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**Original Research Article**

# Improving healthcare access: impact assessment of model urban primary health centers in Chhattisgarh

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## ABSTRACT

**Background:** As per the 2011 census, only 23.24% of Chhattisgarh's population lives in urban areas, while 76.76% resides in rural regions. Urban residents largely rely on district hospitals and medical colleges for secondary and tertiary care, resulting in high unmet demand for OPD services, especially among the working population. To address this challenge, CInI (Collectives for integrated livelihood initiatives), an associate organization of TATA Trusts, initiated an intervention to strengthen healthcare access by developing 20 urban primary health centres (UPHCs) as model facilities with the national health mission (C. G). The intervention focuses on creating a patient flow, ambience, immunization services, technology-adoption (NCD and DPDMIS), and staff capacity to improve quality-care. The primary aim was to create a replicable model that can be scaled up in other facilities statewide.
**Methods:** As a third-party evaluator and with NHM approval, the department of community medicine at Pt. JNM medical college, Raipur, conducted an impact assessment of the 20 intervention UPHCs from June 12-25, 2023. Assessors visited each centre for data collection using a pre-designed semi-structured questionnaire, and findings were analysed through a composite scoring method.
**Results:** The assessment revealed significant improvements in the quality of services at the UPHCs, leading to an increase in OPD footfall.
**Conclusions:** The demonstration of a model health facility through patient-centric amenities and focused capacity building efforts enabled the quality initiatives at the health facility, improved utilisation of services, and showcases an approach that can be replicated across the health system.

**Keywords:** Urban primary health centres, UPHCs, Quality of care, Health infrastructure, Capacity building, Healthcare evaluation, Healthcare access, Urban health

## INTRODUCTION

Modern hospitals are complex multi-product organisations.[1] According to the 2011 Census, the urban population has increased dramatically from around 18% in 1960 to 34% in 2019.[2] Despite this growth, the expansion of essential services, particularly healthcare, has not corresponded adequately. Urban public health services, delivered through UPHCs, fall short of the government's established standards by approximately 40% across the nation. The distribution of these services is inequitable, frequently situated far from slums and other locales that house the most vulnerable populations. Consequently, individuals from low-income backgrounds

are compelled to seek healthcare from private providers. This reliance on private healthcare is exacerbating financial burdens for the poorest, further entrenching them in cycles of debt and poverty while also delaying access to necessary medical care, especially for those with chronic conditions.[3] Urban population in India has registered an increase of 32% in the last decade from 2001 to 2011 and is standing at 37.7 Cr as per the government of India (GOI) census 2011.[4] The overall slum population is estimated to be 7.6 Cr, which is 20% of the total urban population.[5] The urban poor suffer from poor health status. As per the NFHS-5 (2019-21) data, the under-5 mortality rate (U5MR) among the urban is 28.9 per 1000 live births, and the infant mortality rate (IMR) is 26.2 per 1000 live births. The 27% of urban children are underweight and 20% of children aged 12-23 months are not fully vaccinated based on information from vaccination cards.[6] While significant improvements were observed in rural health indicators during the first decade of the 2000s, urban health outcomes remained relatively stagnant, despite the greater availability of secondary-level public and private healthcare facilities. Notably, primary healthcare services and outreach programs were largely absent in urban slum regions. In response to these challenges, the government of Chhattisgarh initiated the State urban health programme in 2012, with a particular focus on urban slum populations. This initiative was integrated into the national urban health mission (NUHM) beginning in 2014, which led to the establishment of UPHCs aimed at addressing the healthcare needs of these underserved populations.[7] As per NUHM implementation framework non-governmental organizations (NGOs) play a critical role in supporting UPHCs by contributing to community mobilization, capacity building, and the implementation of preventive and promotive health activities. The collaborative approach is aimed at strengthening healthcare services and improving access to essential health services for underserved populations in urban areas.[8] Over the past eight years, the NUHM has targeted the revival of service delivery in primary care for the urban poor living in slums.[9] To strengthen the efforts, CInI collaborated with the national health mission (NHM), Chhattisgarh to improve the quality-of-service delivery at select 20 UPHCs under the "model uphc project".[10] Model UPHC project was implemented in Chhattisgarh by CInI (Collectives for integrated livelihood initiatives, an associate organisation of the TATA trusts. The project was a part of Chhattisgarh health systems strengthening initiative (CG-HSS), a collaborative effort between the TATA trusts and national health mission (Chhattisgarh).[11]

