

**CHALLENGES IN IMPLEMENTATION OF QUALITY MANAGEMENT SYSTEMS
AND KEY PERFORMANCE INDICATORS AT AYUSHMAN AROGYA
SUBCENTER UNDER NATIONAL QUALITY ASSURANCE STANDARDS**

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Soumya Prasad

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Dr. Anupam Mehrotra

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Government of Rajasthan
National Health Mission, Rajasthan
Department of Medical, Health & FW, Swasthya Bhawan, Jaipur
Tel.No.0141-2229108, Email ID: spm_raj.nrhm@yahoo.com

No. F 2 (153) NHM/SPM/2025/618

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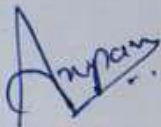
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Her performance was found satisfactory. We extend her good wishes for a bright and successful career ahead.


(Dr. Bharti Dixit)
Mission Director, NHM
Joint Secretary
Medical Health & Family Welfare

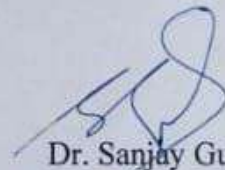
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This is to certify that dissertation titled **Challenges in Implementation of Quality Management System and Key Performance Indicators at Ayushman Arogya Subcenter under National Quality Assurance Standards** is a record of the research work undertaken by Soumya Prasad in partial fulfillment of the requirements for the award of the degree of MBA (Hospital and Health Management) from the IIHMR University, Jaipur under my guidance and supervision and her approach to the research study has been sincere, scientific, and analytical.

A handwritten signature in blue ink, appearing to read 'Anupam'.

Dr. Anupam Mehrotra
Assistant Professor (IHMR)
IIHMR University, Jaipur

Date 9/6/2025

A handwritten signature in blue ink, appearing to read 'Sanjay'.

Dr. Sanjay Gupta
Dean (IHMR)

IIHMR University, Jaipur

Date 9/6/2025

DECLARATION BY STUDENT

I hereby declare that this dissertation titled **Challenges in Implementation of Quality Management System and Key Performance Indicators at Ayushman Arogya Subcenter under National Quality Assurance Standards** is the bonafide record of my original research work. I declare that it has not been submitted to any other university or institution for the award of any degree or diploma. Information derived from the published or unpublished work of others has been duly acknowledged in the text.

Soumya Prasad
(Signature)

Name of Student SOUMYA PRASAD

Date 12/06/25

Abstract

Background: The Quality Management Systems (QMS) and Key Performance Indicators (KPIs) implementation status and challenges at Ayushman Arogya Sub-Centers (AAM-SCs) under the National Health Mission (NHM) in Jaipur 1 Block, Rajasthan, are examined in this dissertation. The study intends to evaluate these Sub-Centers, which are the backbone of rural health service delivery, in terms of their adherence to the National Quality Assurance Standards (NQAS) and to identify the elements that affect service quality at the local level.

Objectives: The study's main goals were to assess AAM Sub-Centers' adherence to QMS standards, examine KPI tracking mechanisms, find domain-specific gaps in service delivery (Structure, Process, Outcome), and comprehend the difficulties frontline healthcare workers encounter when putting quality assurance procedures into practice.

Methodology: A descriptive cross-sectional design was used in seven Jaipur 1 Block Sub-Centers that were specifically chosen. Based on the NQAS checklist, a structured questionnaire comprising three open-ended questions and forty-six binary (Yes/No) items was used to gather data. Compiling domain-wise compliance percentages and composite QMS scores were part of the quantitative analysis. The association between the Structure, Process, and Outcome scores was examined using Pearson's correlation. To identify the difficulties faced by healthcare professionals on the ground and their support needs, qualitative responses were subjected to thematic analysis.

Results: The results demonstrated continuous efforts in ANC checkups, vaccination coverage, and data updates, resulting in high compliance in the Outcome domain (average score: 94.64%). Significant gaps were exposed by lower scores in Structure (75%) and Process (71.43%), especially in the areas of infection control procedures, infrastructure quality, digital tool usage, and human resource availability. Of the seven Sub-Centers, Mundiaramsar received the lowest composite QMS score (57.16%), while Machwa and Niwaru obtained the highest scores (96.15%). There was a moderate correlation between Process and Outcome ($r = 0.65$) and a strong positive correlation between Structure and Outcome scores ($r = 0.84$), indicating that improved service outcomes are linked to better infrastructure and procedural adherence.

Thematic analysis of open-ended responses identified major issues, including inadequate water and sanitation facilities (5/7), insufficient infrastructure (6/7), challenges in monitoring KPIs (6/7), and a lack of trained personnel (7/7 centres). The field's recommendations

highlighted the necessity of more supportive oversight from higher authorities, improved digital infrastructure, and refresher training.

Conclusion: The study comes to the conclusion that although Sub-Centers perform well on outcome metrics, there are still fundamental gaps in the process and structure domains. If these issues are resolved, primary healthcare delivery's general quality could be greatly raised. A structured lens for assessment was offered by the Donabedian Model and the NQAS framework, which also demonstrated the clear connection between input/process quality and health outcomes. The results highlight the necessity of sustained funding for mentorship, training, and infrastructure as well as policy-level assistance to enable Sub-Centers to serve as front-line providers of universal healthcare.

Keywords: Quality Management System, Sub-Center, Key Performance Indicators, National Health Mission, Donabedian Model

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Abbreviations

NHM	National Health Mission
SC	Sub Center
PHC	Primary Health Center
CHC	Community Health Center
ANM	Auxiliary Nurse Midwife
CHO	Community Health Officer
MPHW	Multi Purpose Health Worker
ASHAs	Accredited Social Health Activists
NQAS	National Quality Assurance Standards
QMS	Quality Management System
KPI	Key Performance Indicator
ANC	Antenatal Care
HMIS	Health Management Information System
ANMOL	Auxiliary Nurse Midwife Online
JAS	Jan Arogya Samiti
PSG	Patient Support Group
AAM	Ayushman Arogya Mandir
RCH	Reproductive and Child Health
IEC	Information, Education and Communication
VHSNC	Village Health Sanitation and Nutrition Committee

CHAPTER 1: INTRODUCTION

1. Public Health Infrastructure in India

The capacity of a nation to deliver healthcare services for public good in an effective and equitable manner is dependent on its public health infrastructure. In India, the National Health Mission (NHM), supervises a three-tier system of Sub-Centres (SCs), Primary Health Centres (PHCs), and Community Health Centres (CHCs) which is to provide preventive, promotive, curative and rehabilitative services as well as health care services to the most disenfranchised and unserved villages of rural areas i.e. as part of PHC health system process (MoHFW, 2021). A robust public health infrastructure is requisite for guaranteeing health systems to be resilient to newly emerging health threats and health systems to adapt to demographic and social determinants of health, as well as address routine health care service delivery in areas such as antenatal care (ANC), immunisation and maternal-child health (Bhattacharya et al., 2019). Thus, public health infrastructure is crucial to support and reduce health inequities, enhance health security, promote health equity which then contributes to social equity, and achieve sustainable development (UNDP, 2020).

Despite ongoing reform and financial allocations, there remain significant gaps in terms of the availability, accessibility, and quality of health services provided from these Centers. Infrastructure constraints, lack of proper personnel or human resources, inconsistency or supply shortages of essential medicines and diagnostics remain critical challenges to address a greater emphasis on quality management is required (Berman & Ahuja, 2021).

1.2. Role and Functioning of Sub-Centers

Sub-Centers represent the most peripheral and first point of contact in India's public health system. Each Sub-Center is established to serve a specific population size, typically covering 3,000 to 5,000 people in plain areas and 2,000 to 3,000 people in hilly or tribal regions (MoHFW, 2020; Bashir et al., 2017). They are staffed by Auxiliary Nurse Midwives (ANMs), Community Health Officers (CHOs), and Multi-Purpose Health Workers (MPHWs), among others. Their services include maternal and child health care, immunization, family planning, nutrition, communicable disease control, and non-communicable disease screening (IPHS, 2022).

A Sub-center connects with the community at the grassroots level and provides primary healthcare services, overall ranging from maternity and child health to minor diseases treatment. Rural healthcare in India is experiencing a crisis, where only 20% of outpatients and 45% of inpatients use public care due to outdated infrastructure and limited drug and equipment availability (Sriram, 2017).

Sub-Centers are important segment for translating public health policies into actionable services and for addressing health disparities in rural communities. Many Sub-centers do not have their own structures to provide services to their beneficiaries. Even in a rental building, obtaining a dedicated clinic or labour room is not always feasible. There are deficiencies in basic utilities such as water and power at SCs (Manas et al., 2014).

However, there are many other operational challenges due to inadequate infrastructure, healthcare personnel gaps, inefficient supply chain systems, and underutilized digital health platforms (WHO-SEARO, 2020). These issues hinder effective service delivery.

In light of these challenges, the integration of quality assurance programme mechanisms into Sub-Center operations is crucial to building trust in the public health system and improve the overall community health outcomes (MoHFW, 2018; NHSRC, 2021).

