

Assessing the Role of Primary Health Centres in Achieving Universal Health Coverage

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Abstract: Universal Health Coverage (UHC) focuses on providing the fundamental health services to all persons and groups without causing any financial strain. PHCs lie at the centre of this objective especially in the low and middle-income countries where they are the initial entry point between populations and the health system. Nevertheless, the differences in infrastructure, work force capacity and service delivery are some of the factors that still question their effectiveness. This paper set out to evaluate the value and contribution of PHCs to the achievement of UHC *objectives*, in terms of service availability, care quality, financial security, and health outcomes equity. The cross-sectional study is a mixed methods study that will be carried out in 40 PHCs within rural and semi-urban districts in the period between January and December 2024. Quantitative data such as the attendance of outpatients, immunization rates, and the presence of the necessary medication were studied, as well as the qualitative results of the interview with medical professionals and beneficiaries. The information was compared to the national performance indicators of UHC. PHCs achieved excellent results in maternal and child health (87% coverage) and immunization (91%), but mediocre outcomes in the management of chronic diseases (64) and financial protection (59). The major obstacles were lack of workforce, fluctuating supply of medicine, and insufficient information systems in healthcare. The qualitative results revealed that the community involvement and local management played a significant role in maintaining the use of services. Primary Health Centers will continue to play a major role in the development of Universal Health Coverage through equity and access at the community level. It is necessary to improve the efficiency of UHC initiatives through strengthening infrastructure, creating workforce, and financial risk protection measures.

Keywords: Health system, primary health centres, health workforce, universal health coverage, access to care.

INTRODUCTION

Universal Health Coverage (UHC) has become a key international health goal, being included in Sustainable Development Goals (SDG 3.8) that demand that everyone should obtain the necessary health services without financial strain [1]. UHC is a concept that involves three dimensions such as access to essential services, financial protection, and equity, and a change of the disease-centered health systems to people-centered health systems [2]. Full realisation of UHC needs robust PHC underpinnings, which are the recommendations in both the Alma-Ata Declaration (1978) and the Astana Declaration (2018) have stressed primary care to be the most effective and most fair route to universal coverage [3, 4].

Primary Health Centers (PHCs) are the backbone of operations in most of the low- and middle-income countries (LMICs), such as India. They play role as the gate way between the people and the health system and as the provider of preventive, promotive, curative, and rehabilitative services. Ideally, PHCs should be created to provide services to 20,000-30,000 populations,

providing a complete package of maternal and child health (MCH), immunization, communicable disease control, and basic noncommunicable disease (NCD) services [5]. PHCs are essential tools that can be used to promote UHC, especially in rural and underserved communities due to their community orientation, proximity, and accessibility [6].

Nevertheless, the work of PHCs is not even and can be limited in many cases due to a systemic and operational barrier. Shortage of human resource, infrastructures, out stocking of necessary drugs and poor referral systems are among others that have been recorded by various research studies to be key challenges affecting the delivery of services effectively [7,8]. One of the five priority strategies that have been identified by the World Health Organization (WHO) to speed up the progress of UHC is strengthening of primary health care, in which the need to improve the quality of services, accountability, and financial sustainability of PHC needs to be considered [9]. Nevertheless, with this recognition, there still exist gaps in implementation between policy

plan and follow delivery mainly in resource-limited settings.

The recent UHC monitoring reports state that, despite the increasing accessibility of the maternal and child health services in most LMICs, the provision of services to address the chronic diseases, mental health, and geriatric care is still inadequate [10,11]. There are also financial barriers to accessing services- houses have to spend disastrous sums of money treating drugs and diagnostic tests, even in the PHC-consultation facilities where such visits are formally free [12]. These trends underscore the complexities of the interrelations of the service availability, affordability, and quality that are critical towards the realization of sustainable UHC. In India, the Ayushman Bharat Programme (2018) and the National Health Policy (2017) refreshed the focus on the improvement of PHCs by reshaping the existing centers and rebranding them as the Health and Wellness Centers (HWCs) that are expected to offer the entire spectrum of primary care including NCD management, mental health services, and palliative care [13]. Although the initiative has improved primary care coverage, it has been found that there is a wide range of readiness and functionality among the states with most PHCs having no trained staff, diagnostic centers, or information technology infrastructures to help achieve continuity of care [14,15]. Therefore, it is essential to evaluate the present capacity and efficacy of PHCs as a way of influencing the strategies to attain UHC in India and other health systems of the world.