The main objectives of the project were to create a model for delivering smart healthcare services for the vulnerable sections of the society. Secondly, to enable citizens in the catchment areas not only to access primary care available at the UPHC, but will also assist them in seeking care at other facilities and referral services without hassles. Lastly, the project will promote immunization in the urban areas by providing model immunization corners in all UPHCs as per need. The key components of the model UPHC framework, represented as continuous cycle, highlighting its systematic and integrated approach to service improvement. The model consists of 6 interlinked elements: infrastructure inputs, patient flow and ambience management, capacity building, technology adoption, stakeholder engagement, and monitoring and review. Each component/element supports next, showing an ongoing process of enhancement to strengthen healthcare delivery. At centre of this cycle is concept of model UPHC emphasizing that comprehensive improvement requires coordinated action across all these domains.

## METHODS

The aim of the study was to evaluate the performance and effectiveness of these UPHCs in implementing various healthcare interventions as part of the broader public health framework in the region. The study was carried out through a cross-sectional survey conducted between 12$^{th}$-25$^{th}$ June 2023. A team of 16 assessors, comprising of investigators, scientists, doctors, and other supporting staff, was mobilized to carry out the data collection across all 20 UPHCs intervention centers. The study included all 20 UPHCs that were designated as model UPHCs under the intervention program in Chhattisgarh, and these formed the inclusion criteria for the assessment. UPHCs that were not part of the model UPHC intervention were excluded from the study and were therefore not considered for evaluation. These centers included Charoda, Potiya Kala, New Khursipar, Baikunthdham, Budhamahadev, Rajkishor Nagar, Gandhi Chowk, Dhodipara, Gopalpur, Nawapara, Hirapur, Kanshiram Nagar, Mathpuraina, Devpuri, Aamasivani, Labhandi, Bhanpuri, Bhatagaon, Rajatalab, and Gudhiyari. The field visits were made in person to ensure thorough on-site assessment and to gather real-time data regarding the operational and functional aspects of the UPHCs. Data were collected using a predesigned, semi-structured questionnaire, employing a mixed-method approach for data capture. This approach was designed to encompass both quantitative and qualitative data, enabling a comprehensive evaluation of the centers' operational systems, infrastructure, and service delivery. The questionnaire was structured to assess various measurable elements critical to the functioning of each UPHC. The elements on which the project assessment was conducted was based broadly on 6 thematic areas/parameters of functioning of the UPHCs, namely, Infrastructure inputs, Patient flow and ambience management, capacity building, technology adoption, stakeholder engagement, monitoring and review.

The collected data were first checked for completeness and consistency. Following this, the data were analyzed using a composite scoring system, which aimed to provide an objective and quantifiable measure of the UPHCs' performance. For this scoring system, each of the six aforementioned elements was assessed through a series of checkpoints, with compliance levels evaluated

on a 3-point scale: 2 marks were awarded for full compliance with the checkpoint standards. 1 mark was assigned for partial compliance, indicating that the center met some but not all of criteria and 0 marks were given for non-compliance, where the center failed to meet the set standard. Uniform scoring rules were applied across all UPHCs to provide standardized method of comparison and evaluation.

Calculation of the percentage is as follows-score obtained×100/No. of checkpoints in the checklist×2

Based on this scoring, the performance of individual UPHCs was further categorized as excellent (>90% score), good (60-89% score), poor (<60% score). The results from this evaluation are intended to inform further improvements and modifications to the healthcare delivery model, ensuring better health outcomes for the population served by these centers.