1.3. Quality Management in Public Health

Within the framework of public health systems, quality management is a systematic and deliberate way to optimize health outcomes and services. It involves implementing systematic processes and policies for measuring, monitoring, and improving healthcare services over time.

The government of India pioneered the establishment of the National Rural Health Mission (NRHM) in 2005 to make enhancements to rural health systems and supporting people's health. The Indian Public Health Standards (IPHS) are based on the mission to ensure that SCs provide high quality care. The guidelines provided by the IPHS will serve as a measure for monitoring and improving SCs, and structural failures and quality-related failures can impede rural health care delivery (Manas et al, 2014).

In India, this paradigm is supported by frameworks such as the National Quality Assurance Standards (NQAS) designed to assist healthcare institutions implement practices which safeguard consistency, dependability and accountability in service provision.

Quality management does not only encompass the clinical component of care, it does include support services, the human resources involved, patient satisfaction, infection prevention practices, the complexities of administrative aspects, all with a mission of creating a continuous quality improvement culture at every level of the healthcare system.

The implementation of overall structured Quality Management System (QMS) ensures monitoring and quality healthcare.

1.4. Assessment Levels for Sub-Centres under NHM

Sub-Centres, often called Ayushman Arogya Mandir (AAM) Sub-Centres, undergo a 4-tier assessment process of quality standards. The first three levels of assessment are:

- Internal Assessment: this is done for self-assessment of facility performance by facility staff against standards.
- Peer Assessment: this is done to assess quality and service delivery from the external perspective of health care staff from neighbouring facilities.
- State Level Assessment: this is done for compliance with specific health standards of state, done by appointed state teams.
- National Level Assessment: this is the highest assessment level, to assess adherence to National Quality Assurance Standards (NQAS) and certify facility eligibility for national certification by central teams (MoHFW, 2018; NHSRC, 2021).

Facilities must meet at least 70% score in all domains to be eligible for national certification under NQAS. This collection of standardised assessments ensures that only facilities that are expected to achieve comprehensive quality standards increased visibility at the national level (NHSRC, 2018).

1.5. National Quality Assurance Standards (NQAS)

The Ministry of Health and Family Welfare (MoHFW) has collectively developed National Quality Assurance Standards NQAS for a more systematic health delivery mechanism, and improved health-care for everyone. The standards combine eight domains: service provision, patient rights, inputs, support services, clinical care, infection control, quality management, outcomes which are the main pillars for achieving satisfactory health services and provide the backbone to the NQAS.

The **NQAS checklist** is a comprehensive tool used for assessment and monitoring of healthcare facilities. It enables systematic evaluation across these domains by reviewing elements such as:

- Availability of trained personnel (CHO, ANMs, MPHWs)
- Infrastructure functionality (consultation rooms, clean toilets, power, water supply)
- Drug and diagnostic availability
- Service provision protocols and infection control
- Patient feedback and grievance mechanisms

The checklist is tailored for different facility levels, including Sub-Centers, and supports both internal assessments and external evaluations.

1.6. Donabedian Model and Key Performance Indicators (KPIs)

In 1966, American researcher Avedis Donabedian established and stated the three-dimensional quality structure model, which defines quality qualities in terms of structure, process, and outcome (Donabedian, 1966; Ayanian & Markel, 2016). Scholars have explored and used the Donabedian model, resulting in scientific and practical model framework of quality (Ayanian & Markel, 2016).

The Donabedian Model serves as a conceptual foundation for assessing healthcare quality. It classifies evaluation into three major categories:

- **Structure:** This includes all the physical and organizational infrastructure that supports and encompasses the healthcare delivery. It includes the availability and adequacy of human resources (such as CHOs, ANMs, MPHWs), infrastructure (like clean consultation rooms, functional toilets, power and water supply), essential diagnostic tools, and medical supplies, among others. Proper structure enables effective functioning of any healthcare unit and lays the groundwork for quality service delivery.
- **Process:** This domain includes the activities and interactions that occur during the delivery of healthcare services. It includes adherence to clinical protocols, infection control practices, quality management activities, use of digital health tools like ANMOL or eSanjeevani, patient education, community engagement, and documentation, among others. The process indicates and focuses on safety, timeliness, and efficiency (NHSRC, 2020).
- **Outcomes:** This domain determines the end results of healthcare services provided. It involves quantifying patient health outcomes, client satisfaction, effectiveness of interventions, and performance on Key Performance Indicators (KPIs). Key indicators

such as immunization coverage, ANC visits, NCD screenings, and data reporting on HMIS portals fall into this category, among others. Effective outcome measurement enables healthcare providers to assess the impact of their interventions and make data-driven improvements and decisions (MoHFW, 2021).

1.7. Key Performance Indicators

The key focus in the field of public health is data. Data tracking is crucial as the government makes investments in public health (Peter et al., 2022).

Key Performance Indicators (KPIs) are important for tracking advancements and effectiveness in the provision of healthcare. They are crucial instruments in public health for evaluating the efficiency and responsiveness of the provision of healthcare services (MoHFW, 2018). The ability to reach target groups with necessary facilities is reflected in these metrics, which offer quantifiable insights into how public health facilities operate (NHSRC, 2020). Healthcare professionals and decision-makers can spot service coverage gaps, more effectively allocate resources, and take prompt corrective action by methodically recording and monitoring KPIs.

Any number of KPIs, such as antenatal care (ANC) examinations, vaccination rates, non-communicable disease (NCD) screening rates, remote consultation or teleconsultations, and data updates on national portals, such as HMIS and RCH, are among the commonly used KPIs assessed in Sub-Centers. These and similar KPIs are linked to implementation efforts to establish accreditation and quality enhancement under national schemes such as the National Quality Assurance Standards (NQAS) and the Ayushman Bharat-Health and Wellness Centers (AB-HWC), which are now part of the Ayushman Arogya Mandir (AAM) building block (MoHFW, 2020).

8. Purpose of the Study

The purpose of this study is to evaluate the quality of service delivery at selected Sub-Centers under the National Health Mission, using the NQAS checklist and Donabedian framework. It aims to explore the compliance levels with quality standards, examine key performance indicators, and understand challenges in implementing QMS at the grassroots level.

1.9. Problem Being Investigated

Despite national-level quality initiatives, many Sub-Centers struggle with infrastructural limitations, workforce shortages, weak monitoring mechanisms, and inconsistent service quality. This study investigates these problems by analyzing the structural, process, and outcome-related issues that affect quality healthcare delivery at Sub-Centers.

According to the Indian Public Health Standard (IPHS), SCs' physical infrastructure and human availability require significant improvement. This emphasises the need of looking at the existing state of physical infrastructure at sub-centers. The shortage of necessary drugs and equipment must be addressed as soon as possible. This deficit has a direct influence on the capacity of sub-centers to deliver basic healthcare services to the rural population (Bashar et al., 2017).

1.10. Context of the Study

This study is situated within the broader initiative of strengthening primary healthcare services through Ayushman Bharat Health and Wellness Centres and NHM quality mandates.

By focusing on Sub-Centers, the most peripheral units, the study examines real-world challenges in translating policy into practice, and evaluates how well these facilities align with the national quality framework.

1.11. Importance of the Study

The findings of this study are expected to:

- Highlight domain-wise (structure, process, outcome) performance gaps in Sub-Centers
- Examine the relationship between service quality inputs and health outcomes
- Understand frontline worker challenges in implementing QMS and monitoring KPIs
- Suggest actionable, evidence-based recommendations for quality improvement

This research will help strengthen facility-level quality management systems, guide resource allocation and training needs, and enhance the responsiveness and efficiency of primary healthcare services. The outcome in turn, will support better health outcomes and increase trust in the public health system among rural communities.

1.12. Aim and Objectives

Aim: To assess and analyze the quality of service delivery in Sub-Centers under the National Health Mission using the NQAS checklist and Donabedian's model.

Objectives:

- To assess the current level of compliance with Quality Management System (QMS) standards in Ayushman Arogya Subcenters under Jaipur 1 block.
- To evaluate the adherence to Key Performance Indicators (KPIs) and outcome tracking at the subcenter level.
- To identify domain-wise (Structure, Process, Outcome) performance gaps in QMS implementation.
- To examine the relationship between QMS domain scores (Structure and Process) and outcome performance (KPI indicators).
- To explore challenges faced by healthcare workers in implementing QMS and monitoring KPIs.
- To suggest actionable recommendations to improve QMS and KPI implementation in Ayushman Arogya Subcenters.

