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Institutional capacity for non-communicable disease care in Ghana's primary health care system: a multi-method study

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Abstract

Background The burden of non-communicable diseases (NCDs), including hypertension, diabetes, and mental health conditions, is escalating in Ghana. Robust primary health care policies and effective health systems can prevent illness and complications and improve quality of life for ambulatory care-sensitive conditions like hypertension, diabetes and mental health. Understanding the capacity of Ghana's PHC system to manage NCDs is critical for designing effective policies. However, published evidence on this is limited. In this study we evaluated Ghana's primary health care system capacity to manage these NCDs effectively.

Methods A multi-method approach combined a desk review of national policy documents with a cross-sectional survey of 207 PHC facilities in the Greater Accra and Eastern Regions. The desk reviews analyzed policy goals, resource allocation, and training provisions for NCD care. The survey, conducted between October 2023 and February 2024, used the World Health Organization (WHO) Service Availability and Readiness Assessment (SARA) tool to evaluate service availability and readiness for hypertension, diabetes, and mental health services across domains such as staff, guidelines, equipment, diagnostics, and medications. Multivariable logistic regression using Stata 18 assessed readiness determinants, adjusting for facility type, managing authority, location (urban/rural), and region, with standard errors clustered at the district level. Ethical approval was obtained from the Ghana Health Service and the London School of Hygiene and Tropical Medicine.

Results A total of 13 national policy documents were reviewed, highlighting strong frameworks for resource allocation, workforce training, and NCD care integration into PHC, but revealing gaps in rural resource distribution and lower-tier workforce training. Service availability was highest for hypertension (39%), followed by mental health (38%) and diabetes (35%). District hospitals exhibited the most comprehensive availability (100% for hypertension and diabetes, 79% for mental health), while Community-based Health Planning and Services (CHPS) compounds had

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the lowest (4.2%). Readiness followed similar trends, with district hospitals scoring 77%–82%, and CHPS compounds 30%–36%. Medication availability was critically low, ranging from 1.6% for diabetes to 3.9% for mental health. Logistic regression identified private and urban facilities as having higher readiness than public and rural counterparts.

Conclusion Significant disparities exist in the readiness of PHC facilities in the Greater Accra and Eastern Regions of Ghana to manage NCDs. Targeted interventions to strengthen CHPS compounds, address rural gaps, and improve medication availability are essential for achieving equitable NCD care delivery.

Keywords Non-Communicable Diseases, Primary Health Care, Service Availability, Service Readiness

Introduction

Non-communicable diseases (NCDs), including cardiovascular diseases, diabetes, cancers, mental health and chronic respiratory diseases, represent a significant and growing public health challenge worldwide, with a greater burden in low- and middle-income countries (LMICs) like Ghana [1, 2]. These chronic conditions contribute to a high burden of morbidity and mortality, placing significant strain on health care systems and leading to adverse socioeconomic consequences, affecting productivity and economic development [1–6].

In Ghana, NCDs account for a significant share of the disease burden, with hypertension affecting approximately 30% of the population, obesity among women at 17%, diabetes prevalence at 8.8%, and anemia at 41% [1, 7, 8]. Mental, neurological, and substance use conditions are also widespread in Ghana, with approximately 10% of the population experiencing common mental health conditions and 1–3% affected by severe conditions such as schizophrenia [9, 10]. Despite this high burden of NCDs, significant gaps in detection and treatment persist, particularly in rural primary care settings [11, 12]. Similar trends are observed across LMICs, where systemic resource constraints, limited access to care, and inadequate healthcare worker training exacerbate the NCD burden. Challenges with undiagnosed and poorly managed conditions, such as hypertension and diabetes, are well documented in countries like Nigeria and India, highlighting a shared global issue [13–16]. Addressing NCDs, particularly mental health, diabetes, and hypertension, is crucial as these conditions contribute significantly to the NCD burden and intersect with broader social, economic, and health inequities [5, 17]. Mental health issues often go untreated, with severe socio-economic repercussions such as reduced productivity and increased poverty. Meanwhile, diabetes and hypertension remain major risk factors for cardiovascular diseases, which account for over 80% of global cardiovascular-related deaths in LMICs [18–20].

To effectively tackle these NCDs, a robust and well-structured health system is essential. Primary health care (PHC) systems play a critical role in managing and preventing these conditions, including LMICs like Ghana [21–23]. PHC provides the first point of contact for

individuals within the health care system, offering preventive care and managing ambulatory care-sensitive conditions, thereby reducing the burden on higher-level health care facilities and minimizing complications and mortality [24–26]. Strengthening PHC to address the growing burden of NCDs is therefore vital to achieving equitable and sustainable health care delivery.

In Ghana, the health care system is structured into three tiers: primary, secondary, and tertiary care. The PHC system, which forms the foundation of this structure, includes Community-based Health Planning and Services (CHPS) compounds, health centers, and district hospitals [27]. CHPS compounds, located in communities, are the most basic units of care, staffed by community health officers who deliver preventive and basic curative services [28]. Health centers provide a broader range of services, including maternal and child health and minor surgical procedures. Polyclinics are higher-level primary care facilities, usually located in urban areas, that offer a broader spectrum of outpatient services, including general medical care, minor emergency care, and selected diagnostic services, often functioning between health centres and district hospitals in terms of service complexity. District hospitals, the apex of primary care, offer more advanced medical and surgical services while acting as referral points for lower-tier facilities [29, 30]. This decentralized model is intended to ensure accessibility and comprehensiveness of care, particularly for underserved populations in rural and peri-urban areas [31]. National treatment guidelines require the management of NCDs such as hypertension, diabetes, and mental health issues across all tiers, with CHPS compounds focusing on prevention, health centers handling uncomplicated cases, and district hospitals managing complex cases [32]. Recognizing the pivotal role of policies in shaping NCD management, Ghana has developed several national strategies aimed at addressing these conditions within the PHC framework. These policies emphasize the integration of NCD services across all tiers of the health-care system, focusing on early detection, prevention, and equitable service delivery [33, 34]. Despite progress in addressing NCDs, challenges persist in the readiness of Ghana's PHC system to manage the rising prevalence of these conditions [32, 35]. While the country's health care

system has historically focused on managing infectious diseases, the increasing burden of chronic conditions highlights a mismatch between health system capacities and population health needs [36, 37]. Previous research on NCD management in Ghana has primarily focused on tertiary care facilities or disease-specific interventions, leaving a critical knowledge gap regarding the preparedness of the PHC system [33, 34, 38–40]. For the few studies that have explored NCD management within PHC settings, the methodologies are limited to small-scale, case study-based analyses, such as assessments involving only a few district hospitals or health facilities, which restrict broader applicability [32, 34, 38, 40, 41]. This narrow focus limits insights into the broader systemic challenges of PHC readiness. Consequently, there is insufficient regional-level data with broad facility representation on service availability and preparedness for managing key conditions like hypertension, diabetes, and mental health. Addressing this gap necessitates comprehensive, multi-facility research that evaluates PHC capacity for NCD care across diverse geographical and operational contexts within these regions of Ghana.

In this study, we conceptualise institutional capacity primarily in terms of structural service availability and readiness for NCD care at the primary health care level, as measured using the WHO Service Availability and Readiness Assessment (SARA) framework. While institutional capacity more broadly encompasses governance, financing, referral systems, supervision, health information systems, and quality of care, these dimensions were outside the empirical scope of this analysis.

This study addresses the limitations of previous research by evaluating the availability and readiness of PHC facilities to manage hypertension, diabetes, and mental health across two regions of Ghana. By using a broader and more diverse range of facilities, this study captures critical rural–urban dynamics and provides valuable regional insights beyond prior studies. Additionally, the study assesses whether existing policy frameworks align with PHC capacity to address service availability and readiness across key domains, including infrastructure, workforce, guidelines, diagnostics, medicines, and equipment. By identifying strengths and areas for improvement, the study provides actionable insights for strengthening PHC capacity to deliver effective NCD management.