## RESULTS

### *Over all deliverables of the project*

There was an increase in quality improvement significantly by 84% against the overall deliverables of this project. Out of 20 intervention UPHCs, 11 UPHCs namely Potiyakala (Durg), New Khursipar (Durg), Budhamahadev (Kabeerdhaam), Rajkishor nagar (Bilaspur), Gopalpur (Korba), Nawapara (Sarguja), Amaseoni (Raipur), Labhandi (Raipur), Bhanpuri (Raipur), Bhatagaon (Raipur), Rajatalab (Raipur) graded as excellent in all approaches. Seven (07) UPHCs namely Charoda (Durg), Baikunthdham (Durg), Kashiram Nagar (Raipur), Gudhiyari (Raipur), Gandhi Chowk (Bilaspur), Hirapur (Raipur), Mathpurena (Raipur) were graded as good. Only two (02) UPHCs namely Devpuri (Raipur) and Dhodipara (Korba) were graded as poor.

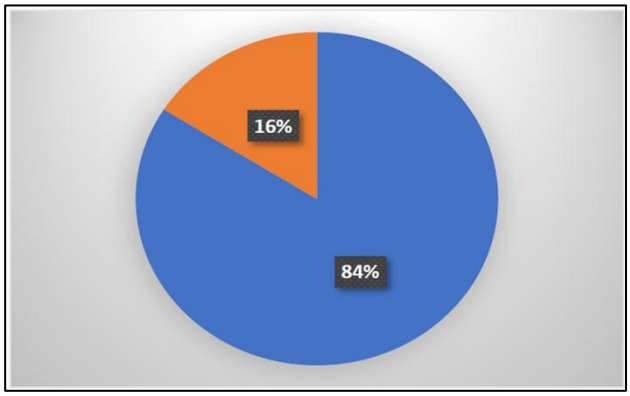


**Figure 1: Overall achievement of deliverables under the model UPHC project.**

### *Improvement in the thematic component*

A significant increase was observed in the thematic components. Under the monitoring and review mechanism, there was an 80% increase. Other components showed the following improvements: Patient flow and ambience (79%), infrastructure inputs/internal reorganization (82%), stakeholder engagement (82%), capacity building (90%), and technology adoption (86%).

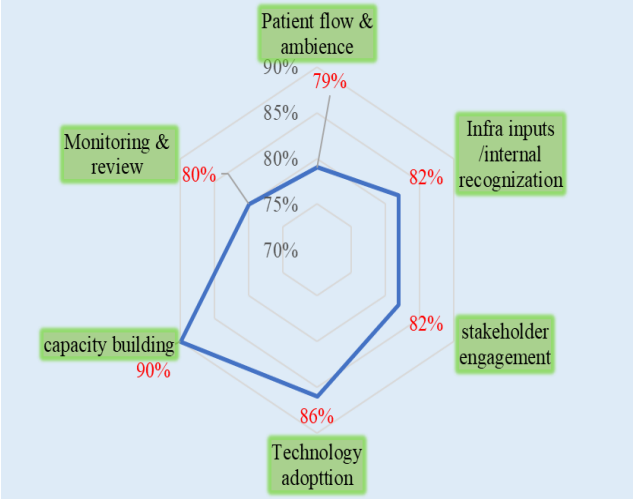


**Figure 2: Thematic improvement of key components.**

### *Thematic improvement facility wise*

This data likely highlights areas for targeted improvements in lower-performing UPHCs and acknowledges high-performing centers as potential benchmarks. Nawapara UPHC achieved the highest score, reaching a perfect 100, followed by Bhatagaon UPHC with a score of 96 and Raja Talab UPHC at 98. Other UPHCs, including Baikunth, Raikishor Nagar, Labhandi, and Bhanpuri, all scored 94, demonstrating strong performance. The centers, such as Charoda, Potiyakala, and New Khursipar, scored between 80 and 89, indicating a moderate level of performance. In contrast, Gopalpur UPHC and Ama Sivari UPHC scored significantly lower, at 58 and 32, respectively, highlighting areas where improvement is needed. Overall, the mean score for all UPHCs is 84, reflecting a generally moderate level of achievement across the centers.