CHAPTER 2: REVIEW OF LITERATURE

S.No.	Article	Authors (Year)	Study Location and Sample Size	Study Type	Salient Features (Key Findings)
1.	“Are our subcenters equipped enough to provide primary health care to the community: A study to explore the gaps in workforce and infrastructure in the subcenters from North India” (Bashar et al., 2017)	M. A. Bashar ¹ , Sonu Goel ¹	Ambala, Haryana, India, 30 subcenters	Cross Sectional	Only 11% of tribal sub-centers meet IPHS norms, with many lacking water, power, and labor rooms. Poor infrastructure, staff shortages, and irregular outreach hinder maternal and child healthcare. Cultural and language barriers lead to low use of services like antenatal care and immunization. Strengthening these centers with local resources and culturally sensitive care is essential.
2.	“A Study of status of facilities available at Sub Centres and Right to Health” (Sunil Choudhary, 2019)	Sunil Choudhary	Sewar block, Bharatpur district, Rajasthan, 30 subcenters	Cross Sectional	The article emphasizes that sub-centers in Indigenous areas must incorporate traditional knowledge and culturally appropriate practices to build trust and improve healthcare use. It highlights the need for community participation and health education to counter colonial legacies. Key challenges include poor

					infrastructure, staff shortages, and lack of culturally sensitive care. Strengthening sub-centers with better resources, community involvement, and culturally competent services is crucial to reduce health disparities among Indigenous populations.
3.	“Are the subcenters adequately equipped to deliver primary healthcare? A study of public health manpower and infrastructure in the health district in Andhra Pradesh, India” (Shyamkumar Sriram, 2017)	Shyam-kumar Sriram	Nellore, Andhra Pradesh, 60 subcenters	Cross-sectional study	Only 8% of sub-centers meet IPHS, and just 14.6% have functional labor rooms, limiting their ability to manage deliveries. Most operate with only one ANM and lack male health workers, leading to staff overload. About 50% of essential drugs are unavailable, affecting service delivery. These gaps result in frequent referrals to higher facilities, weakening sub-centers' role as primary rural healthcare providers. They offer key services like maternal and child health, immunization, and disease control but face challenges such as staff shortages, poor infrastructure, and weak supervision. Improving staffing, training, and infrastructure is crucial for their effectiveness.

4.	“Study on the Availability of Physical Infrastructure and Manpower Facilities in Sub-centers of Chittoor District of Andhra Pradesh” (Bayapa Reddy et al., 2012)	Bayapa Reddy N1, G. Ravi Prabhu2, T S R Sai	Chittoor District, Andhra Pradesh, 34 subcenters	Cross Sectional	There is a major shortage of health workers at sub-centers, with 67.7% male and 27.5% female positions vacant. Only 26.4% have staff housing, and just 20.6% are equipped with basic tools like stethoscopes and BP apparatus. Most sub-centers lack proper infrastructure, delivery facilities, and emergency referral services. To meet IPHS norms, sub-centers must improve staffing, provide residential facilities, ensure access to water, electricity, communication, and maintain proper staff-to-population ratios. Regular supervisory visits by medical officers are also crucial. Community involvement and culturally appropriate services can improve utilization. Investment in training and equipment is urgently needed. Strengthening sub-centers is key to ensuring equitable rural healthcare delivery.
5.	“Sub Centre Support, Need of the Hour: A	Manas P Roy, U Mohan, SK	Lucknow, Uttar Pradesh	Cross-sectional	Although 87.5% of Sub-Centres (SCs) had buildings, only 56.2% were operational

	Comparative Study from Lucknow” (Manas P Roy et al., 2012)	Singh, VK Singh, AK Shrivastava			and just 37.5% had completed construction. Half had labor rooms, but none conducted deliveries due to lack of electricity (100%) and resident staff (87.5%). Electricity was available in only 18.8%, and piped water was absent in all SCs. While 75% performed well in ANC registration and immunization, 50% lacked early registration data, and 87.5% failed in referring high-risk pregnancies. Despite NRHM efforts, major gaps in infrastructure, staff housing, and utilities persist. Strengthening SCs through full IPHS implementation is essential for effective primary care and better rural health outcomes.
6.	“Baseline Assessment of Primary Healthcare Delivery Through Subcenters of Northern India” (Sonu Goel et al., 2019)	Sonu Goel , Madhur Verma, Kamal Kishore, Kritika Upadhyay, Vijai Sharma	Ambala, Haryana	Cross-sectional study	Most sub-centers had average infrastructure, with only 52% in good condition. Basic equipment and medicines were generally available, but record-keeping—especially for antenatal care and child illnesses—was inconsistent. Health workers practiced good hygiene and had sound MCH knowledge, but clinical skills

					needed improvement; only 65% measured blood pressure accurately, and just 48% correctly performed hemoglobin tests. The study highlights gaps in Haryana's health system and stresses the need for regular supportive supervision. It suggests that better use of existing resources can enhance clinical skills, documentation, and service monitoring at sub-centers.
7.	“A Cross-sectional Study of Public Health Workforce and Infrastructure at Subcenters in District Bandipora of Jammu and Kashmir, India” (Ghulam Mustafa Kataria et al., 2023)	Ghulam Mustafa Kataria, Ashfaq Ahmad Bhat1	Haryana, 29 sub centers	Cross-sectional study (NFHS data)	Female health workers were available in 100% of subcenters, while male workers were present in just 8.8%. Only 17.6% of centers had their own buildings; the rest operated from rented spaces. Labor rooms were missing in 67.6%, with deliveries occurring in just 2 subcenters. Separate male-female public utilities were available in only 14.7%, and no residential facilities were available for staff. The study highlighted major workforce and infrastructure gaps in subcenters when compared to IPHS norms. It emphasized the urgent need to deploy more

					male health workers and improve physical infrastructure. The absence of government buildings and staff housing was found to hinder effective service delivery. The absence of government buildings and staff housing was found to hinder effective service delivery.
8.	“Gap Analysis in Workforce and Infrastructure in the Subcenters for Upgradation to Health and Wellness Center in a Community Development Block of Purba Bardhaman District, West Bengal” (Prosun Goswami et al., 2021)	Prosun Goswami, Amitava Chakraborty, Dilip Kumar Das, Soumalya Ray	Bardhaman, West Bengal, 38 sub centers	Cross-sectional survey	No subcenter had a Community Health Officer, and 23.7% of subcenters were without a second ANM. Lack of staff residential facility, water supply, and inadequate civil construction were major barriers to infrastructure. 28.9% of ANMs had adequate knowledge about services to be delivered through HWCs. Scarcity of workforce, including CHO and male health workers. Inadequate infrastructure, including lack of staff residential facility, water supply, and proper civil construction. Low knowledge among ANMs about services to be implemented under HWCs.

9.	“What enabled the successful implementation of a quality certification initiative in Bhavnagar, Gujarat? A policy analysis case study” (K Shruti Lekha et al., 2025)	K. Shruti Lekha, Tapasvi Puwar, Sudha Ramani, Harsha Joshi, Preet Verma, Chandrama ni Kumar, Ankita Shah, Sumit Malhotra, Anish Sinha, Deepak Saxena	Bhavnagar, Gujarat, 300	Cross sectional study	Supportive policy context in Bhavnagar with district managers endorsing the NQAS initiative and providing support to facilities. Policy champions and a well-trained mid-level team for implementation played a crucial role in the successful certification process. Positive framing of NQAS and treating the checklist as a guidebook contributed to the success of the initiative. Pragmatic adaptations were made to meet checklist requirements and overcome infrastructure and resource deficits. The study identifies key factors that have contributed to the successful implementation of the quality certification initiative in Bhavnagar. These factors include a supportive policy context, policy champions, a well-trained mid-level implementation team, positive framing of NQAS, pragmatic adaptations to meet checklist requirements, and a peer mentoring system.
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10.	“Strengthening Primary Level Health Service Delivery: Lessons from a State in India” (Prahlad Rai Sodani et al., 2017)	Prahlad Rai Sodani, Kalpa Sharma	Rajasthan, 148	Cross Sectional Study	It suggests that SCs likely face even greater challenges in service delivery, particularly in maternal and newborn care, emergency response, and specialized treatments. Limited infrastructure, shortage of trained staff, and lack of essential equipment are major concerns. Strengthening SCs through better resources, adherence to treatment protocols, and accountability mechanisms is crucial to improving primary healthcare at the grassroots level. Although the study focuses on PHCs, it highlights similar concerns for Sub-Centers (SCs), the first point of care in rural areas. Gaps in emergency, maternal, and gynecological services at PHCs suggest SCs may face even greater challenges. Strengthening SCs through better infrastructure, staffing, and adherence to IPHS norms is essential for delivering quality care and building community trust.
11.	“Sub-center health profiling and	Sheikh Moham-	Jammu Kashmir,	Cross-sectional	The study demonstrates the health profiling and health

	health care delivery services in a rural community of northern India” (Sheikh Mohammad Saleem et al., 2018)	mad Saleem, Salim Khan, Shah Sumaya Jan	1091 population	observational study	services assessment of a specific sub-center in a rural area of Kashmir Valley. The presence of the sub-center and the services delivered by it are well accepted by the local rural community. The study highlights the importance of sub-centers in providing basic health care services and improving the health status of the community population.
12.	“Assessment of available health services at subcentres as per Indian public health standards guidelines in a district of Jammu and Kashmir India: A cross sectional study” (Ghulam Mustafa Kataria et al., 2023)	Ghulam Mustafa Katari, Rauf Ur Rashid Kaul	Jammu & Kahmir, 34 subcenters	cross-sectional study	The study on Sub-Centres (SCs) in Bandipora district, J&K, highlights that while most SCs effectively deliver antenatal care, childcare, immunization, and treatment of minor illnesses, there are notable service gaps. Only 2 out of 34 SCs provided delivery (intranatal) services, indicating poor infrastructure and staffing for comprehensive maternal care. Although school health services and disease control activities were widely available, home-based care and referral support by ANMs were limited. Overall, the findings point to the need for strengthening SCs, particularly