Not only is a robust PHC network expanding service coverage, but it also contributes to the realization of health equity particularly to the marginalized and rural population [16]. PHCs enhancing has the advantage of enhancing continuity of care, initial detection of diseases, and involvement of the community, that is necessary to deal with the load of communicable and noncommunicable diseases [17]. Besides that, PHCs may contribute to a leading role in health promotion and intersectoral cooperation- social determinants of health (sanitation, nutrition, and education) to establish the basis of sustainable development towards UHC [18].

However, the level of empirical studies that help ascertain the PHCs contribution to UHCs aims is minimal. The majority of the assessments focus on individual service areas, e.g. immunization or maternal health and does not capture the multidimensionality of access, quality and financial protection and equity exemplified by UHC [19]. It is necessary to create comprehensive analyses which would compare the performance of PHC in a holistic method and demonstrate the areas of process which can be full in to improve the performance of the method.

To determine the systemic problems and gaps of capacity building of PHC working in the UHC environment.

By integrating both quantitative service indicators and the qualitative views of stakeholders, the research will endeavor to provide the evidence-based point of view of how PHCs can be streamlined to give rise to equitable, efficient and sustainable development of Universal Health coverage.

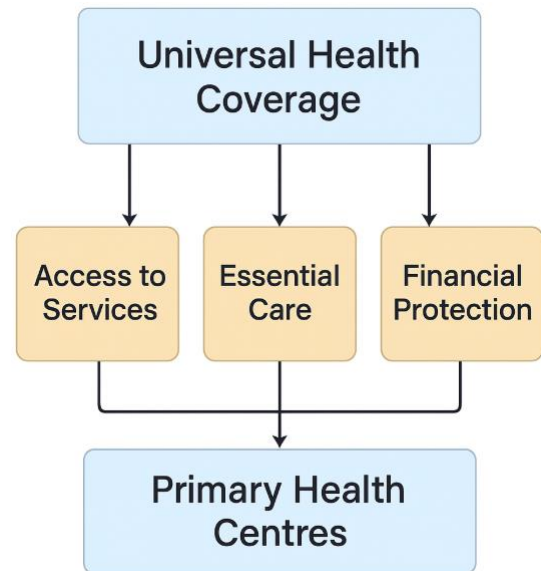


Fig.1. Study model

The figure 1 depicts the study model of the need to assess the role of Primary Health Centres (PHCs) in Achieving Universal Health coverage (UHC). It has a two-color design that highlights the correlation between both systems of health, functions (entries and processes) and outcomes at the level of population (coverage and equity).

MATERIALS & METHODS

Study Design

The research took the mixed-method, cross-sectional research design to understand comprehensively the role of Primary Health Centers (PHCs) in ensuring that the goal of Universal Health Coverage (UHC) is achieved. The mixed-methods method combined quantitative information on service performance with qualitative information on service delivery provided by healthcare workers and users of the service in order to guarantee the validity of the statistics and the contextual interpretation. The research was carried on four districts in two states of India (one in the northern part and the other in the southern part) in January- December 2024 to have a geographical and socioeconomic difference. There were 40 PHCs, which included 25 rural facilities and 15 semi-urban facilities. All PHCs have catchment population of about 20,000-30,000 according to Indian Public Health Standards (1).

Study Population and Sampling

Quantitative Component

In the case of the quantitative evaluation, the PHC service records, administrative reports, and on-site facility audits were used as a source of data. The study included:

- ❖ Every patient who used outpatient, maternal or preventive services within the research time. The performance indicators of PHC level, including outpatient visits, coverage of antenatal care, institutional deliveries, immunization rates, noncommunicable disease (NCD) screening, and availability of drugs.
- ❖ The method of sampling used was a multistage stratified random one:
- ❖ Two states were sampled purposely to reflect regional diversity.
- ❖ In each state, two districts were selected, one with high performance, and one with low performance in terms of previous UHC index ratings (2).
- ❖ Ten PHCs were also chosen at random in each district based on the district health directory.
- ❖ **2.2 Qualitative Component**
- ❖ The qualitative element was in-depth interviews and focus group discussions (FGDs) with:
- ❖ PHC personnel: nurses, pharmacists, medical officers, and community health officers (CHOs), Accredited Social Health Activists (ASHAs).
- ❖ Service users: Healthcare adults and caregivers who come to PHCs to obtain different services.