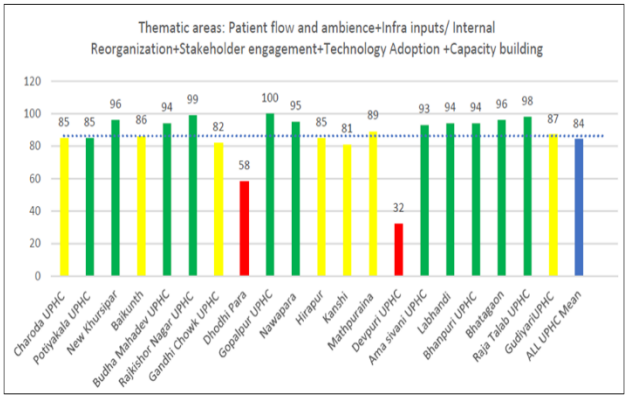


**Figure 3: Improvement in each of the 20 intervention UPHCs for select thematic areas.**

***Status of total OPD footfall post intervention***

This graph illustrates the percentage increase in outpatient department (OPD) footfall at various UPHCs over the project period, highlighting the growth in patient visits for each center.

Key observations reveal that Gandhi Chowk UPHC achieved the highest increase, with an impressive 103% rise in footfall, followed by Raja Talab UPHC (84%), Gudiyari UPHC (87%), and Raikishor Nagar UPHC (80%). Bhatagaon UPHC also performed well with a 68% increase in patient visits.

Several centers exhibited more moderate increases in footfall. Potiyakala UPHC (59%), Gopalpur UPHC (58%), and Mathpuraina UPHC (32%) saw dramatic growth in patient visits, indicating progress, though at a slower pace.

UPHCs such as Charoda UPHC (16%), Devpuri UPHC (17%), and Kashi Ram UPHC (15%) showed minimal growth. Ama Sivani UPHC registered no increase in patient visits (0%), suggesting a lack of change or improvement.

High-performing UPHCs may have effectively attracted more patients, while low-performing centers might need to explore new strategies to boost their footfall and engagement.

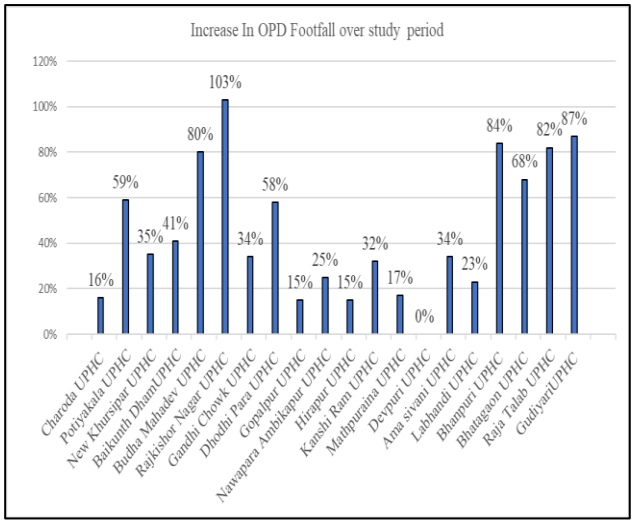


**Figure 4: Percentage (%) increase in total OPD footfall after intervention.**

***Status on immunization services and OOPE (Out of pocket expenditure)***

The total increase in the immunization services across all UPHCs was 38%, indicating an overall positive trend in footfall increase across the centers, though with significant variance. This status highlights UPHCs that could serve as models for immunization best practices (like Gandhi Chowk) and those that might need further support or strategic changes (like Devpuri and Amasivni) to improve patient outreach and engagement. Although, Mathpuraina and Devpuri UPHC does not show increase owing to the ongoing construction.

For OOPE, among patients visiting the facilities, out-of-pocket expenditures (OOPE) were primarily observed for transportation and food. There were no OOPE for OPD care, medications, laboratory services, or imaging.