					in terms of intranatal care and home-based outreach.
13.	“Application of Donabedian Three-Dimensional Model in Outpatient Care Quality: A Scoping Review” (Jinrong Yang Lisheng Xu et al., 2025)	Jinrong Yang Lisheng Xu, FanLiu, Chunxia Yang, Jingyi Wei, Jingying Xie, and Jingjun Wang, Yonghong Ma	NA	Scoping Review	The three-dimensional quality model, introduced by Avedis Donabedian in 1966, defines healthcare quality through three key components: structure, process, and outcome. Applied to sub-centers, this model helps assess and improve service quality by examining infrastructure and resources (structure), the delivery of care and staff performance (process), and the resulting health outcomes in the community. Over time, this model has been widely adopted and refined, making it a globally recognized and practical framework for evaluating and enhancing the quality of care in primary healthcare settings like sub-centers.
14.	“Progressive Trends of Childhood Immunization in Rajasthan: A study based on the NFHS database” (Nirmala Peter et al., 2022)	Nirmala Peter, Lokesh Sharma, Jai Kishan Tondon	NA	Literature Review	Data plays a vital role in public health by providing measurable insights into the effectiveness of programs and interventions. Given the substantial government investments in terms of funding and manpower, it is

					crucial to systematically track progress through key performance indicators (KPIs). These KPIs help evaluate whether health goals are being achieved and ensure that resources are being used efficiently. By regularly monitoring these indicators, policymakers and health managers can identify gaps, make informed decisions, and improve service delivery. This data-driven approach is essential for enhancing accountability and maximizing the impact of public health initiatives.
15.	“Assessment of IPHS standard in sub-centre for providing maternal and child health services at Bareilly District of Uttar Pradesh” (Sumit Saxena et al., 2022)	Sumit Saxena, Ashish Kumar, Deval Arora, Vedang Tyagi, Anju Saxena	Bareilly, Uttar Pradesh, 24 subcenters	Cross-Sectional	The study highlights the importance of addressing disparities in infrastructure and logistics in sub-centres to improve maternal and child health services. The findings emphasize the need for further investigation into the reasons behind these disparities and the challenges faced by sub-centres in meeting IPHS standards..

CHAPTER-3: METHODOLOGY

This chapter outlines the research methodology adopted to investigate the status and challenges of implementing Quality Management Systems (QMS) and Key Performance Indicators (KPIs) in Ayushman Arogya Sub-centers. The methods include the research design, study population, sampling, data collection instruments, procedures, data analysis techniques, and ethical considerations.

3.1 Research Questions

1. What is the current compliance status of sub-centers with respect to the structure, process, and outcome domains of QMS as defined by NQAS?
2. To what extent are key performance indicators (e.g., ANC coverage, immunization, NCD screenings) being monitored and documented at the sub-center level?
3. Which specific components of QMS (structure or process) show the most significant gaps in implementation across sub-centers?
4. Is there a correlation between structure and outcome scores, and between process and outcome scores in the selected sub-centers?
5. What are the perceived challenges and barriers faced by frontline healthcare workers in implementing QMS and maintaining KPIs?
6. What support mechanisms or systemic changes do healthcare workers recommend for strengthening QMS practices at the sub-center level?

3.2 Research Design

This study follows a **descriptive cross-sectional design**. It aims to systematically assess and document the current status of QMS and KPI implementation across selected subcenters without introducing any interventions. Data was collected at a single point in time, reflecting a snapshot of existing quality practices and challenges.

3.3 Study Setting

The study was conducted across **seven Ayushman Arogya Subcenters** located in **Jaipur 1 Block, Rajasthan**. These facilities represent a mix of operational challenges and implementation variations typical to the region.

3.4 Study Population

The study targeted **frontline healthcare providers** at subcenter level, including:

- **Auxiliary Nurse Midwives (ANMs)**
- **Community Health Officers (CHOs)**
- **Accredited Social Health Activists (ASHAs)**

These staff members are directly involved in the implementation of QMS protocols and the tracking of KPIs.

3.5 Sampling Technique and Sample Size

A **purposive sampling** method was employed to select seven subcenters based on accessibility, geographic representation, and operational diversity.

- **Sample size:** 7 sub-centers
- **Sampling unit:** Sub-center
- **Respondent unit:** Healthcare staff working at the sub-center

3.6 Data Collection Tools and Procedure

3.6.1 Instrument Used

Data were collected using a **structured questionnaire** developed based on the **National Quality Assurance Standards (NQAS)** checklist. The tool comprised **(53 questions in total)**:

- **3 questions related to general information:** Name of the sub-center, Sub-center Type and Date of virtual assessment.
- **1 multiple select question** related to functionality of service areas.
- **46 closed-ended binary questions** divided into:
 - Structure (12 items)
 - Process (26 items)
 - Outcome (8 items)
- **3 open-ended questions** to explore implementation challenges and support needs.

3.6.2 Data Collection Procedure

- Data was collected through virtual interviews, direct observation, and review of facility records.

- Respondents were briefed about the study and interviewed using the structured checklist.
- KPI tracking and documentation status were verified using health records and registers.

3.7 Operational Definitions

- **Quality Management System (QMS):** A structured framework comprising standardized protocols, performance monitoring, supervision, and corrective action mechanisms to maintain service quality.
- **Key Performance Indicators (KPIs):** Quantitative metrics such as ANC coverage, immunization, NCD screening, and data updates that reflect service quality and performance at the sub-center level.

3.8 Data Analysis

3.8.1 Quantitative Analysis

- Binary responses (Yes = 1, No = 0) were entered in Excel and analysed.
- **Compliance Frequency and Percentage Analysis** was performed per checklist item.
- Domain-wise scoring was conducted for **Structure**, **Process**, and **Outcome** using normalized percentages.
- **Composite QMS scores** were calculated as the average of domain scores.
- **Correlation analysis** (Pearson's r) was done to test relationships between Structure, Process, and Outcome scores.

3.8.2 Qualitative Analysis

- Open-ended responses were analysed using **thematic analysis**.
- Recurring themes such as manpower shortage, infrastructural gaps, and monitoring issues were coded and their frequencies tabulated.

3.8.3 Visualization

- Results were displayed using:
 - **Bar charts** (domain and composite scores)
 - **Theme frequency graphs** (qualitative insights)

3.9 Ethical Considerations

- **Informed consent** was obtained verbally from all participants before data collection.
- **Voluntary participation** was ensured, with the right to withdraw at any point without penalty.
- **Confidentiality**: No personal identifiers were recorded. Data was anonymised and used solely for academic purposes.
- The study was conducted as part of the student's dissertation, with oversight from institutional faculty.

CHAPTER 4: RESULTS

This chapter presents the findings of the study conducted across seven Ayushman Arogya Subcenters under Jaipur 1 block, Rajasthan. The results are organized in alignment with the study's objectives and are presented through tables, charts, and thematic summaries.

Quantitative and qualitative data were analyzed to assess compliance with Quality Management System (QMS) and Key Performance Indicators (KPIs), identify implementation challenges, and propose areas for improvement.

Methodology for Quality Assessment and Scoring

1. Question-wise Compliance Calculation

- For each question within the assessment tool, responses were recorded as either "Yes" or "No".
- The number of "Yes" and "No" responses were tallied.
- Subsequently, the percentage of "Yes" (compliant) and "No" (non-compliant) responses was calculated, based on the total number of responses for that question (out of 100%).

2. Section-wise Compliance Evaluation

- The tool was divided into three major sections: Structure, Process, and Outcome.
- For each section, the percentage compliance was derived by averaging the scores of the questions falling under that section.
- This provided an overall compliance score for each of the three sections.

3. Domain-wise Performance Analysis

- Each subcenter was assessed across domains.
- The score for each domain was calculated for every subcenter individually.
- These scores were then used to compute the overall percentage compliance for each domain, facilitating a domain-wise performance analysis for every subcenter.

4. Composite Quality Management Score

- To obtain a composite score reflecting the overall quality management performance of each subcenter, the average of the Structure, Process, and Outcome scores was taken.

- This composite score enabled a standardized comparison among the subcenters.

5. Ranking of Subcenters

- Based on the composite quality scores, subcenters were ranked in order of performance.
- It was observed that subcenters that were preparing for or had undergone national-level assessments demonstrated higher compliance with quality management standards compared to others.

4.1 Compliance Frequency and Percentage Analysis (Binary questions)

A total of 46 checklist items from the structured questionnaire were categorized under three domains: **Structure (12 items)**, **Process (26 items)**, and **Outcome (8 items)**. For each item, compliance (Yes/No) responses were recorded across the seven sub-centers.

Questionnaire was divided into 5 sections. Section 1 contained basic information like name, type of subcenter and date of assessment, Section 2, 3 & 4 contained questions related to structure, process & outcome respectively. While Section 5 contained open ended questions.