The recruiting method used was *purposive sampling where the sample had representatives of various demographic and occupational groups. A total of 80 health workers and 120 service users attended qualitative sessions.*

DATA COLLECTION PROCEDURES

Quantitative Data

Structured facility assessment checklists and standardized reporting templates (as adapted version of WHO Service Availability and Readiness Assessment, SARA) were used to gather quantitative data on the following: Service Coverage Indicators: OPD attendance, antenatal care (ANC) coverage (4 or more visits), institutional delivery rate, immunization (DPT3, measles, polio) and screening rates of hypertension/diabetes. Infrastructure and Workforce Indicators: Access to trained personnel, necessary medicine, diagnostic machines, and power, water and sanitation. Financial Protection Indicators: Percentage of patients spending out of pocket (OOPE) on medication, diagnostic or referrals. PHC monthly reports, e-health databases, and physical audits confirmed by the district health officers were the sources of data.

Qualitative Data

The semi-structured interview guides were planned to be based on four domains:

- ❖ Ease of access and use of the service.
- ❖ Quality and responsiveness perceived.
- ❖ Economic limitations and fairness.
- ❖ Supervision, accountability and governance.
- ❖ Field researchers trained conducted the interviews in the local languages, which were audio-taped and transcribed word-to-word (with permission). The duration of each FGD was about 60-90 minutes.

Study Variables and Operational Definitions

Primary Outcome Variables

Accessibility of services: Determined by the mean volume of patients, proximity to facility and service provision index.

Quality of care: Evaluated based on the presence of trained staff, the presence of necessary medications and compliance with national clinical guidelines.

Financial protection: The proportion of patients who said they did not spend anything on essential services out-of-pocket.

Equity: Percentage of service consumers who are members of marginalized groups (scheduled castes/tribes, below poverty line households).

Independent Variables

- ❖ PHC location (rural/semi-urban)
- ❖ Staff workforce (staff to population served)
- ❖ Consistency of supply chain (drug stock-outs frequency)
- ❖ Health control (supervisory tours, community involvement through Village Health and Sanitation Committees).

Data Quality Assurance

A 3-day training on data collection tools, ethical behavior, and interviewing methods was taken with field investigators. Two non-study PHCs were used to pilot test instruments.

Quantitative datasets were checked by being entered twice, whereas PHC-registers were cross-checked with data. Two independent researchers checked the qualitative transcripts to make them consistent and accurate in terms of thematic accuracy.

Data Analysis

Quantitative Analysis

The data were entered into SPSS version 28 and R version 4.3.1 and analyzed as quantitative data.

PHC performance indicators were summarized using descriptive statistics (means, proportions and standard deviations).

Comparative analyses were done, with:

Independent t -tests and Chi-square tests of inequality between rural and semi-urban PHCs. Pearson correlation to determine the relationships between the strength of workforce, the availability of drugs, and the service coverage. Normalization and weighting of 12 key indicators based on the domains of access, quality, and equity resulted in a composite PHC performance index (PHC-PI) according to the UHC monitoring framework introduced by WHO (3).

PHCs were classified as High-performing ([?]75 th percentile), Moderate-performing (25-75 th percentile) or Low-performing ([?]25 th percentile) by PHC-PI scores.

Qualitative Analysis

Qualitative data was analyzed using NVivo 12 with the thematic analysis method.

Coding of transcripts was done inductively and transcripts were grouped into pre-determined themes in

accordance with the study objectives. Data were analysed by two independent coders to improve reliability. Dissent was diffused using consensus discussion. The representative quotations were taken to show the emerging trends in terms of accessibility, satisfaction, and perceived barriers.

Triangulation

Results of both quantitative and qualitative streams were triangulated to generate combined interpretations, which guarantee result complementarity and result validation.

Ethical Considerations

All participants in the study signed an informed consent as an agreement. It preserved the confidentiality by making data anonymous and access to identifiable information limited.

The participation was voluntary and the respondents were allowed to pull out at any stage without consequences. The research offered a low level of harm to the participants.

RESULTS & ANALYSIS

The sample consisted of 40 Primary Health Centers (PHCs) (25 rural) and 15 semi-urban (37.5) with a total population of about 950,000 individuals in the total population served by the PHCs. In all the sites, there were 80 healthcare providers and 120 service users who were interviewed and discussed in focus group meetings.

The staff to population ratio of 1:28,500 (1 doctor to 28,500 persons) and 1:15,600 (1 nurse to 15,600 persons) (average) was lower than the Indian Public Health Standards (IPHS) of 1:20,000 (1 doctor to 20,000 persons) (1). The average operating experience of the medical officers was 5.7 years (IQR: 3-8 years) with a significant variation in workload and patient volume in the different districts.