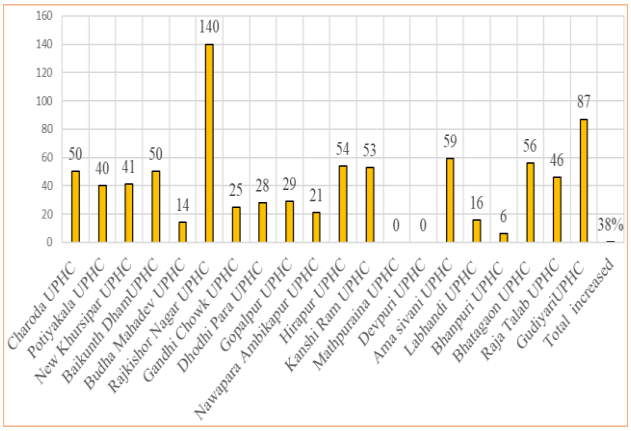


**Figure 5: Increase in immunization services in UPHCs.**

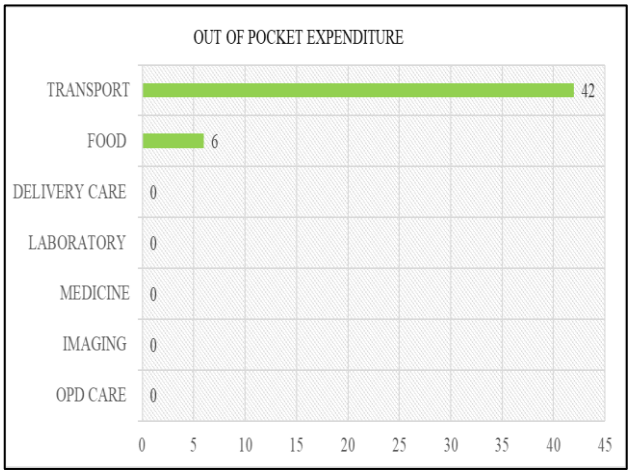


**Figure 6: Out of pocket expenditure in UPHCs.**

## DISCUSSION

Our study aimed to examined the impact of the project which was to improve the overall quality of comprehensive primary healthcare services in the selected UPHCs by improving the infra; providing good ambience; building capacities of healthcare workers; enabling technology adoption and supporting with monitoring and reviews.

Urban infrastructure has always been a challenge for NUHM. There were sporadic and scanty efforts such as world bank-funded India population projects. Although a

large number of secondary and tertiary care hospitals exist in cities, the primary health infrastructure remains grossly inadequate in urban areas in terms of subcenters and primary health centers.[12] On survey, we found that the overall efforts for developing twenty (20) UPHCs are significantly helping the slum population and urban poor living in the catchment area of these UPHCs. This intervention provided additional support for improving quality of care and thereby patient's satisfaction; upgrading Infra and ambience; enabling technology adoption; building capacities of health workers and demonstrating model immunization rooms. 20 UPHCs experienced an overall 84% achievement of deliverables post the engagement.

A study conducted by Nair et al shows that UPHCs are widely used in slum, coastal, and urban areas, highlighting the high demand for health services among the urban poor. Special attention is needed for slum and coastal populations due to poor living conditions. Increased use of UPHCs has reduced the burden on larger hospitals like SDHs and DHs. Kerala has shown better utilization due to effective programs. Improved infrastructure under Kayakalp initiative and NQAS certification reflects commitment of NUHM and State.[13]

