committee at Dr. Pinnamaneni Siddhartha Institute of Medical Sciences and Research foundation Gannavaram, Andhra Pradesh, India. With approval Number: PG/1057/24 .The ethical guidelines of our university were strictly followed

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Conflict of interests: None

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