Understanding how the PHC system can better manage these conditions is crucial for improving public health outcomes, reducing healthcare costs, and enhancing the quality of life for individuals affected by chronic diseases. This research is part of a broader effort of the NIHR Global Health Research Centre for NCD Control in West Africa, which aims to improve NCD prevention, diagnosis, and treatment in Ghana, Burkina Faso, and Niger.

Funded by the National Institute for Health and Care Research (NIHR), the Centre focuses on hypertension, diabetes, and co-existing stress, anxiety, and depression. The Centre aims to strengthen capacity, engage stakeholders, and implement evidence-based interventions by co-producing adaptable packages, evaluating their cost effectiveness, and analyzing stakeholder roles. These efforts are designed to inform scalable and sustainable NCD management solutions while enhancing research, community engagement, and policy capacities across West Africa [42].

Methods

This study utilizes a multi-method approach, combining quantitative research with a desk review of policies on NCDs in Ghana. The quantitative component involves a cross-sectional survey using the Service Availability and Readiness Assessment (SARA) tool developed by the World Health Organization (WHO). The SARA tool is a standardized methodology designed to systematically assess and monitor the capacity of health care facilities to provide essential health services. It evaluates two key dimensions: service availability, which measures whether a facility provides specific services and service readiness, which examines the facility's capacity to deliver those services, including trained staff, equipment, diagnostic tools, and essential medications [43]. SARA provides a comprehensive and reliable framework for identifying gaps in health care delivery, enabling targeted interventions to improve service delivery. The desk review component involves an analysis of national policies and strategic documents to identify systemic and policy-related challenges and opportunities to strengthen NCD care in Ghana. The version of the SARA questionnaire used for data collection has been included as a supplementary file for reference (See Supplementary Material).

Primary data for the SARA survey were collected by the NIHR Global Health Research Centre for Non-Communicable Disease Control in West Africa (STOP-NCD) research team through interviewer-administered assessments conducted between October 2023 and February 2024 across 207 primary health care facilities in the Greater Accra and Eastern Regions of Ghana. These data were generated through field data collection undertaken as part of the NIHR Global Health Research Centre for Non-communicable Disease Control in West Africa. After receiving national ethical clearance, the approval letter was formally communicated to the Regional Health Directorates and subsequently to the District Health Management Teams, who were briefed on the study objectives and procedures. However, individual facilities were not pre-informed about the specific visit dates; assessment teams visited facilities without prior

notification to minimise preparation bias and obtain a realistic measure of routine service availability and readiness.

The assessment team consisted of trained field enumerators with health-related backgrounds, most of whom were awaiting national service placement or were unemployed at the time of data collection. These enumerators were not government staff and were recruited specifically for this study through the STOP-NCD project. Prior to fieldwork, all assessors underwent structured training on the WHO SARA tool, ethical procedures, and standardised data collection protocols to ensure high-quality and consistent assessments across facilities.

Each facility assessment took approximately 45–120 min to complete, depending on the facility type and the time required to verify tracer items. Each facility was assessed by one to two trained enumerators, depending on the size of the facility and field team availability. The assessment findings were not shared with individual facilities at the end of the visits, as the study required independent verification without facility-level consensus-building. However, aggregated results were disseminated to the Regional Health Directorates and District Health Management Teams as part of stakeholder engagement meetings.

Sample size

Desk review

For the desk review, websites of key organizations such as the Ministry of Health, Ghana Health Service, Mental Health Authority, Ghana NCD Alliance were searched for documents on policy, strategy, and guidelines for NCD prevention and Control in Ghana. The criteria for selecting the national policies and regulatory documents for NCD control in Ghana include: (i) that the documents must have a national character and be operationalised at the national level (ii) that documents must be endorsed by the government of Ghana represented by the sector ministry (Ministry of Health) (iii) document must be addressing at least one of the three disease conditions (i.e., Diabetes, Hypertension and Mental health). The exclusion criteria include (i) policy documents that focused on other communicable diseases or other disease conditions other than NCDs (ii) local policies/plans/strategies only operationalized at the local level (i.e., regional, district or sub-district level), (iii) international or donor-driven policies/resolutions/protocols not officially adopted by Ghana. In all, 56 documents were retrieved with 13 meeting the inclusion criteria after screening and proceeding for analysis (See table A1).

Ghana's health system operates under a unitary governance structure, where policy formulation is centralised at the national level. National agencies, including the Ministry of Health, Ghana Health Service, Mental Health

Authority, and related bodies, develop all formal NCD policies, guidelines, and strategic frameworks. Regional and district health directorates do not produce independent NCD policies; instead, they adapt and implement national policies through annual operational plans. For this reason, the desk review focused exclusively on national-level policy documents, as no regional NCD-specific policies exist for assessment.

Service availability and readiness assessment

The sampling strategy for this study was developed in accordance with the guidelines of the SARA manual to ensure a comprehensive assessment of service availability and readiness for NCD management across diverse settings in Ghana [43]. The strategy followed a systematic, multi-stage approach. In the first stage, two regions, Greater Accra (GA) and Eastern Region (ER) were selected. This selection was intended to capture varied geographical and contextual differences within the country.

In the second stage, ten districts were randomly selected from these two regions based on proportional representation, with four districts from GA and six from ER. The randomization strategy involved assigning unique identifiers to all districts within each region and using a computerized random number generator to ensure unbiased selection. The selected districts in GA included three urban districts (Ga South, Ayawaso West, and Tema West Municipal) and one rural district (Ada East). In ER, four rural districts (Upper West Akim, Kwahu Afram Plains North, Akyemansa, and Ayensuano) and two urban districts (Nsawam Adoagyiri and Yilo Krobo) were chosen, ensuring a comprehensive representation of both urban and rural contexts. In the final stage, all public and private primary health care facilities listed by the District Health Management Teams (DHMTs) as PHC facilities were included, provided they met the study's functionality criteria. A facility was considered functional if it had an existing physical structure, was open and operational at the time of data collection and was actively providing primary health care services. Facilities that were closed, under construction, or without a physical structure were excluded. In total, 207 facilities met these criteria and were included in the assessment (See Fig. 1 for a map of the sampled facilities).

This inclusive approach ensures that all operational PHCs within the selected districts are evaluated, providing robust data on NCD management capabilities without relying on a predetermined sample size. Notably, the selected sample size of 207 facilities surpasses the SARA manual's minimum recommendation for regional-level assessments, ensuring sufficient statistical power to assess service availability and readiness. While the study enhances facility-level representation within the chosen

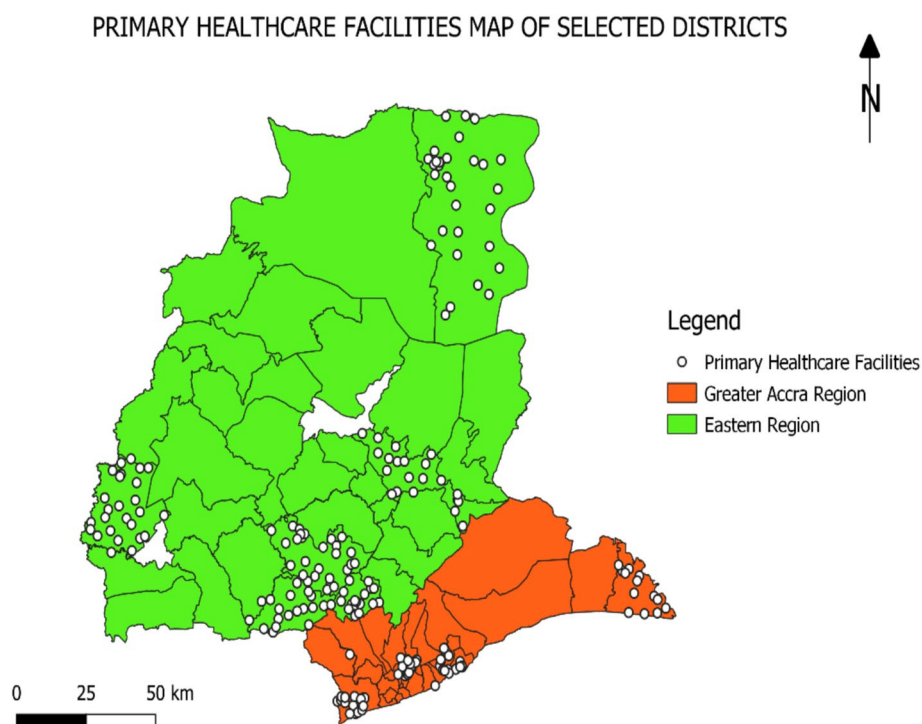


Fig. 1 Map of sampled PHCs

districts, its sample size reflects the total number of functional PHCs rather than a predefined target, which may limit the generalizability of findings to the national level. Nevertheless, this methodology adheres to SARA guidelines, offering a comprehensive and practical evaluation of NCD management readiness across diverse contexts.