Table 4.1: Compliance frequencies of the checklist items (binary questions)

Section	Questions	Yes Count	No Count	Yes %	No %	Total %
Section 2 - Structure	S2_Q1 (Is a Community Health Officer, CHO posted and available regularly?)	7	0	100.00	0.00	100
	S2_Q2 (Are two Auxiliary Nurse Midwives, ANMs available and adhering to duty roster?)	5	2	71.43	28.57	100
	S2_Q3 (Is Multi-Purpose Health Worker, MPHW available as per guidelines?)	3	4	42.86	57.14	100
	S2_Q4 (Are Accredited Social Health Activist, ASHAs assigned and trained?)	7	0	100.00	0.00	100

	S2_Q5 (Is there a functional consultation room with adequate privacy and ventilation?)	5	2	71.43	28.57	100
	S2_Q6 (Are separate clean and functional toilets available for males and females?)	3	4	42.86	57.14	85.71
	S2_Q7 (Is there a designated space for Yoga sessions and immunization?)	7	0	100.0 0	0.00	100
	S2_Q8 (Is there uninterrupted water and electricity supply with backups?)	3	4	42.86	57.14	100
	S2_Q9 (Are essential diagnostic kits available (Hb, UPT, malaria RDKs etc.)?)	7	0	100.0 0	0.00	100
	S2_Q10 (Is the drug supply adequate as per the Essential Drug List (EDL)?)	5	2	71.43	28.57	100
	S2_Q11 (Are drug stocks maintained and displayed?)	5	2	71.43	28.57	100
	S2_Q12 (Are Information, Education, and Communication, IEC materials displayed?)	6	1	85.71	14.29	100
Section 3 - Process	S3_Q1 (Are Antenatal Care, ANC services being provided with at least 4 checkups and proper high-risk pregnancy identification?)	6	1	85.71	14.29	100
	S3_Q2 (Are sick newborns and infants identified and referred appropriately?)	7	0	100.0 0	0.00	100
	S3_Q3 (Is the name of the facility and list of services visibly displayed in the local language?)	4	3	57.14	42.86	100
	S3_Q4 (Are IEC/BCC materials displayed and audio-visual aids used for patient education?)	4	3	57.14	42.86	100

S3_Q5 (Are patients informed about diagnosis, treatment plans, and follow-ups?)	7	0	100.00	0.00	100
S3_Q6 (Are privacy and confidentiality of patient records and consultations maintained?)	6	1	85.71	14.29	100
S3_Q7 (Is essential infrastructure such as electricity, water, toilets, and examination space available and functional?)	6	1	85.71	14.29	100
S3_Q8 (Are essential instruments and diagnostic tools available and functional?)	5	2	71.43	28.57	100
S3_Q9 (Are required medicines and consumables available as per EDL?)	5	2	71.43	28.57	100
S3_Q10 (Is IT infrastructure [e.g., ANMOL(Auxiliary Nurse Midwife Online), NCD(Non-Communicable Disease) portal, eSanjeevani] functional?)	3	4	42.86	57.14	100
S3_Q11 (Are CHO, ANMs, MPHWs, and ASHAs available and trained as per guidelines?)	4	3	57.14	42.86	100
S3_Q12 (Is there a system for regular maintenance and cleaning of the facility?)	4	3	57.14	42.86	100
S3_Q13 (Are digital and paper-based records maintained and safely stored?)	4	3	57.14	42.86	100
S3_Q14 (Are teleconsultation services being used effectively?)	3	4	42.86	57.14	100
S3_Q15 (Is the Jan Arogya Samiti (JAS) functional and meet regularly?)	7	0	100.00	0.00	100

	S3_Q16 (Are patient support groups (PSG) formed and functioning?)	3	4	42.86	57.14	100
	S3_Q17 (Is community feedback taken into account to improve service quality?)	6	1	85.71	14.29	100
	S3_Q18 (Are linen and other clinical support materials regularly cleaned and available?)	6	1	85.71	14.29	100
	S3_Q19 (Are drugs and consumables properly stored with temperature monitoring?)	6	1	85.71	14.29	100
	S3_Q20 (Are expired drugs segregated and returned/disposed of safely?)	7	0	100.0 0	0.00	100
	S3_Q21 (Is BMW (bio-medical waste) segregated and disposed of as per norms?)	7	0	100.0 0	0.00	100
	S3_Q22 (Are personal protective equipment (PPE) and hand hygiene followed during procedures?)	3	4	42.86	57.14	100
	S3_Q23 (Is staff trained in infection control and protocols for disinfection followed?)	4	3	57.14	42.86	100
	S3_Q24 (Is there a designated QI team or focal person at the subcenter?)	0	7	0.00	100.0 0	100
	S3_Q25 (Are internal assessments using NQAS checklists conducted?)	6	1	85.71	14.29	100
	S3_Q26 (Are actions taken on assessment findings and gaps closed?)	7	0	100.0 0	0.00	100
Section 4 - Outcome	S4_Q1 (Are KPIs like ANC checkups, immunization coverage, NCD screenings maintained?)	7	0	100.0 0	0.00	100

S4_Q2 (Are facility data regularly updated in relevant portals (e.g., HMIS, RCH)?)	5	2	71.43	28.57	100
S4_Q3 (Are community outreach and population enumeration updated?)	7	0	100.0	0.00	100
S4_Q4 (Is feedback collected from patients and acted upon?)	7	0	100.0	0.00	100
S4_Q5 (Is the action plan from JAS meetings implemented?)	7	0	100.0	0.00	100
S4_Q6 (Has community feedback been collected in the last 6 months?)	7	0	100.0	0.00	100
S4_Q7 (Are grievance redressal mechanisms in place (complaint box, 104 helpline etc.)?)	6	1	85.71	14.29	100
S4_Q8 (Is the team using KPI trends to identify gaps and improve services?)	7	0	100.0	0.00	100

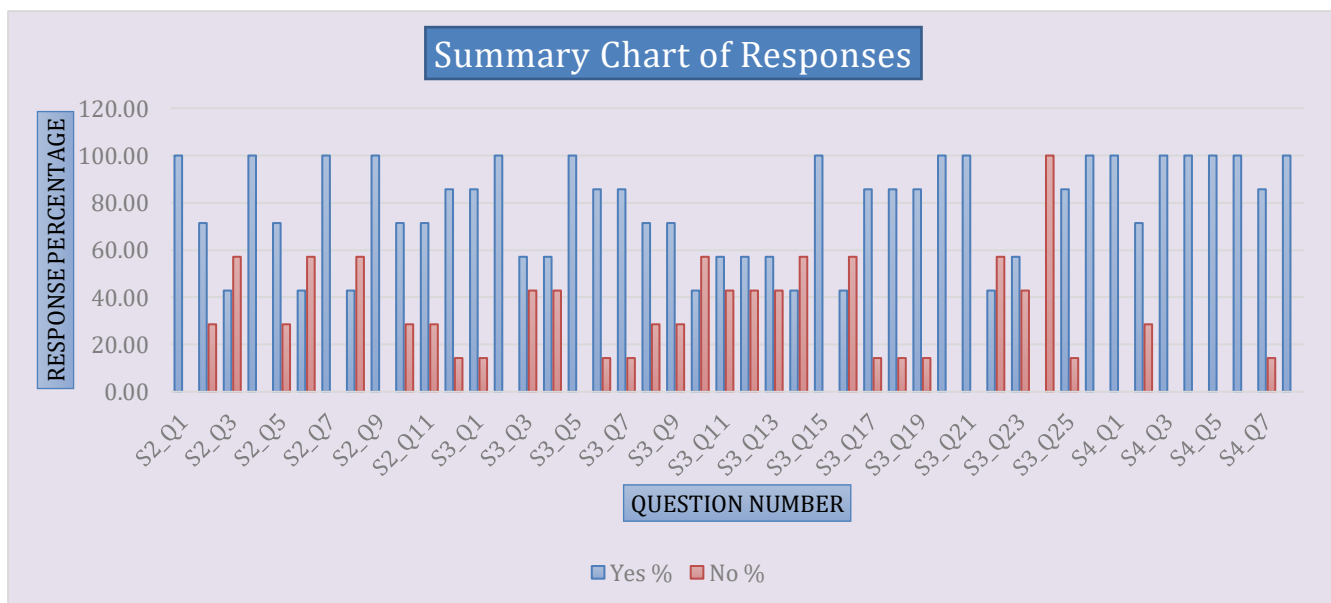


Figure 4.1: Summary chart of compliance percentage (Binary questions)

The Figure 4.1 which is the summary of Table 4.1 gives the entire picture of the compliance percentages across the Structure, Process and Outcome variables (Donabedian Model).

Table 4.2: Section-Wise Average Compliance

Section	Average Compliance (%)
Structure	75%
Process	71.43%
Outcome	94.64%

The above table indicates the fact that although outcome compliance percentages of all the sub-centers were **high** (average compliance is 95%), but the percentages related to the structure and process compliance remains **low** as compared to the outcome percentages.