In our study it was found that among patients visiting the facilities, OOPE were primarily observed for transportation and food. There were no OOPE for OPD care, medications, laboratory services, or imaging. A study done by Garg and Goyanka estimated the cost of outpatient care per visit in Delhi for 2019-20 for AAMCs and compared it with UPHCs, public hospitals, private clinics and private hospitals. The cost per visit at a private clinic at ₹1146 (US$16) was more than 3-times higher than that at a UPHC (₹325/US$5) and 8-times higher than that at AAMCs (₹143/US$2.0). The government cost per visit was ₹439 at a public hospital, three times higher than at a UPHC (₹148), which in turn was 1.5 times higher than at an AAMC (₹101). Including out-of-pocket expenses, the total cost per visit was ₹143 at AAMCs, ₹325 at UPHCs, and ₹1099 at public hospitals.[14] Bahuguna et al in the study found that the average cost of inpatient care was ₹2,502 at DHs and ₹1,601 at CHCs, with significant variation across states. For outpatient visits, DHs averaged ₹224 and CHCs/PHCs ₹214, again with wide state-wise differences.[15] Chatterjee et al found that in 2011-12, outpatient visit costs ranged from ₹94 at district hospitals to ₹2213 at private hospitals.[16] A 2020 study done in Chhattisgarh, India, which accounted for both government spending and out-of-pocket expenses, estimated the cost of outpatient care to be ₹400 at public facilities, ₹586 at informal private providers, and ₹2,643 at formal for-profit providers.[17] In terms of facility-level costs, studies conducted in Gujarat, Himachal Pradesh, and Kerala estimated that the annual recurrent expenditure ranged from ₹5.24 million to ₹12 million for PHCs, and from ₹860,000 to ₹1.87 million for sub-centres.[18]

The increase in OPD footfall signifies the increase utilization of health facilities. This will reduce the OPD burden in district hospitals to community health centres in meeting the primary needs of urban population.[19] Also, state support in infrastructure upgrade in line with Kayakalp drive and NQAS certification proven to be beneficial. The USP of this project was development of model immunization room to boost the immunization practices in and around the urban area. Similar best practise was found in urban Patna. Child-friendly air-conditioned model immunization centres have been equipped with audio-visual information, education and communication (IEC) materials, proper sanitization, closed-circuit television (CCTV) surveillance and dedicated cold chain equipment.[20]

## CONCLUSION

Quality of services at the intervention UPHCs has improved. There is a positive perception among the patients and service providers, which will contribute towards higher utilisation of health facilities. Adoption of the model approach across all the UPHCs may result in reduced turnaround time for patients, infection control with better management of biomedical waste, uptake of quality assurance initiatives, optimal utilisation of IT platforms for record keeping and supply chain management, improved amenities and ambience for patient safety and staffs' ease of operability, skilled and motivated staff, improved processes at pharmacy, laboratories along with a child-friendly immunization room to cater to all primary healthcare requirements of the citizens. Awareness regarding the immunization room and services offered at the facility must be improved among the citizens. Continuous capacity building is an essential aspect and should be done with the help of quality champions/master trainers developed as part of this project.

### *Recommendations*

*Sustainability through government ownership and support*

To ensure the long-term viability and impact of this model, continuous government ownership and support are paramount. Government backing provides the necessary infrastructure, resources, and policy alignment to maintain momentum. This commitment should extend beyond initial implementation phases, as ongoing funding, regulatory support, and advocacy are crucial for sustaining the initiative's success.

*Technology adoption and best practices*

Adopting cutting-edge technologies and implementing best practices are essential for enhancing the quality-of-service delivery. This includes developing and utilizing digital platforms such as portals and BMWM (Best Management and waste management systems) for effective monitoring, management, and reporting. These technological tools not only streamline operations but

also ensure greater transparency, data-driven decision-making, and improved service delivery outcomes.

*Capacity building for enhanced quality*

Capacity building is a cornerstone of improving service delivery quality. Regular training and professional development activities, led by quality champions and master trainers, should be a key part of the program. These experts can provide tailored guidance, share knowledge on new tools, and help overcome challenges faced on the ground. Additionally, these sessions foster a culture of continuous learning and adaptation, ensuring that teams are equipped to meet evolving demands and challenges.

*Long-term engagement for greater impact*

To maximize the impact of these efforts and ensure their sustainability, a minimum engagement period of 2-3 years is critical. This extended duration allows for the gradual integration of the model into regular operations, the institutionalization of best practices, and the reinforcement of capacity building through repeated cycles of training and feedback. Shorter engagement periods may not provide enough time to embed the necessary changes and achieve the desired outcomes.

In conclusion, for the model to be sustainable and impactful, it is essential that it benefits from ongoing government ownership, effective technology integration, continuous capacity building, and a long-term commitment to engagement. Through these measures, the model can evolve and sustain itself, delivering lasting improvements in quality of service.

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