Data analysis

For the desk review, national policy and regulatory documents relevant to non-communicable disease (NCD) management and primary health care (PHC) in Ghana were systematically identified and reviewed for the period 2010–2022. Documents were retrieved through targeted searches of official government and institutional websites, including the Ministry of Health, Ghana Health Service, and WHO Ghana, alongside complementary grey literature sources such as national strategies, policy briefs, and regulatory frameworks. Search terms included combinations of “non-communicable diseases,” “hypertension,” “diabetes,” “mental health,” “primary health care,” “policy,” and “Ghana.” Identified documents were screened for relevance to PHC and NCD service delivery; documents that were not policy or regulatory in nature, not directly related to PHC-level NCD care, or superseded by updated versions were excluded. Included documents were systematically categorised into key thematic areas, policy goals, resource allocation, training and capacity building, service delivery, and PHC integration and thematically coded against domains aligned with

the WHO SARA framework (staff and guidelines, equipment, diagnostics, medicines and commodities, and service delivery). Coding was undertaken by the lead author and reviewed for consistency. As policy documents do not contain empirical outcome or implementation data, the desk review focused on policy content and alignment with service readiness domains rather than assessing policy effectiveness.

Service availability refers to the percentage of health care facilities that can diagnose and/or manage specific NCDs. In this study, we assessed the availability of services for hypertension, diabetes, and mental health disorders. The data for service availability were collected based on the standardized criteria outlined in the SARA manual as seen in the table A2. These criteria ensure that the results are comparable across different health care settings and provide a clear picture of the current state of service provision for these chronic conditions.

Service readiness assesses the ability of health care facilities to provide specific services, focusing on key domains such as staff and guidelines, equipment, diagnostic capabilities, and the availability of medicines and commodities. Each domain is evaluated based on the mean availability of tracer items, which are essential for the diagnosis and management of the selected NCDs. Tracer items were verified through direct observation during facility assessments, and domain scores reflect the proportion of required tracer items available at the facility on the day of the survey, rather than the presence of

any single item. The study employed the WHO SARA tool to evaluate the service readiness of health care facilities for managing three key NCDs: hypertension, diabetes, and mental health disorders. The assessment of service readiness was conducted across three critical domains: staff guidelines, essential equipment, and the availability of necessary medications. For hypertension management, details on the availability of staff guidelines, equipment (such as stethoscopes and blood pressure apparatus), and essential medications (including ACE inhibitors and beta-blockers) are provided in the supplementary table A3. Similarly, the evaluation of diabetes management, including the availability of guidelines, diagnostic tools (e.g., blood glucose measurements), and medications like metformin and insulin, is outlined in supplementary table A4. For mental health management, supplementary table A5 provides information on the availability of guidelines, necessary equipment, and psychotropic medications such as amitriptyline, diazepam, and risperidone. The domain scores for each category were calculated based on the mean availability of tracer items, with the overall service readiness index being the average of these domain scores. This structured approach provides a comprehensive understanding of the readiness of health care facilities to manage these NCDs, highlighting both strengths and areas for improvement. Full details are available in the supplementary materials for further reference.

Univariate and multiple logistic regression analyses were performed to identify factors influencing the readiness of health care facilities to provide services for specific NCDs, including hypertension, diabetes, and mental health conditions. The readiness of facilities was modeled as a binary outcome, with a readiness score of 70% or higher indicating that a facility was equipped to deliver NCD care [40, 44]. The focus on readiness, rather

than availability, is justified by the need to assess not just the presence of services but the actual capacity of facilities to deliver effective and quality care, which requires adequate infrastructure, trained staff, equipment, and essential medication, factors critical for managing NCDs. The binary readiness outcome reflected whether facilities had the necessary staff, guidelines, equipment, and medications for managing these conditions. The univariate logistic regression was used to assess crude associations between factors such as the facility type, managing authority (public vs. private), location (urban vs. rural), and region (See table A6 for the description of the variables used in the analysis). Multivariable logistic regression using Stata 18 assessed readiness determinants, adjusting for facility type, managing authority, location (urban/rural), and region, with standard errors clustered at the district level. Variance inflation factors indicated no evidence of problematic multicollinearity among covariates. Sensitivity analyses using $\geq 60\%$ and $\geq 80\%$ thresholds was conducted. All analyses were conducted using STATA 18 [45], providing a comprehensive assessment of the determinants of facility readiness for NCD management.

Results

Desk review

We found thirteen documents that concern NCD control. The findings of the analysis of these documents are presented below, according to the themes in the study framework. Table 1 illustrates the findings from the desk review, according to these predetermined themes.

Seven policy documents have objectives that are directly or indirectly related to strengthening institutional capacity for NCD control at the primary care level [46–52]. These policy goals include generally strengthening the health care delivery system [53] and more

Table 1 Policy documents according to themes

Title of Document	Relevant Policy Goals	Resource Allocation	Training and Capacity Building	Service Delivery	Integration with PHC
National Policy, Non-communicable Diseases, Second Edition, MoH, Ghana	✓	✓	✓	✓	✓
The National Health Policy	✓	✓	✓	✓	✓
National Medicines Policy, 3rd Edition 2017	✓	✓	✓	✓	
Ghana National Alcohol Policy 2016			✓		
Mental Health Policy 2019–2030	✓	✓	✓	✓	✓
National Guidelines for the Management of Cardiovascular Diseases		✓	✓	✓	
Strategic Plan 2019–2022, Mental Health Authority	✓	✓	✓		
Narcotics Control Commission Act, 2020 (Act 1019)			✓		
Excise Duty (Amendment) Act, (Act 1108)			✓		
Mental Health Act (Act 846)	✓				✓
Public Health Act (Act 851)	✓		✓	✓	✓
Tobacco Control regulation (LI2247)			✓		
National Nutrition Policy			✓	✓	✓

specifically for NCD care [54] and reducing NCD burden through effective management strategies [54]. Other policy goals encompassed ensuring fair financing systems for universal access to NCD care [50–52] and essential medicines, and fostering medicine affordability [46], providing NCD care in collaboration with the general health care system, providing NCD services at all levels of care (including primary care), training and retaining qualified NCD staff [49, 50], as well as integrating NCD care into PHC [50, 52].

A total of six policy documents make provisions concerned with allocating resources for general and NCD care in PHC [46, 47, 50–53]. This includes financial resource mobilization by including NCDs in the benefit package of the National Health Insurance Scheme (NHIS) and leveraging public–private partnerships to increase funding for these conditions [47, 50–52]. There is also policy support for providing other important resources such as essential medicines for improved NCD care [46, 51] and well-equipped ambulances for emergency response to NCDs [53].

Also, ten documents reviewed provide direction for training and building health workforce capacity for NCD care [46–48, 50–56]. These documents mention the need to develop guidelines for NCDs such as diet-related NCDs [54], and establish frameworks for continuously training and building the capacity of health workers at the PHC level [46–48, 50–52]. Also, some of these policies aim to strengthen training institutions in training qualified health professionals to deliver NCD care [50–52, 54, 55]. Others provide specific guidelines for basic and advanced measures for NCD control by the public and health professionals, respectively [53].