4.2 Domain-wise Performance Analysis (involving Binary questions)

Checklist responses were grouped by domain (Structure, Process, and Outcome) and scored for each sub-center. Domain scores were then normalized into percentages.

Table 4.3: Domain-wise scoring (Raw)

Sub-center Name	Structure (Max 12)	Process (Max 26)	Outcome (Max8)
Bhaupura	9	15	8
Jairampura	10	23	8
Lakher Amer	8	18	7
Machwa	12	23	8
Naathwala Shahpura	7	17	7
Niwaru	12	23	8
Mundiaramsar	5	11	7

Table 4.4: Normalized Domain scores (percentage)

Subcenter	Structure (%)	Process (%)	Outcome (%)
Bhaupura	75%	57.69%	100%
Jairampura	83.33%	88.46%	100%
Lakher Amer	66.67%	69.23%	87.5%
Machwa	100%	88.46%	100%
Naathwala Shahpura	58.33%	65.38%	87.5%
Niwaru	100%	88.46%	100%
Mundiaramsar	41.67%	42.31%	87.5%

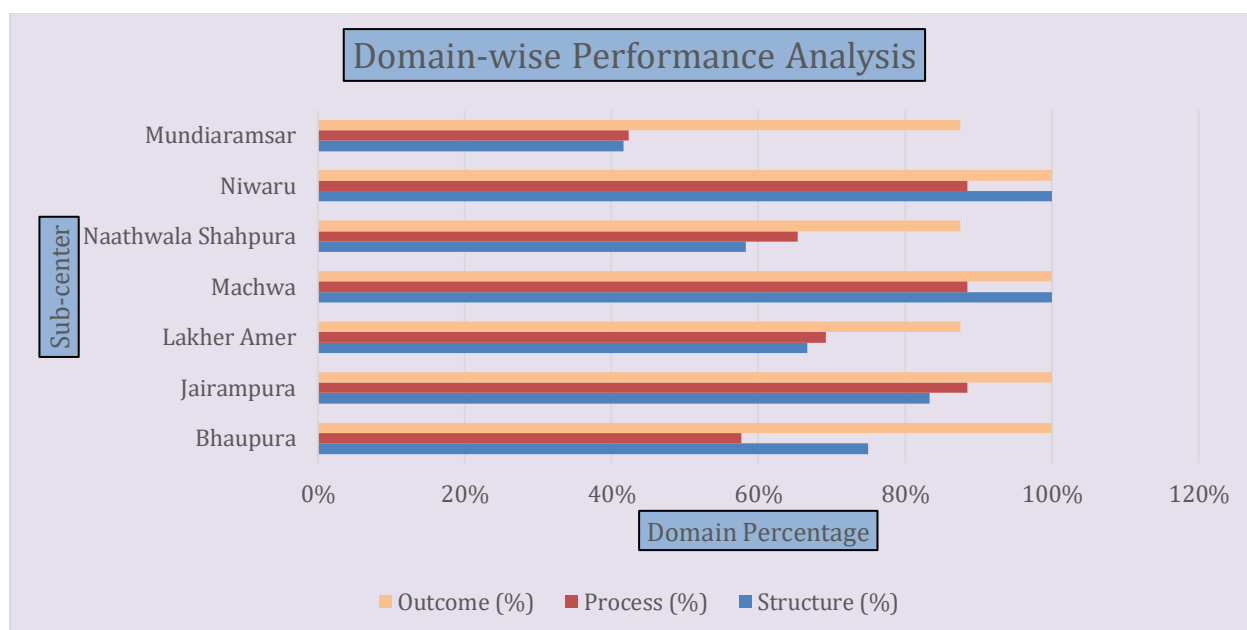


Figure 4.2: Domain-wise Performance Analysis (Bar Graph) of the sub-centers

First the domain scores were calculated (Yes = 1 and No = 0) and the raw scores tabulated in Table 4.3. Then the normalized domain scores (percentages) were calculated by dividing the raw scores with the maximum score of that domain. Majority of the sub-centers had a good score in the outcome domain, while they lacked in the structure and process domain. No sub-center had a 100% score in process domain.

Notably, **Machwa and Niwaru** showed high consistency across all domains, while **Mundiaramsar** had lower compliance in structure and process domains.

A bar graph showing the visual representation of the domain scores (Figure 4.2) highlighted the domain-wise performance analysis.

4.3 Composite QMS Scores and Ranking of Sub-centers

To provide a consolidated view of overall quality management, a composite score was calculated by averaging the normalized scores of the three domains.

Table 4.5: Composite QMS scores of all sub-centers (Average of 3 Domains)

Subcenter	Composite QMS Score (%)
Machwa	96.15
Niwaru	96.15
Jairampura	90.60
Bhaupura	77.56
Lakher Amer	74.47
Naathwala Shahpura	70.40
Mundiaramsar	57.16

Table 4.6: Ranking of the sub-centers based on QMS Scores (percentage)

Rank	Subcenter	Composite QMS Score (%)
1	Machwa	96.15
1	Niwaru	96.15
2	Jairampura	90.60
3	Bhaupura	77.56
4	Lakher Amer	74.47
5	Naathwala Shahpura	70.40
6	Mundiaramsar	57.16

According to the statistics, the sub-centers in Machwa and Niwaru had exactly the same composite QMS scores of 96%, which was the highest among the 7 sub-centers. The least overall quality management score was that of the sub-center in Mundiaramsar (57%).

4.4 Correlation Analysis

To examine the relationship between QMS domains and KPI performance (Outcome), Pearson correlation coefficients were computed.

Methodology for Correlation Analysis

1. Data Collection

Data was collected from multiple subcenters, each assessed on three quality parameters:

- Structure (%)

- Process (%)
- Outcome (%)

2. Data Preparation

Each subcenter's scores in the above parameters were compiled into a structured tabular format. This allowed for easy comparison and statistical analysis.

3. Selection of Correlation Technique

The Pearson correlation coefficient method was selected to evaluate relationships between the variables. This technique is appropriate when the variables are quantitative and approximately normally distributed.

4. Pairs of Variables Chosen

Two pairs of variables were analyzed:

- Structure vs. Outcome
- Process vs. Outcome

These pairs were chosen to understand how the quality of structure and processes impacts health outcomes at subcenters.

5. Application of Pearson's Formula

Pearson's formula calculates the degree of linear relationship between two variable, which was applied using Excel's CORREL() function in this case.

6. Result Interpretation

The output correlation coefficients were:

- **Structure vs. Outcome:** $r = 0.84$ (p value= 0.01659784)
- **Process vs. Outcome:** $r = 0.65$ (p value= 0.11660919)

The analysis was able to establish a strong ($r = 0.84$) and statistically significant ($p = 0.016$) positive correlation between structure and outcome scores, meaning that subcenters that have better structure (facilities, human resources, logistical readiness), likely have better outcome related indicators (KPI monitoring and reporting of data). There was a moderate positive correlation between process and outcome scores ($r = 0.65$) but this relationship was not statistically significant ($p = 0.117$). This indicates that while compliance with service delivery protocols, and quality of care practices are likely to improve outcomes, the association cannot be securely established as we did not have strong evidence based on this sample. Overall, the findings indicate that

structural readiness has a larger and statistically established association for influencing measurable health service outcomes at the sub-centre level.

4.5 Thematic Analysis of Open-ended Responses

Open-ended responses from Section 5 of the questionnaire (S5_Q1 to S5_Q3), which are listed below, were thematically analyzed to identify recurring implementation challenges.

Questions (Open-ended) –

1. S5_Q1 (What challenges do you face in implementing QMS at your sub-center?)
2. S5_Q2 (What are the major issues in monitoring or reporting KPIs?)
3. S5_Q3 (What support do you need from higher authorities for better QMS implementation?)

Recurring themes were identified from the responses of the open-ended question and listed down. They were then charted out in Table 4.7 for finding out their frequency of occurrence across the sub-centers.