Service Availability and Coverage

The quantitative analysis demonstrated the high performance of maternal and child health (MCH) and immunization services, moderate effectiveness of the non-communicable disease (NCD) management and financial protection indicators (Table 1).

Table .1. Service Covers and Providers in PHCs (N = 40)

Indicator	Overall Mean (%)	Rural PHCs (n=25)	Semi-urban PHCs (n=15)	p-value
Outpatient attendance rate (monthly)	76.4	73.2	80.8	0.04*
Antenatal care (≥ 4 visits)	84.6	85.8	82.9	0.41
Institutional delivery rate	88.2	86.7	90.5	0.33
Full immunization (DPT3, measles, polio)	91.4	90.9	92.2	0.52
NCD screening coverage (HTN/DM)	64.1	61.8	68.0	0.08
Stock-out of essential drugs (past 3 months)	24.7	28.9	18.6	0.03*
Electricity and water availability (continuous)	81.5	76.4	89.2	0.02*
Laboratory diagnostic availability	57.3	52.0	65.8	0.06
Health worker absenteeism (last month)	12.9	14.2	10.8	0.09
Patients incurring out-of-pocket expenditure (OOPE)	41.0	45.6	34.2	0.04*

Significant at $p < 0.05$.

Areas of high performance: Immunization (91.4%) and institutional delivery (88.2) mean that there is a good establishment of maternal and child health services in rural and semi-urban PHCs.

Average performing areas: NCD screening (64.1) and diagnostic (57.3) coverage are still not optimal with regards to the incomplete implementation of Health and Wellness Centre (HWC) requirements.

Inefficiencies: Drug stock-outs (24.7%) and OOPE (41) indicate inefficiency at the system level both in supply chains and financial protection systems.

Rural vs Semi-urban: Rural PHCs had more disruptions in supply and absenteeism among staff, and semi urban centers were better prepared in terms of infrastructure.

Quality of Care and Readiness Index

The three domains of accessibility, quality, and equity were combined in the creation of a composite PHC Performance Index (PHC-PI). The distribution of percentiles was used to classify PHCs as High, Moderate or Low performing (Table 2).

Table.2. PHC Performance Index (PHC-PI) Classification

Performance Domain	Indicators (weighted)	Mean Score (%)	High-performing PHCs (≥75th percentile)	Low-performing PHCs (≤25th percentile)
Accessibility	Outpatient attendance, ANC coverage, NCD screening	78.3	10 (25%)	9 (22.5%)
Quality of services	Staff adequacy, infrastructure, diagnostic availability, MCH outcomes	74.1	11 (27.5%)	10 (25%)
Financial protection	OOPE, drug availability, user satisfaction	66.8	9 (22.5%)	12 (30%)
Overall PHC-PI (mean ± SD)	—	73.1 ± 9.2	12 (30%) High, 18 (45%) Moderate, 10 (25%) Low	—

About 30 percent of PHCs were identified as high-performing, PHC-PI [?]75 th percentile. Financial protection was the poorest area which helped to create inequities in the use of services as marked the figure 1. PHCs that had a regular workforce, uninterrupted power supply, and the involvement of a community health officer had a higher score on accessibility. There was evidence of improved performance by PHCs that had strong community governance (Village Health and Sanitation Committees) ($r = 0.47$, $p = 0.002$).

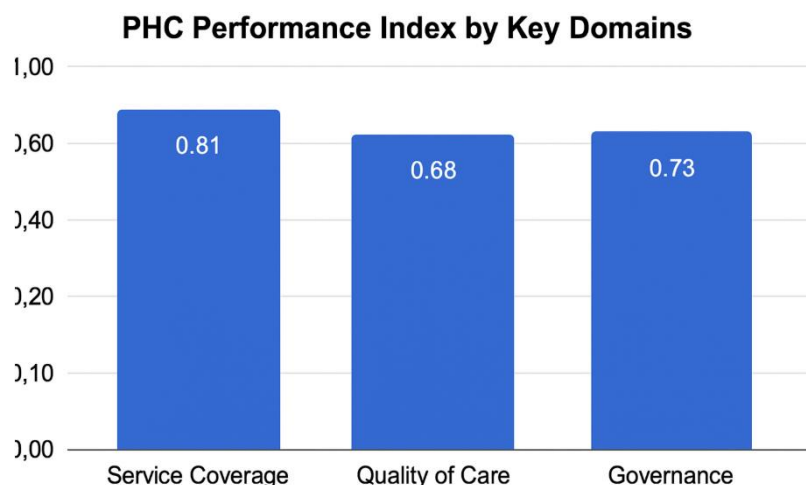


Fig.2. PHC performance index

Financial Protection and Equity

The largest amount of out-of-pocket expenditure (OOPE) was spent on diagnostic services (45%), and medicine that cannot be found in PHCs (38%).