We found seven documents concerned with improving service delivery for NCDs [46–48, 51, 52, 54, 55]. These policies and guidelines emphasize the early detection and appropriate management of NCDs at all health care levels, especially in PHC [46–48, 50, 51], and provide necessary guidance for drug prescription and patient referral [53]. Others such as the national nutrition policy highlight the intention to implement interventions aimed at NCDs [54]. Furthermore, the national NCD policy establishes plans for removing bottlenecks in NCD care at the primary level by addressing infrastructural, logistic, and other relevant issues affecting NCD care in PHC [51].

A total of six documents included plans to integrate NCD care at the PHC level [47–51, 54]. These policies underscore the provision of NCD care at all levels of health care in the country, stressing care provision at the PHC level to ensure adequate health education, prompt case detection, and appropriate management of NCDs [47–51]. The national nutrition policy also seeks to increase the capacity of the health system to implement interventions at all levels of health care [54].

Service availability and readiness

Table 2 provides an overview of the facility characteristics and the availability of services for hypertension, diabetes, and mental health conditions across the selected primary health care (PHC) facilities in GR and ER regions of Ghana.

The majority of the health facilities were CHPS compounds (56.0%), followed by health centers (30.9%), polyclinics/clinics (6.3%), and district hospitals/hospitals (6.8%). The distribution of facilities between public and private ownership showed that 82.1% were public, while 17.9% were privately managed.

Service availability for hypertension, diabetes, and mental health varied significantly across facility types. District hospitals/hospitals exhibited the highest service availability for hypertension and diabetes, with 100% of these facilities offering diagnostic and management services for both conditions. Mental health services were less available, with 78.6% of district hospitals providing these services. In contrast, CHPS compounds had the lowest service availability across all three conditions, with only 4.2% of these facilities offering hypertension, 2.5% for diabetes and mental health services.

When comparing urban and rural locations, urban facilities had notably higher service availability for all three conditions. For example, 71.8% of urban facilities offered hypertension services, compared to only 16.0% in rural areas. A similar trend was observed for diabetes and mental health services, highlighting the disparity in health care service provision between urban and rural areas.

Service readiness

The results, detailed in Tables 3, 4, and 5 indicate significant variability in service readiness depending on the facility type, managing authority, and location. The overall average service readiness for hypertension management was 45.5%, with district hospitals/hospitals showing the highest readiness at 77.3%. CHPS compounds again scored the lowest, with a readiness index of 30.8%. Urban facilities demonstrated higher readiness (61.8%) compared to rural facilities (34.5%). Private facilities outperformed public ones, with a readiness score of 77.5% compared to 38.0% for public facilities.

In addition, service readiness for diabetes management was 50.6%. District hospitals/hospitals had the highest readiness score of 81.6%, while CHPS compounds lagged significantly behind at 35.7%. Like hypertension, urban facilities (65.8%) had higher readiness compared to rural facilities (40.31%). Private facilities showed superior readiness (79.0%) over public facilities (44.0%). The overall service readiness for hypertension medications was 17.1%, with district hospitals having the highest availability at 58.6%. Medication readiness was lowest in CHPS

Table 2 Facility characteristics and service availability

Facility Characteristics			Service Availability		
	Number of facilities(n)	Percentage	Hypertension (%)	Diabetes (%)	Mental Health (%)
Type of facility					
District Hospital/Hospital	14	6.8	100.0	100.0	78.6
Polyclinics/Clinics	13	6.3	92.3	92.3	84.6
Health Centre	64	30.9	76.9	75.4	75.4
CHPS	116	56.0	4.2	2.5	2.5
Managing authority					
Public	170	82.1	24.7	21.1	27.1
Private	37	17.9	97.5	95.0	82.5
Location					
Urban	83	40.1	71.8	67.0	65.9
Rural	124	59.9	16.0	13.6	19.2
Districts					
Ada East	13	6.3	30.0	15.4	46.2
Ayawaso West	16	7.7	21.4	21.4	81.3
Ga South	16	7.7	100.0	100.0	93.8
Tema West	15	7.3	100.0	100.0	81.3
Upper West Akim	20	9.6	15.0	15.0	10.0
Nsawam Adoagyiri	16	7.7	43.8	25.0	62.5
Akyemansa	25	12.1	11.5	7.7	11.5
Ayensuano	28	13.5	21.4	21.4	25.0
Kwahu Afram Plains North	38	18.4	13.2	10.5	15.8
Yilo Krobo	20	9.7	28.6	28.6	23.8
Regions					
Greater Accra	60	29.0	83.6	80.3	77.0
Eastern	147	71.0	20.1	16.8	22.2
Overall	207		38.6	35.2	38.1

compounds, with only 1.6% availability. Urban facilities (33.8%) and private facilities (55.0%) showed higher medication readiness compared to rural (5.8%) and public facilities (8.2%), respectively. The overall service readiness for diabetes medications was 20.4%, with district hospitals exhibiting the highest availability at 71.4%. CHPS compounds had the lowest medication readiness for diabetes, with only 2.2% availability. Urban facilities (38.1%) and private facilities (58.0%) showed higher medication readiness compared to rural (8.3%) and public facilities (11.5%), respectively.

The readiness for mental health services was notably lower, with an overall readiness score of 44.2%. District hospitals/hospitals led with a score of 68.9%, while CHPS compounds had a readiness score of 31.3%. Urban facilities were more prepared to handle mental health conditions, with a readiness score of 57.5%, compared to 35.1% in rural areas. Private facilities were better equipped for mental health services (67.5%) than public ones (38.7%). The overall service readiness for mental health medications was 13.0%, with district hospitals showing the highest availability at 37.1%. CHPS compounds had the lowest readiness, with only 3.9% medication availability for mental health services. Urban facilities (22.2%) and private facilities (25.0%) demonstrated higher medication

readiness compared to rural (6.8%) and public facilities (10.2%), respectively.

Factors associated with service readiness

Table 6 presents the factors associated with the readiness of facilities to provide NCD management services, with both unadjusted and adjusted odds ratios reported. The type of facility was a significant determinant of service readiness across all three NCDs. District hospitals and polyclinics/clinics were consistently associated with higher service readiness compared to health centers and CHPS compounds. The managing authority (private vs. public) also played a crucial role, with private facilities generally showing higher readiness scores, although the adjusted odds ratios suggest that this factor was not statistically significant for mental health services.

Location and region were other significant factors, with urban facilities and those in the Greater Accra region displaying higher readiness for NCD management. For instance, urban facilities had higher odds of being ready to manage hypertension (adjusted OR=3.1), and mental health conditions (adjusted OR=2.6) compared to rural facilities. The Eastern region was associated with lower readiness scores across all three NCDs, highlighting regional disparities in health care service provision.

Table 3 Service readiness of PHC for hypertension services

	Trained staff & Guidelines	Equipment	Medication	Overall Service Readiness
Type of facility				
District Hospital/Hospital	82.1	91.1	58.6	77.3
Polyclinics/Clinics	61.5	90.4	43.9	65.3
Health Centre	63.9	90.0	30.9	61.6
CHPS	20.8	69.9	1.6	30.8
Managing authority				
Public	30.6	75.3	8.2	38.0
Private	83.8	93.8	55.0	77.5
Location				
Urban	63.5	87.9	33.8	61.8
Rural	25.2	72.6	5.8	34.5
Districts				
Ada East	15.4	73.1	14.6	34.4
Ayawaso West	78.1	84.4	42.5	68.3
Ga South	81.3	95.3	46.3	74.3
Tema West	93.8	100.0	66.9	86.9
Upper West Akim	10.0	71.3	3.0	28.1
Nsawam Adoagyiri	40.6	84.4	11.9	45.6
Akyemansa	7.7	69.2	5.4	27.4
Ayensuano	51.8	74.1	4.3	43.4
Kwahu Afram Plains North	29.0	74.3	5.5	36.3
Yilo Krobo	33.3	78.6	9.1	40.3
Regions				
Greater Accra	69.7	88.9	43.9	67.5
Eastern	28.9	74.7	6.1	36.5
Overall	40.7	78.8	17.1	45.5

All values in the table are mean readiness scores (%) across facilities within each category

The very large odds ratios observed for some facility categories, particularly in comparisons involving CHPS compounds, reflect the strong concentration of readiness among higher-level facilities and the relative scarcity of ready facilities at lower levels of care. These large estimates are partly driven by sparse data and quasi/perfect separation in some outcome categories, indicating that comprehensive readiness remains uncommon in primary-level facilities and that effect sizes should be interpreted in terms of direction and relative magnitude rather than exact point estimates.