Table 4.7: Theme and frequency table of the sub-centers

Theme	Description	Frequency (out of 7 sub-centers)
Human Resource Shortage	Lack of CHOs, ANMs, MPHs, multitasking of limited staff	7/7
Infrastructure Deficiencies	Poor physical setup—no boundary wall, damaged facilities	6/7
Water & Sanitation Issues	Inadequate washrooms, irregular water supply, no cleanliness support	5/7
Lack of Equipment & Instruments	Insufficient medical instruments and IEC material	4/7
Monitoring & Supervision Gaps	No or weak external support/mentorship	2/7

Patient Privacy Issues	No segregation between male/female patients, no private consultation	1/7
Workload and Burnout	High workload due to understaffing	2/7
KPI Monitoring Challenges	Dropouts, lack of tracking, unreachable patients	6/7

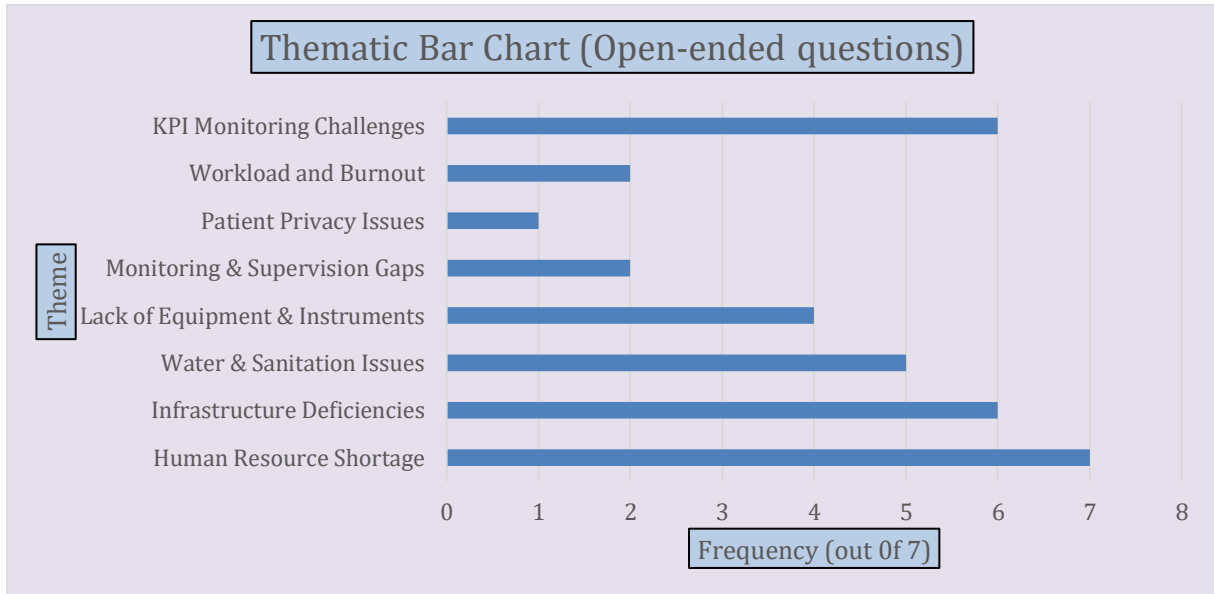


Figure 4.3: Thematic frequency chart of reported implementation challenges

From the frequencies calculated, a bar graph (Figure 4.3), which visually represents the thematic analysis data. Across the sub-centers, the challenges related human resources shortage (7/7) was the highest, which was followed by challenges related to infrastructural deficiencies (6/7) and KPI monitoring (6/7).

CHAPTER 5: DISCUSSION

This chapter presents a detailed interpretation of the findings from the study

“Implementation of Quality Management System and Key Performance Indicators in Ayushman Arogya Sub-Centers of Jaipur 1 Block, Rajasthan”. The study evaluated the structural readiness, procedural effectiveness, and service outcomes of selected sub-centers using the Donabedian Model and National Quality Assurance Standards (NQAS). By comparing the results with existing literature and highlighting key patterns, this chapter offers insight into the current status of service delivery at the primary level and suggests ways for continuous improvement.

5.1 Structural Domain: Foundation of Service Readiness

The structural domain in this study recorded an average compliance of 75%, reflecting moderate adherence to basic facility and staffing standards. While all sub-centers had a posted Community Health Officer (CHO), ANM & ASHAs contrastingly availability of Multi-Purpose Health Workers (MPHWs), essential utilities (such as uninterrupted water and electricity), and functional infrastructure (like toilets and consultation rooms) varied significantly.

This is consistent with previous findings from the study of Haryana and Andhra Pradesh, where similar challenges in infrastructure and human resource availability were observed (Bashar & Goel, 2017; Sriram, 2019). The observations denote that service environments at the sub-center level, while functional, may benefit from further strengthening to align fully with Indian Public Health Standards (IPHS) to improve overall efficiency.

5.2 Process Domain: Operationalizing Quality Standards

In the process domain, the study noted an average compliance of 71.43%. There was good performance of sub-centers regarding service communication, patient rights, and routine care practices such as antenatal check-ups and referrals. Although gaps were there, which were related to infection control practices, the operational use of digital health tools (eSanjeevani, ANMOL), and the presence of Quality Improvement (QI) teams.

These findings align with assessments from Bharatpur district (Choudhary, 2019), where sub-centers showed commitment in routine health services but there were gap in procedural systems like internal assessment and infection control. Strengthening processes like supportive supervision and ensuring regular peer assessments may enhance the performance

of these procedural areas. The study's results highlighted the potential of procedural improvements to bridge the gap between structural components and service quality outcomes of the sub-centers.

5.3 Outcome Domain: Promising Indicators of Performance

Outcome indicators recorded the highest compliance, with an average of 94.64% of the sub-centers. Sub-centers had very compliant and efficient documentation of Key Performance Indicators (KPIs) such as antenatal care coverage, immunization, community outreach, and grievance redressal. All surveyed facilities (sub-centers) reported complete maintenance of these data points and responsiveness to community feedback mechanisms.

The outcome results suggest that, even in the presence of certain structural and process-level challenges, frontline healthcare providers are effectively achieving service delivery goals. Similar findings were reported in studies from Chittoor and Nellore districts (Sriram S, 2019), where consistent service outcomes were observed despite structural challenges. The dedication of healthcare staff and the use of structured registers and health management information systems (HMIS) appear to play an important role in the positive performance which was observed.

5.4 Literature Integration and Broader Context

The findings of this study are consistent with national trends, indicating that while India's rural health infrastructure has grown extensively, quality assurance is challenging to a large extent and requires attention. The Donabedian Model proved valuable in structuring the overall quality into measurable dimensions. This enabled focused analysis and in turn helped make suggestions for specific improvements.

National reports under the National Health Mission (NHM), along with multiple regional studies also highlight the importance of quality assurance frameworks such as NQAS. These frameworks enable sub-centers to not only deliver care but also monitor service consistency, patient satisfaction, and compliance with clinical protocols, among others, and thus improving the overall quality. The present study which was done by me, adds to this body of work by focusing on sub-centers transitioning under the Ayushman Bharat initiative in Jaipur 1 Block, Rajasthan.

5.5 Strengths of the Study

The use of the NQAS checklist, a tool grounded in national quality benchmarks, in this study helped in the standardization of methodology. This standardization allowed findings to be contextualized within broader public health policy and framework; and performance metrics. Also the application of the Donabedian model helped analyze quality across interlinked domains (Structure, process and Outcome), identifying root causes of service challenges.

The integration of both quantitative and qualitative data added depth to the analysis and provided grounds for further research. While compliance percentages offered quantitative measurable insights, qualitative feedback from health workers provided a practical understanding of implementation barriers. This holistic approach enhances the relevance of the findings for decision-makers along with the practitioners and experts.

Additionally, the study focused on a diverse sample of sub-centers from Jaipur 1 Block, allowing for contextual and academic relevance. The diverse sample also reflected the regional implementation patterns to some extent. Frontline worker perspectives (qualitative data) added authenticity to the data, revealing a strong commitment to service delivery despite certain challenges. Ethical adherence, confidentiality, and informed participation enhanced the reliability of the research process and methodology.

5.6 Limitations of the Study

The study was conducted across a limited number of facilities (seven sub-centers), which may constrain broader generalizability. The cross-sectional design also captures performance at a single point in time, which may not account for seasonal or staffing fluctuations.

CHAPTER 6: CONCLUSION

This study was undertaken as part of a dissertation work under the National Health Mission (NHM), Rajasthan, during the MBA program in Health and Hospital Management at IIHMR University. The primary aim was to understand the status and implementation challenges related to Quality Management Systems (QMS) and Key Performance Indicators (KPIs) in Ayushman Arogya Sub-centers located within Jaipur 1 Block. The study results which are obtained are based on a structured assessment using the National Quality Assurance Standards (NQAS) checklist and interactions with frontline healthcare workers.

The study pointed out to the strengths and gaps of the QMS implementation framework at the sub-center level. While many sub-centers showed great outcome scores, indicating efforts by staff towards maintaining performance in areas like maternal and child health and non-communicable disease (NCD) screening, there were many challenges particularly in the structure and process domains across the sub-centers. Structural challenges, such as the shortage of human resources and basic infrastructure unavailability, decreased the potential of service delivery in the sub-centers. In the process domain, certain gaps related to documentation, procedural adherence, and digital tool usage were commonly observed.

Despite these challenges and limitations, it is noteworthy that people in sub-center, including ANMs, CHOs, and ASHAs, demonstrated a strong sense of responsibility and adaptability, among other qualities, which was evident in their efforts to maintain service continuity even when there was limited resources. The outcome scores reflect their hard work, suggesting that with additional support in structure and process domains, overall quality can be further improved with time and efforts.

The qualitative component of this study (open-ended questions), highlighted several thematic interpretations: manpower shortage, intermittent training, documentation burdens, and the need for supportive supervision, among others. Many respondents emphasized that enhancements like refresher trainings, functioning digital infrastructure, and periodic mentorship could positively impact both morale and overall performance. The study also underlined the importance of community engagement in sustaining quality practices.

In terms of theoretical grounding, the findings affirm the relevance of the Donabedian model, which articulates that improvements in structure and process domains are often necessary

precursors to sustained gains in outcomes. The observed correlations between structure, process, and outcome scores further clarifies the relation.