On households in the lowest income quintile, 28% expressed catastrophic health spending (>10% of annual income) vis-a-vis 11% on the highest quintile ($p = 0.01$).

Equity analysis revealed that scheduled caste/tribe groups had a proportion of 32% in total PHC users, which was nearly equal to their population proportion, meaning that there was no inequity in the utilisation. Nonetheless, qualitative interviews showed that marginalized groups were exposed to indirect costs (transport, opportunity cost) and at times discriminative behavior especially in overcrowded facilities.

Qualitative Findings: Thematic Analysis

The qualitative data yielded three broad themes;

Theme 1: Availability and Confidence.

The PHC is within walking reach and we visit this first when we have a fever or when giving birth. However, sometimes the doctor is not on duty, and we will be forced to visit the private clinic. There are two main types of this condition: type 1 and type 2. This condition is characterized by two major types including type 1 and type 2.

Geographical proximity and free consultations were appreciated by participants, and it enhanced confidence in the services of the public health. Non-regularity in the staff and a little time in the evening were however cited as being a barrier, particularly to working adults.

Theme 2: Continuity and Quality of Care.

We can cope with deliveries and immunization but we lack reagents to test sugar. In the case of NCD patients we rely on the district hospital. (Nurse, Semi-urban PHC) Health workers complained that they had difficulties in ensuring quality as they had stock-outs in diagnostic reagents, a shortage in workforce, and referral feedback. Limited continuity of care among chronic diseases in 40 percent of PHCs due to the lack of laboratory technicians.

Theme 3: Governance, Financing, and Community Participation.

The local committee assists us in recognizing poor families, but the money to make the repairs, or to raise awareness is usually late. (Medical Officer, Rural PHC) Good governance and adequate funding using Village Health and Sanitation Committees (VHSCs) were linked to improved performance. The involvement of the community was regarded as one of the drivers of accountability and health awareness.

Correlation Analysis

A correlation was done between workforce adequacy, drug availability and coverage of the services gave a moderate to strong positive relationship:

- ❖ The number of staff per population vs. outpatient attendance: $r = 0.51$, $p = 0.001$.
- ❖ NCD screening vs. Drug availability: $r = 0.46$, $p = 0.004$.
- ❖ Diagnostic preparedness/patient satisfaction: $r = 0.49$, $p = 0.002$.

These results prove that infrastructure and workforce capacity have a direct effect on utilization and

satisfaction, which supports the UHC framework focus on the quality and preparedness.

Interpretation and Policy Implications

It has been found that Primary Health Centers are vital but under-optimized pillars on the way to Universal Health Coverage. Although access to services in maternal and preventive health is sound, the inadequacy of the system in chronic disease care, financial protection, and quality of infrastructure are barriers to the achievement of comprehensive UHC.

The PHCs that performed well had certain similar features: they had sufficient human resources, dependable supply of drugs, well-developed community governance, and monitored health information systems. Conversely, not performing PHCs did not have technical staff, there were high rates of drug stock-outs, and low levels of community control.

Increased investment, capacity-building of workforce, and inclusion of digital health will be important in strengthening PHCs to increase coverage and quality, in line with WHO UHC roadmap and Ayushman Bharat vision of India.

CONCLUSION

In this paper, it is established that Primary Health Centres (PHCs) are the cornerstones to the establishment of Universal Health Coverage (UHC) through delivery of convenient, fair and community based care. Despite the fact that returns on the material and preventive health services are very high, the supply of workforce, reliability of supply chains and financial security issues continue to cripple the potentials. The PHC-PI discovery offers arguments that seeks to hypothesize that there are certain similarities in high performing PHCs that include satisfactory staffing, great management, common medicine and community engagement. The incorporation of PHCs into digitally connected, well-resource and community-empowered health system is one of the ways that these transformations will be realized. In conclusion, strategic need of equitable and sustainable development of health system is not only the goal but the policy targets to strengthen PHCs. Through a proper investment in primary care the health systems of India and the likes are well placed to make a bold leap into this future that holds a promise of health to everybody without necessarily over charging the constitution.

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