Sensitivity analysis

To assess the robustness of the main findings to alternative definitions of service readiness, we re-estimated the adjusted logistic regression models using a stricter $\geq 60\%$ and $\geq 80\%$ readiness threshold, in addition to the primary $\geq 70\%$ threshold. Overall, the direction and pattern of associations remained broadly consistent, with facility type continuing to be the strongest predictor of readiness across hypertension, diabetes, and mental health services. However, effect sizes at the $\geq 80\%$ threshold were generally attenuated and estimates became less precise, reflecting the substantially smaller number of facilities meeting the stricter readiness criterion.

At the $\geq 80\%$ threshold, quasi/perfect separation was observed for some facility categories, particularly lower-level facilities (e.g., CHPS and some health centres) for hypertension and mental health services, as very few of these facilities met the comprehensive readiness benchmark. Consequently, these categories were omitted from some models and the effective sample size was reduced ($N=91$), leading to wider confidence intervals and reduced statistical power (see Table 7). These results indicate that while basic service readiness ($\geq 60\%$) is present across a broader range of PHC facilities, comprehensive readiness ($\geq 80\%$) remains uncommon and is largely concentrated in higher-level facilities, underscoring persistent gaps in infrastructure, equipment, and trained personnel at the primary care level.

Discussion

The study revealed notable disparities in the availability and readiness of health care facilities in Ghana to manage NCDs like hypertension, diabetes, and mental health conditions. District hospitals had the highest service availability, with 100% offering diagnostic and management services for hypertension and diabetes. In contrast, CHPS compounds showed the lowest availability, with only 4.2% providing services for any of the

Table 4 Service readiness of PHC for diabetes services

	Trained staff & Guidelines	Equipment	Diagnostics	Medication	Service Readiness
Type of facility					
District Hospital/Hospital	82.1	90.5	82.1	71.4	81.6
Polyclinics/Clinics	69.2	92.3	74.4	49.2	71.3
Health Centre	57.7	98.0	75.6	36.6	67.0
CHPS	19.1	92.4	29.1	2.2	35.7
Managing authority					
Public	28.5	93.9	41.9	11.5	44.0
Private	80.0	94.2	83.8	58.0	79.0
Location					
Urban	57.1	96.1	72.0	38.1	65.8
Rural	25.6	92.5	34.8	8.3	40.3
Districts					
Ada East	19.2	89.7	29.5	15.4	38.5
Ayawaso West	68.8	85.4	70.8	37.5	65.6
Ga South	78.1	97.9	89.6	53.8	79.8
Tema West	93.8	100.0	89.6	76.3	89.9
Upper West Akim	15.0	93.3	39.2	5.0	38.1
Nsawam Adoagyiri	31.3	100.0	65.6	16.3	53.3
Akyemansa	3.9	88.5	35.3	7.7	33.8
Ayensuano	53.6	95.2	48.2	7.1	51.0
Kwahu Afram Plains North	27.6	93.9	24.1	9.0	38.6
Yilo Krobo	23.8	96.8	50.8	14.3	46.4
Regions					
Greater Accra	67.2	93.4	71.9	47.2	69.9
Eastern	26.5	94.2	40.8	9.4	42.7
Overall	38.3	94.0	49.8	20.4	50.6

All values in the table are mean readiness scores (%) across facilities within each category

three conditions. Despite policy documents emphasizing the provision of medicines at the PHCs, the readiness of CHPS compounds to deliver medications was particularly limited, ranging from 1.6% for diabetes to 3.9% for all three conditions. Urban facilities demonstrated greater service readiness compared to rural ones; for example, urban readiness for hypertension was 61.8%, while rural facilities lagged at 34.5%. Private facilities outperformed public ones, with readiness scores of 77.5% for hypertension and 79.0% for diabetes, reflecting better resourcing and management in the private sector. Regional disparities were also evident, with Greater Accra showing significantly higher readiness across all NCDs compared to the Eastern Region. A critical issue identified was the low level of medication availability at CHPS compounds, where only 1.61% of necessary hypertension medications were available, further underscoring their limited capacity to manage NCDs effectively. Overall, the readiness for mental health services was the lowest, at 44.2%, indicating a gap in the capacity of health care facilities to address mental health needs.

The study's findings align with broader patterns observed across LMICs, revealing significant disparities in health care service availability and readiness. For instance, findings from Uganda highlight that rural

facilities frequently lack trained personnel and essential diagnostic tools, often due to resource constraints, limited access to medical training, and lower investment in rural health care infrastructure [57]. Similar challenges have been documented in other parts of Africa, such as Nigeria and Tanzania, where lower-level health care facilities struggle with inadequate resources, including staff shortages and insufficient training for NCD management [58, 59]. These issues are frequently attributed to underfunding, a lack of comprehensive training programs, and difficulties in retaining health care workers in rural areas due to lower salaries and less professional development opportunities [58, 59].

In Ghana, similar challenges have been documented, reinforcing the findings of this study. Specifically, in the Brong-Ahafo Region, community health officers reported a lack of adequate training for managing hypertension, despite their eagerness to provide care [60]. This study in Ghana supports the broader observations by highlighting how systemic factors such as uneven resource allocation between urban and rural settings, insufficient government funding for primary health care training, and a national health focus that often prioritizes other areas over NCD management contribute to these gaps. Additionally, logistical challenges, including geographic

Table 5 Service readiness of PHC for mental health services

	Trained staff & Guidelines	Equipment	Medication	Service Readiness
Type of facility				
District Hospital/Hospital	78.6	91.1	37.1	68.9
Polyclinics/Clinics	76.9	90.4	34.6	67.3
Health Centre	63.1	90.0	20.1	57.7
CHPS	19.9	69.9	3.9	31.3
Managing authority				
Public	30.6	75.3	10.2	38.7
Private	83.8	93.8	25.0	67.5
Location				
Urban	62.4	87.9	22.2	57.5
Rural	26.0	72.6	6.8	35.1
Districts				
Ada East	46.2	73.1	8.2	42.5
Ayawaso West	81.3	84.4	17.6	61.1
Ga South	93.8	95.3	28.9	72.7
Tema West	81.3	100.0	34.4	71.9
Upper West Akim	7.5	71.3	6.6	28.4
Nsawam Adoagyiri	43.8	84.4	16.0	48.1
Akyemansa	1.9	69.2	8.7	26.6
Ayensuano	48.2	74.1	8.0	43.5
Kwahu Afram Plains North	29.0	74.3	4.3	35.9
Yilo Krobo	23.8	78.6	16.1	39.5
Regions				
Greater Accra	77.1	88.9	23.0	63.0
Eastern	25.8	74.7	9.0	36.5
Overall	40.7	78.8	13.0	44.2

All values in the table are mean readiness scores (%) across facilities within each category

Table 6 Factors associated with the readiness of facilities to provide non-communicable diseases management services