While the sample size was limited to seven sub-centers and generalizations are challenging to make, this study highlights the operational realities of implementing national standards at the grassroots level which is relatively under-explored.

In conclusion, this dissertation does not aim to critique the healthcare system but rather to present an honest reflection of the existing scenario as observed during the study. The intent is to support and strengthen ongoing efforts under the Ayushman Bharat initiative by offering practical recommendations grounded in real-world evidence. With collaborative effort, sustained investment, and system-level support, Ayushman Arogya Sub-centers can be further empowered to deliver high-quality, equitable healthcare to every corner of Rajasthan.

6.1 Recommendations

From the assessment of Quality Management Systems (QMS) and Key Performance Indicators (KPIs) in Ayushman Arogya Sub-centers of Jaipur 1 Block, the following recommendations are listed. They are intended to serve as supportive inputs for further enhancing primary healthcare service delivery in an inclusive manner.

6.1.1 Strengthening Human Resources and Infrastructure

- **Encourage recruitment and retention of key staff**, especially Multi-Purpose Health Workers (MPHWs), to complement the efforts of CHOs, ANMs, and ASHAs. Addressing staffing gaps can directly contribute to improving service delivery under the structural domain.
- **Ensure timely maintenance and upgrades** of essential infrastructure such as electricity, water supply, sanitation facilities, and consultation rooms. Leveraging local partnerships and convergence with other government schemes (like Jal Jeevan Mission or Swachh Bharat) may provide practical solutions.

6.1.2 Enhancing Procedural Implementation

- **Capacity-building workshops** focused on infection control, digital tools (e.g., eSanjeevani, ANMOL), and internal quality improvement processes could significantly strengthen compliance in the process domain.

- **Formation or reactivation of Quality Improvement (QI) teams** at the sub-center level can foster ownership and regular peer-led assessments, contributing to a culture of continuous improvement.

6.1.3 Data Management and Technology Integration

- Continued support and refresher training in **Health Management Information Systems (HMIS)** and KPI documentation will help reinforce the excellent outcome-level performance already demonstrated.
- **Feedback loops based on community inputs** can be systematically integrated into service delivery plans, promoting responsive and people-centered care.

6.1.4 Supportive Supervision and Monitoring

- **Encouraging periodic supervisory visits** by block-level or district-level officers can provide valuable feedback and on-the-spot mentoring to sub-center staff.
- Adoption of a **non-punitive, learning-oriented supervision model** may further motivate staff, especially in rural and remote locations.

6.1.5 Community Engagement and Outreach

- Promote **greater community involvement** through Village Health, Sanitation, and Nutrition Committees (VHSNCs) and local governance bodies. This helps build trust and reinforces accountability at the grassroots level.
- Incorporate **community-based feedback** as a formal input in quality assessments, as seen in successful models in other districts.

6.1.6 Policy-Level Support and Resource Alignment

- The strong outcome scores observed in this study reflect a **committed and resilient workforce**, which can be further empowered through targeted policy support in staffing norms, supply chain logistics, and digital health infrastructure.
- Scaling good practices across other sub-centers in the region — including **documentation practices and grievance redressal systems** — can contribute to more uniform service quality.

These recommendations are offered with great respect to the hard work of all stakeholders in the health system. They aim not to critique but to **support the shared goal of delivering**

high-quality, equitable, and accessible healthcare at the primary level in Rajasthan. With ongoing collaboration and sustained investment, Ayushman Arogya Sub-centers have the potential to become exemplars of quality care under the Ayushman Bharat initiative.

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ANNEXURE

STUDY TOOL

Section 1: General Information

Question No.	Question	Response
S1_Q1	Name of Sub-center	
S1_Q2	Sub-center Type	Type A / Type B
S1_Q3	Date of Virtual Assessment	

Section 2: Structure (Inputs – Infrastructure, HR, Supplies)

Question No.	Question	Response Options
S2_Q1	Is a Community Health Officer, CHO posted and available regularly?	Yes/No
S2_Q2	Are two Auxiliary Nurse Midwives, ANMs available and adhering to duty roster?	Yes/No
S2_Q3	Is Multi-Purpose Health Worker, MPHW available as per guidelines?	Yes/No
S2_Q4	Are Accredited Social Health Activist, ASHAs assigned and trained?	Yes/No
S2_Q5	Is there a functional consultation room with adequate privacy and ventilation?	Yes/No
S2_Q6	Are separate clean and functional toilets available for males and females?	Yes/No

S2_Q7	Is there a designated space for Yoga sessions and immunization?	Yes/No
S2_Q8	Is there uninterrupted water and electricity supply with backups?	Yes/No
S2_Q9	Are essential diagnostic kits available (Hb, UPT, malaria RDKs etc.)?	Yes/No
S2_Q10	Is the drug supply adequate as per the Essential Drug List (EDL)?	Yes/No
S2_Q11	Are drug stocks maintained and displayed?	Yes/No
S2_12	Are Information, Education, and Communication, IEC materials displayed?	Yes/No

Section 3: Process (Service Delivery, QMS Practices)

Question No.	Question	Response Options
S3_MSQ	Which of the following service areas are functional? (Tick all that apply)	1. Maternal & Child Health 2. Family Planning 3. Communicable Diseases 4. Non-Communicable Diseases 5. Emergency care

		6. Elderly & Palliative care Eye care 7. Oral & ENT care 8. Mental Health 9. Health Promotion 10. Adolescent Health 11. Diagnostic & Pharmacy Services
S3_Q1	Are Antenatal Care, ANC services being provided with at least 4 checkups and proper high-risk pregnancy identification?	Yes/No
S3_Q2	Are sick newborns and infants identified and referred appropriately?	Yes/No
S3_Q3	Is the name of the facility and list of services visibly displayed in the local language?	Yes/No
S3_Q4	Are IEC/BCC materials displayed and audio-visual aids used for patient education?	Yes/No
S3_Q5	Are patients informed about diagnosis, treatment plans, and follow-ups?	Yes/No
S3_Q6	Are privacy and confidentiality of patient records and consultations maintained?	Yes/No
S3_Q7	Is essential infrastructure such as electricity, water, toilets, and examination space available and functional?	Yes/No

S3_Q8	Are essential instruments and diagnostic tools available and functional?	Yes/No
S3_Q9	Are required medicines and consumables available as per EDL?	Yes/No
S3_Q10	Is IT infrastructure [e.g., ANMOL(Auxiliary Nurse Midwife Online), NCD(Non-Communicable Disease) portal, eSanjeevani] functional?	Yes/No
S3_Q11	Are CHO, ANMs, MPHWs, and ASHAs available and trained as per guidelines?	Yes/No
S3_Q12	Is there a system for regular maintenance and cleaning of the facility?	Yes/No
S3_Q13	Are digital and paper-based records maintained and safely stored?	Yes/No
S3_Q14	Are teleconsultation services being used effectively?	Yes/No
S3_Q15	Is the Jan Arogya Samiti (JAS) functional and meet regularly?	Yes/No
S3_Q16	Are patient support groups (PSG) formed and functioning?	Yes/No
S3_Q17	Is community feedback taken into account to improve service quality?	Yes/No
S3_Q18	Are linen and other clinical support materials regularly cleaned and available?	Yes/No
S3_Q19	Are drugs and consumables properly stored with temperature monitoring?	Yes/No
S3_Q20	Are expired drugs segregated and returned/disposed of safely?	Yes/No

S3_Q21	Is BMW (bio-medical waste) segregated and disposed of as per norms?	Yes/No
S3_Q22	Are personal protective equipment (PPE) and hand hygiene followed during procedures?	Yes/No
S3_Q23	Is staff trained in infection control and protocols for disinfection followed?	Yes/No
S3_Q24	Is there a designated QI team or focal person at the subcenter?	Yes/No
S3_Q25	Are internal assessments using NQAS checklists conducted?	Yes/No
S3_Q26	Are actions taken on assessment findings and gaps closed?	Yes/No

Section 4: Outcomes (KPIs and Monitoring)

Question No.	Question	Response Options
S4_Q1	Are KPIs like ANC checkups, immunization coverage, NCD screenings maintained?	Yes/No
S4_Q2	Are facility data regularly updated in relevant portals (e.g., HMIS, RCH)?	Yes/No
S4_Q3	Are community outreach and population enumeration updated?	Yes/No
S4_Q4	Is feedback collected from patients and acted upon?	Yes/No
S4_Q5	Is the action plan from JAS meetings implemented?	Yes/No
S4_Q6	Has community feedback been collected in the last 6 months?	Yes/No
S4_Q7	Are grievance redressal mechanisms in place (complaint box, 104 helpline etc.)?	Yes/No

S4_Q8	Is the team using KPI trends to identify gaps and improve services?	Yes/No
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Section 5: Perceived Challenges (Open-Ended)

Question No.	Question
S5_Q1	What challenges do you face in implementing QMS at your sub-center?
S5_Q2	What are the major issues in monitoring or reporting KPIs?
S5_Q3	What support do you need from higher authorities for better QMS implementation?