Variables	Service Readiness for Hypertension		Service Readiness for Diabetes		Service Readiness for Mental Health	
	Unadjusted	Adjusted	Unadjusted	Adjusted	Unadjusted	Adjusted
Facility Type						
Polyclinics	187.2 (19.5–1800.0)	43.8 (5.34–358.6)	92.8 (15.5–555.5)	28.4 (1.32–611.7)	263.3 (26.6–2609.5)	74.9 (9.24–608.1)
District Hospital/Hospital	429.0 (41.1–4480.6)	83.8 (3.49–2011)	212.7 (32.0–1412.0)	56.9 (2.41–1344)	292.5 (29.8–2872.5)	73.2 (4.85–1103)
Health Centers	83.1 (10.9–632.5)	23.65 (2.34–239.6)	49.7 (11.3–218.5)	20.1 (1.75–231)	83.1 (10.9–632.5)	32.6 (4.36–243.1)
Managing Authority						
Private	27.0 (11.3–64.7)	3.2 (0.60–16.74)	21.3 (9.1–49.8)	2.5 (0.34–18.85)	15.6 (6.9–35.0)	1.1 (0.22–5.1)
Location						
Urban	18.5 (7.3–46.6)	3.1 (0.99–9.67)	10.7 (4.9–23.2)	1.6 (0.49–4.99)	15.0 (6.3–35.9)	2.6 (0.9–7.1)
Region						
Eastern	0.1 (0.0–0.1)	0.5 (0.16–1.74)	0.1 (0.0–0.1)	0.4 (0.08–2.23)	0.1 (0.0–0.1)	0.3 (0.06–1.25)
Observations	207	207	207	207	207	207

Odds Ratios (OR) with 95% Confidence Intervals (CI) are provided in parentheses. The reference categories are CHPS for Facility Type, Public for Managing Authority, Rural for Location, and Greater Accra for Region. Unadjusted ORs represent results from univariate models, while Adjusted ORs control for all included covariates in multivariate models

Table 7 Adjusted odds ratios (OR) for facility readiness at alternative thresholds

Variables	Service Readiness for Hypertension		Service Readiness for Diabetes		Service Readiness for Mental Health	
	60%	80%	60%	80%	60%	80%
Facility Type						
Polyclinics	28.55	0.72	71.8	11.9	17.42	3.75
95% CI	(6.2–131.5)	(0.21–2.52)	(11.4–451)	(0.91–156)	(3.1–99.3)	(0.4–32.6)
District Hospital/Hospital	40.02	6.70	59.84	49.5	17.88	11.68
95% CI	(1.7–943.1)	(0.4–113.6)	(3.6–984.2)	(2.3–1031)	(2.2–158.8)	(0.8–162.6)
Health Centers	20.22	–	34.48	12.70*	10.07	–
95% CI	(2.3–177.3)	–	(7.2–165.1)	(0.99–162)	(3.4–29.7)	–
Managing Authority						
Private	1.7	3.7	2.81	1.08	0.84	1.07
95% CI	(0.28–10.85)	(0.96–13.88)	(0.5–16.9)	(0.1–9.08)	(0.25–2.8)	(0.1–11.9)
Location						
Urban	3.51*	1.88	1.19	1.81	1.61	3.00*
95% CI	(0.8–14.9)	(0.6–5.6)	(0.26–5.43)	(0.38–8.72)	(0.56–4.6)	(0.8–10.3)
Region						
Eastern	0.29	0.41	0.28	0.35	0.09	1.63
95% CI	(0.1–1.8)	(0.14–1.2)	(0.04–1.9)	(0.05–2.31)	(0.03–0.28)	(0.1–15)
Observations	207	91	207	207	207	91

isolation and transportation difficulties, further limit access to training opportunities for rural health care workers, reflecting the disparities uncovered in the current study. Moreover, the Essential Medicines List (EML) in Ghana stipulates specific medications available at different levels of health care facilities. Notably, antihypertensive drugs are often not included in the lower-level CHPS compounds [17]. This lack of essential medications makes the diagnosis and management of hypertension challenging at these lower-tier facilities, further exacerbating health care disparities [61].

The urban–rural divide identified in this study aligns with patterns observed in existing literature, driven by several underlying factors. In Ghana, Ayanore et al. [62] highlighted that urban facilities generally exhibit better service readiness than rural ones, primarily due to concentrated investments in urban areas. This trend reflects a broader prioritization of urban centers, where larger populations and perceived economic benefits drive better funding and infrastructure development. A similar pattern was noted internationally; for example, in Vietnam's Central Highlands, urban health facilities were significantly better prepared for hypertension management than rural counterparts, where geographical isolation and limited financial resources often restrict access to essential equipment and trained personnel [63].

Private health care facilities also consistently demonstrate higher readiness levels than public facilities across various LMICs, primarily due to differences in funding and management. In Ethiopia, private clinics were found to have more reliable stocks of essential medicines and a greater number of trained staff for managing conditions like diabetes [64]. This is largely because private facilities

often have access to more flexible funding, enabling quicker acquisition of medical supplies and hiring of specialized staff. Similarly, in Kenya, private health centers outperformed public ones in terms of staff availability and equipment readiness [65]. As private institutions typically benefit from higher revenue through direct payments, allowing them to invest more heavily in their resources. Additionally, private facilities often adopt more efficient management practices, focusing on service quality to attract paying clients, whereas public facilities may face bureaucratic delays, inconsistent funding, and reliance on limited government budgets, especially in rural and low-income areas. These factors contribute to the persistent gaps between public and private health care readiness in LMICs.

The findings reveal a consistent gap in mental health service readiness across LMICs, characterized by inadequate infrastructure, insufficient trained professionals, and limited access to essential resources. A study in Ethiopia emphasized that mental health services are significantly under-resourced compared to other NCDs like hypertension, often due to insufficient government funding, competing priorities, and social stigma [66, 67]. These systemic factors create a cycle of underfunding, hindering effective mental health care delivery. In Ghana, similar challenges were highlighted in a recent study on adolescent mental health (AMH), which underscored socio-economic, cultural, and security issues exacerbating adolescent mental health conditions in West Africa [68]. With less than 30% of PHCs offering mental health services, a pronounced urban–rural disparity emerged, with urban centers better equipped than rural areas. This mirrors the disparities observed for other NCDs

in Ghana [68]. The implications are significant: inadequate mental health services led to higher untreated cases, reduced productivity, and increased health-care costs. Addressing these gaps requires comprehensive reforms, including national guidelines, integration of mental health into primary care, and targeted capacity building. Public awareness campaigns are essential to reduce stigma and ensure equitable resource distribution. Improving mental health services is crucial for socio-economic development, enhancing education outcomes, and reducing long-term costs.

Regional disparities in Ghana, with Greater Accra showing higher readiness than the Eastern Region, are consistent with findings from other parts of Sub-Saharan Africa. In Nigeria, similar disparities were observed, with urbanized regions scoring higher for NCD management than rural areas, highlighting the critical role of resource allocation and infrastructure investment in regional readiness [69]. These differences not only reflect disparities in funding but also in the availability of trained health care professionals and the quality of health care infrastructure. In Ghana, mission hospitals, often supported by external funding, were better equipped than government facilities, underscoring the importance of funding and management practices [70]. Addressing these gaps will require targeted interventions to ensure that rural and government facilities have access to comparable resources and support, ultimately improving health outcomes across all regions.

The desk review emphasizes that Ghana has an extensive set of national policy documents for NCD control, focusing on institutional capacity building, resource allocation, training, service delivery, and integration of NCD care into PHC. However, implementation gaps, particularly in resource-constrained settings, present significant challenges. Garcia et al. [71] research highlights the superiority of decision-analytic approaches for hypertension management over traditional guidelines, stressing the critical need for evidence-based and contextually adaptable guidelines tailored to local health care environments [71]. This reflects a broader issue within Ghana's policy framework, while the policies are theoretically sound, they often lack sufficient operational specificity and implementation guidance to accommodate regional disparities in resource-constrained PHC settings, particularly between urban and rural health care facilities. It is important to note that national policies are primarily designed to provide high-level strategic direction, whereas operationalisation and contextual adaptation are typically elaborated in separate implementation frameworks, clinical guidelines, and district-level operational plans. However, when these high-level policy commitments are compared with the substantial differences in staffing, diagnostics, infrastructure, and medicines

availability observed in the SARA assessment, the absence of explicit policy-to-service linkage becomes evident. The policies seldom outline how national strategies should be interpreted or adapted in resource-constrained PHC settings, leading to gaps in translating national intent into effective, context-appropriate implementation at the facility level. This gap in alignment, rather than a deficiency in policy design per se, underpinned our conclusion that national NCD policies exhibit limited practical adaptability across diverse regional contexts [72, 73].

A major challenge identified in the SARA is the inequitable resource distribution, with urban areas like Greater Accra enjoying a clear advantage in service readiness. Campbell et al. [72] noted the vital role of accessible and affordable medications in effective hypertension management in low- and middle-income countries (LMICs), underlining the financial constraints that often obstruct equitable health care delivery. Ghana's policy commitments to equitable distribution are not consistently accompanied by clearly articulated operational mechanisms or financing pathways at the PHC level, with public-private partnerships and inclusive financing yet to make a tangible impact on addressing these systemic disparities.

Training and workforce capacity building emerge as central themes in Ghana's NCD strategy, yet implementation remains uneven. Limenih [73] findings on the impact of structured training underscore the necessity of continuous professional development, particularly for chronic conditions like hypertension. Ghana's policy rhetoric supports upskilling health care workers, but practical training initiatives are lacking, particularly in rural areas where professional development opportunities are minimal. Chowdhury et al. [74] further emphasize that sustained support and individualized care significantly enhance diabetes management in LMICs, reinforcing the idea that ad-hoc training efforts are insufficient. Without systemic and continuous training programs, the policy directives risk remaining largely aspirational.

The integration of NCD care into PHC is a strategic move that aligns with international best practices. Mercer et al. demonstrate that multicomponent interventions, particularly task-shifting, are effective in LMICs [75]. Our SARA findings provide empirical justification for this approach: CHPS and several rural PHC facilities showed very low staff-and-guidelines readiness scores across hypertension, diabetes, and mental health, indicating substantial gaps in trained personnel, supervision, and competency for NCD care. These deficits suggest that redistributing selected NCD tasks to appropriately trained Community Health Nurses (CHNs) and other frontline workers could help extend essential services to underserved areas, especially where fully trained clinical staff are scarce. However, task shifting alone will not

resolve the challenges identified; Ghana still faces critical barriers in infrastructure, availability of diagnostics, and standardization of care pathways at lower-level facilities. These gaps raise concerns about the feasibility of integrating NCD services without parallel investments in equipment, medicines, and supportive supervision systems. The findings of Lum et al. [76] underscore that education, when integrated effectively, is cost-efficient and improves chronic disease management—yet Ghana's PHC still struggles with the practical implementation.

Resource allocation and monitoring remain inconsistent. Flood et al.'s [77] analysis emphasizes that structured data monitoring is crucial for effective health interventions, and while Ghana's national policies consistently acknowledge the importance of data-driven decision-making, the gap between policy intent and implementation suggests a lack of robust systems for routine monitoring and use of NCD data. Lamptey et al.'s findings on Community Health Worker (CHW) programmes further illustrate the potential of strengthened data and supervision systems to improve service delivery in rural contexts, yet these approaches have not been adequately scaled in Ghana [78]. This observation is directly grounded in our desk review, which revealed that although multiple policy documents reference the importance of monitoring and evaluation, none specify operational mechanisms for routine NCD data collection or utilisation at the PHC level.

Implications for future policy and practice

To improve Non-Communicable Disease (NCD) management in Ghana, a multifaceted approach targeting workforce development, infrastructure, integration, data systems, community health, and targeted investments is essential. These strategies are designed to enhance Ghana's capacity to manage chronic conditions effectively, particularly in underserved areas.

First, strengthening the health care workforce is fundamental to improving NCD service readiness in Ghana. The SARA assessment revealed extremely low staff-and-guidelines readiness scores at CHPS facilities, 20.8% for hypertension, 19.1% for diabetes, and 19.9% for mental health, highlighting significant gaps in staff competency, availability of clinical guidelines, and capacity to deliver basic NCD care. These gaps align with national policies and the Essential Medicines List, which do not authorise full diagnosis and management of these conditions at CHPS level unless staff have received specialised training and the requisite tools are available. Consequently, deliberate, continuous, and structured training programs must be prioritised to equip existing PHC staff, particularly those in rural and underserved areas, with the skills needed to manage NCDs safely and effectively. In addition, targeted workforce incentives are critical to ensure

that trained personnel accept and remain in rural postings, enabling capacity-building efforts to translate into sustained improvements in service delivery. Together, strengthened competency and strategic deployment constitute a core foundation for improving PHC readiness for NCD management across the country.

Second, there is a need to enhance infrastructure and resource allocation. Investing in upgrades for health facilities, particularly Community-based Health Planning and Services (CHPS) compounds, will provide essential diagnostic tools, equipment, and medications. This investment will address the disparities between urban and rural facilities, ensuring equitable health care access for all communities.

Expansion of NCD care into all levels of the primary health care (PHC) is another vital step. A focus on seamlessly integrating NCD services at all levels of primary health care, especially in lower-tier facilities, will ensure comprehensive care. This involves establishing standardized guidelines and resources tailored to local needs, facilitating consistent and high-quality service delivery.

Additionally, improving data monitoring systems is essential for evidence-based decision-making. Developing robust monitoring frameworks will enable accurate tracking of NCD care delivery, guiding resource allocation, and fostering accountability in health interventions.

Targeted investments in CHPS compounds are particularly important. Investing in CHPS infrastructure will enhance access to essential diagnostic and treatment tools, strengthening the foundation of primary health care in rural and underserved areas. Finally, empowering CHNs is crucial. Enhancing the skills of CHNs through continuous training and the use of mobile health tools will extend the reach of NCD care to remote and hard-to-reach communities, ensuring that every individual has access to quality health care.

Limitations of the study

We acknowledged some limitations in this study. First, data were collected from PHC facilities in only two regions, Greater Accra and the Eastern Region, which were selected to reflect Ghana's urban–rural service delivery dynamics. Although they offer important insights, these regions do not capture all contextual variations across the country, and findings may not fully represent every regional setting.

Second, while the SARA tool provides a standardized and objective measure of service availability and readiness, it is a one-time cross-sectional assessment. It may not fully capture fluctuations in readiness due to stock-outs, staffing changes, or temporary operational challenges. Moreover, the presence of guidelines or equipment during assessment does not guarantee routine use or staff competency in applying them. Importantly,

facility staff were not pre-informed about assessment visits; therefore, readiness scores are unlikely to have been artificially inflated.

Third, the study relied solely on publicly available national policy documents and did not assess policy implementation or effectiveness, as these were outside the study's scope. The desk review therefore describes policy content but does not evaluate whether policies have reduced NCD burden in practice.

Finally, the desk review focused only on policy documents related to service delivery, workforce, resources, and integration. It did not comprehensively assess all health-system building blocks, such as governance arrangements or health information systems, which may also influence institutional capacity for NCD care.

Despite these limitations, strengths include the use of the standardized WHO SARA methodology, a large sample of 207 facilities, and rigorous procedures that ensured objective assessment. Although SARA provides only a cross-sectional snapshot, it remains a globally endorsed tool that enables comparison across countries and over time. Future research should incorporate longitudinal assessments, clinical audits, direct observations, and the use of standardised patients to evaluate the technical quality of care. To capture patient experience, exit interviews, routine satisfaction surveys, and qualitative engagement with patients and caregivers would provide deeper insights. Mixed-methods evaluations embedded within ongoing NCD programmes would also allow triangulation of structural, process, and outcome indicators, strengthening the evidence base on NCD care quality in Ghana's PHC system. Additionally, future studies should assess the effectiveness of national NCD policies, examining how well policy intentions are translated into improved service delivery and patient outcomes across diverse PHC contexts.

Conclusion

In conclusion, strengthening institutional capacity for NCD care within Ghana's primary health care system remains essential, and evidence from PHC facilities in the Greater Accra and Eastern Regions highlights important gaps in service availability and readiness. This study highlights important gaps in service availability and readiness for hypertension, diabetes, and mental health, particularly at CHPS facilities and in rural settings, reflecting limitations in trained staff, diagnostic capacity, and essential medicines. These findings point to the need for targeted investments such as structured workforce development programmes, improved diagnostic and pharmaceutical supply systems, and strategic infrastructure upgrades at the lowest levels of care. Policy frameworks, while clearly articulated at the national level, need more practical adaptability to regional contexts, especially

given variations in staffing patterns, facility functionality, and resource distribution. Aligning policies more closely with the operational realities of PHC facilities, including empowering CHNs and enhancing the scope and capability of CHPS, will support the delivery of essential NCD services across urban and rural Ghana.

Future policies should incorporate mechanisms that enable flexible implementation, strengthen supportive supervision, and ensure sustained financing for NCD services at PHC level. The findings also provide critical evidence to inform the STOP-NCDs initiative, supporting the co-development of scalable, context-appropriate interventions. Collectively, these actions can contribute significantly to reducing the national burden of chronic diseases and advancing Ghana's broader health system goals.

Appendix

Table 8 List of National Documents for NCD prevention and control

Title of Document	Type of Document	Year of Publication	Category of NCD
National Policy, Non-communicable Diseases, Second Edition, MoH, Ghana.	Policy	2022	General
The National Health Policy	Policy	2020	General
National Medicines Policy, 3rd Edition 2017	Policy	2017	General
Ghana National Alcohol Policy 2016	Policy	2016	Hypertension; Mental Health
Mental Health Policy 2019-2030	Policy	2018	Mental Health
National Guidelines for the Management of Cardiovascular Diseases	Guidelines	2019	Cardiovascular diseases
Strategic Plan 2019-2022, Mental Health Authority	Strategy	2019	Mental Health
Narcotics Control Commission Act, 2020 (Act 1019)	Act of Parliament	2020	Mental Health; hypertension
Excise Duty (Amendment) Act, (Act 1093)	Act of Parliament	2023	General
Mental Health Act (Act 846)	Act of Parliament	2012	Mental Health
Public Health Act (Act 851)	Act of Parliament	2012	General
Tobacco Control regulation (LI2247)	Legislative Instrument	2017	Mental health; Hypertension

Table 9 Service availability for NCDs

Variables	Description
Hypertension	Percentage of facilities offering the diagnosis and/or management of Hypertension
Diabetes	Percentage of facilities offering the diagnosis and/or management of Diabetes
Mental Health	Percentage of facilities offering the diagnosis and/or management of Mental Health

Source: Authors' own construction based on SARA Manual

Table 10 Service readiness for hypertension management

General service domains	Tracer items	Domain score
Staff and guidelines (a)	Guidelines for diagnosis and treatment of hypertension Staff trained in diagnosis and management of hypertension	$n/2 \times 100$, where n is the total number of items available in the domain
Equipment (b)	Stethoscope Blood pressure apparatus Adult scale Oxygen	$n/4 \times 100$, where n is the total number of items available in the domain
Medicines and commodities (c)	ACE Inhibitors (e.g., enalapril, lisinopril, ramipril, perindopril) Thiazides (e.g., hydrochlorothiazide) Beta-blockers (e.g., bisoprolol, metoprolol, carvedilol, atenolol) Calcium Channel Blockers (e.g., amlodipine) Aspirin cap/tablet Furosemide cap/tablet Spironolactone tablets Isosorbide Dinitrate Tablet Glyceryl Trinitrate Sublingual Tablet Simvastatin tablet	$n/10 \times 100$, where n is the total number of items available in the domain
Service readiness index		Mean score of the three domains $= \frac{(\alpha + b + c)}{3}$

Source: Authors' own construction based on SARA Manual

Table 11 Service readiness for diabetes management

General service domains	Tracer items	Domain score (mean availability of items)
Staff and guidelines (a)	Guidelines for diagnosis and treatment of hypertension Staff trained in diagnosis and management of hypertension	$n/2 \times 100$, where n is the total number of items available in the domain
Equipment (b)	Stethoscope Adult scale	$n/3 \times 100$, where n is the total number of items available in the domain

Table 11 Service readiness for diabetes management

General service domains	Tracer items	Domain score (mean availability of items)
Diagnosis(c)	Measuring tape (height board/ stadiometre) Blood glucose	$n/3 \times 100$, where n is the total number of items available in the domain
Medicines and commodities (d)	Urine dipstick- protein Urine dipstick- ketones Metformin cap/tab Insulin injection Glucose 50% injection Glibenclamide cap/tab Gliclazide or glipizide tablet Aspirin cap/tablet	$n/6 \times 100$, where n is the total number of items available in the domain
Service readiness index		Mean score of the three domains $= \frac{(\alpha + b + c + d)}{4}$

Source: Authors' own construction based on SARA Manual

Table 12 Service readiness for mental health management

General service domains	Tracer items	Domain score (mean availability of items)
Staff and guidelines (a)	Guidelines for diagnosis and treatment of mental health issues Staff trained in diagnosis and management of mental health issues	$n/2 \times 100$, where n is the total number of items available in the domain
Equipment (b)	Stethoscope Blood pressure apparatus Adult scale Oxygen	$n/4 \times 100$, where n is the total number of items available in the domain
Medicines and commodities (c)	Amitriptyline Carbamazepine Chlorpromazine Diazepam Fluoxetine Fluphenazine Haloperidol Lithium Phenobarbital Phenytoin Sodium valproate Lorazepam Levodopa Trihexyphenidyl	$n/15 \times 100$, where n is the total number of items available in the domain

Table 12 Service readiness for mental health management

General service domains	Tracer items	Domain score (mean availability of items)
	Risperidone	
Service readiness index		Mean score of the three domains = $\frac{(\alpha+b+c)}{3}$

Source: Authors' own construction based on SARA Manual

Table 13 Description of Variables Used in the Analysis

Variable	Description
Facility Type	Type of primary health care facility (e.g., Polyclinics, District Hospital/Hospital, Health Centers, CHPS).
Managing Authority	Management type of the facility, categorized as Public or Private.
Location	Geographic location of the facility, categorized as Urban or Rural.
Region	Region of Ghana where the facility is located, specifically Greater Accra or Eastern Region.

Supplementary Information

The online version contains supplementary material available at <https://doi.org/10.1186/s12875-026-03278-6>.

Supplementary Material 1.

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Authors' contributions

Conceptualization of the study was led by MAA, YJ, NI, LT, EA, EdA, JN, JA, TM, IA and PP. The desk review and policy analysis were conducted by MAA, NYA, NBA, AC, PL, MPA, and DKA. The cross-sectional survey design and data collection strategy were developed by MAA, DKA, YJ, NI, LT, EA, EdA, JN, JA, TM, IA and PP. Data analysis and interpretation were performed by MAA, under the guidance of JA, JN and PP. Review and oversight of the manuscript were provided by JN, IA, TM, and PP. All authors contributed to the review and revision of the final manuscript, ensuring accuracy and alignment with the study objectives.

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Data availability

The datasets used and/or analysed during the current study are available from the corresponding author on a reasonable request.

Declarations

Ethics approval and consent to participate

Ethical approval for this study was secured from the Ghana Health Service Ethics Review Committee, with the reference number GHS ERC 013/02/23. The committee reviewed the study protocols to ensure compliance with ethical standards, focusing on protecting participant confidentiality, informed consent, and data security. All necessary measures were taken to adhere to ethical guidelines, ensuring that the research met the highest standards for ethical conduct. Participants were informed about the purpose of the study, and their consent was obtained before data collection. The study was conducted in accordance with the ethical principles outlined by the Ghana Health Service.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

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