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# Enhancing Medication Safety through Quality Accreditation: A Study on the Impact of NABH Initiatives in a Tertiary Care Hospital in South India

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# Abstract

**Background**: Hospital accreditation is a critical component of healthcare quality assurance, involving self-assessment and peer review to ensure compliance with patient safety standards. Through its fifth edition standards, the National Accreditation Board for Hospitals and Healthcare Providers (NABH) in India emphasises the Management of Medication (MOM) as a key area for reducing medication errors and improving patient outcomes. However, limited evidence exists on how accredited institutions translate these standards into measurable outcomes and improvements in medication safety.

**Methods**: We conducted an observational, cross-sectional study at a 2,000-bed NABH-accredited tertiary care teaching hospital in South India. Data were collected from 2012 (pre-standardisation) and 2015 (post-implementation) through mixed methods, including semi-structured interviews with pharmacists, nursing supervisors, and quality managers; direct process observations; and document reviews. Quantitative key performance indicators (KPIs) analysed included adverse drug reactions (ADRs), high-risk medication use, procurement deviations, stockouts, drug rejections, and patient satisfaction scores. These indicators were mapped against NABH MOM standards and analysed using descriptive statistics.

**Results**: Following accreditation, inpatient satisfaction improved from 74.6 to 88.4 and outpatient satisfaction from 72.0 to 86.7. ADR rates declined from 1.33% to 1.12%, and high-risk medication use reduced from 4.6% to 3.9%. Procurement metrics improved: local purchases dropped from 3.0% to 0.08%, stockouts from 2.2% to 0.18%, and drug rejections from 2.9% to 0.22%. Stakeholder interviews revealed enhanced adherence to standard operating procedures, greater audit participation, and better management of high-risk medications. Improvements aligned with NABH MOM standards.

**Conclusion**: NABH accreditation can act as a structured pathway for enhancing medication safety from merely a series of isolated initiatives into an integrated, sustainable system within healthcare. Integrating clinical pharmacologists, expanding the scope of audit-driven feedback, and adopting digital tools for real-time monitoring offer future opportunities in the area to strengthen these gains.


# Introduction

Hospital accreditation is an essential process under healthcare quality assurance and includes a strenuous self-assessment and external peer evaluation process to maintain necessary patient safety standards. Accreditation has many dimensions, including analytical scrutiny, counselling, and scope for continuous improvement. It is a process aimed at strict standards to guarantee the delivery of secure and effective care.

Medications are indispensable for managing diverse health conditions, ranging from infectious diseases to chronic ailments and alleviating pain and suffering. Even then, medication-related errors are among the most common preventable causes of patient harm. The World Health Organisation estimates that a significant proportion of such errors can be avoided through systemic interventions and standardised protocols.(1)

Quality accreditation initiatives are administered by India's foremost institutional framework for healthcare quality improvement, the National Board of Accreditation for Hospitals and Healthcare Institutions (NABH), established under the Quality Council of India.(2) The NABH's fifth edition standards for hospitals outline benchmarks across ten chapters, with the Management of Medication (MOM) chapter specifically designed to address the complexities of medication safety, aimed at mitigating risks and optimising overall patient safety outcomes. These standards promote a sense of direction in procurement, storage, prescribing, dispensing, administration, and monitoring, intending to minimise high-risk situations and adverse drug events.(3)

Successful implementation of NABH standards, particularly in medication management, requires technical adherence, strong institutional support and collaboration. While many published studies have focused on the challenges of NABH implementation in public hospitals, including infrastructural deficits, policy misalignment, and workforce shortages, there is still a lack of documentation of how accredited institutions operationalise these standards to produce measurable outcomes, particularly in large private tertiary hospitals. (4)

This study seeks to fill that gap by presenting an institutional case analysis of a 2000 + bedded NABH-accredited tertiary care teaching hospital in South India. We examined the hospital's adherence to key NABH MOM standards and measured its impact on medication safety outcomes through pre-and post-accreditation quality indicators. The focus is not only on compliance, but also on understanding how the hospital's medication-related systems improved through phased implementation, strategic training, policy enforcement, and continuous quality improvement cycles. By aligning our methodology with NABH's objective elements and comparing them against observed clinical indicators such as adverse drug reactions (ADRs), stockouts, and patient satisfaction, this study provides a practical understanding for healthcare administrators, quality professionals, and policymakers seeking to optimise the accreditation process.

# Methodology

We present an observational, cross-sectional study conducted at a NABH-accredited tertiary care teaching hospital in South India, with a bed capacity of over 2,000. The hospital has been continuously accredited since 2009 and has implemented NABH's 5th Edition standards, including comprehensive protocols under the Management of Medication (MOM) chapter.

The study evaluated the hospital's medication safety practices in alignment with NABH MOM standards, assessed changes in key quality indicators pre- and post-accreditation implementation cycles and finally analysed the operational framework used.

A mixed-method approach was adopted, combining both qualitative assessments and quantitative KPI audits. Qualitative data comprised semi-structured interviews with stakeholders, including pharmacists, department heads, nursing supervisors, and quality managers. On-site process observations across

pharmacy, inpatient wards, and clinical departments, as well as document reviews from the Quality Office, including SOPs, incident reports, and policy documents.

Quantitative data included patient satisfaction scores (inpatient and outpatient), percentage of drugs procured via local purchase, Stockout rates, drug rejection rates, Adverse Drug Reactions (ADR) rates, and patients receiving high-risk medications.

These indicators were collected from two reference time points: 2012 (pre-standardisation phase) and 2015 (post-implementation phase). Year-on-year comparisons were made using internal Quality Indicator dashboards and reports validated by the hospital's Quality Department.

To ensure relevance, the above data points were mapped to specific objective elements of NABH MOM 5th Edition standards, including:

- MOM. 1. a: Organised medication management system
- MOM. 3. e: High-risk medication storage
- MOM. 4. d: Safe prescribing practices
- MOM. 5. b: Medication documentation and authorisation
- MOM. 8. b-d: ADR tracking and reporting
- MOM. 10. b: Reconciliation during transitions of care

Data was compiled and analysed using Microsoft Excel. Comparative analysis focused on percentage change in indicators between 2012 and 2015, error trend direction (declining/improving/stable), and implementation fidelity, assessed through checklists and compliance audit forms

Descriptive statistics were used to present frequencies, proportions, and trend comparisons. Wherever possible, indicators were interpreted against NABH targets or internal benchmarks.

Ethical considerations: This study used anonymised operational data and internal quality indicators. No patient-identifiable information was accessed, and no intervention was conducted on human subjects. As such, Institutional Review Board (IRB) approval and patient consent were not required. All the procedures aligned with ethical standards for quality improvement studies in healthcare.

# Results

Our study was conducted over a three-year analysis period from 2012 to 2015 in a tertiary care teaching hospital in South India. We aimed to observe the effect of the NABH's medication safety standards on key quality indicators that reflect clinical safety outcomes, procurement efficiency, and patient satisfaction metrics.

Following NABH implementation, patient satisfaction improved, and medication availability and delays were reduced. The inpatient satisfaction index increased from 74.6 to 88.4, while the outpatient

satisfaction index increased from 72.0 to 86.7. These findings are summarised in Table 1.

Table 1. Patient Satisfaction Indices

| Category | 2012 (Pre) | 2015 (Post) |
|---|---|---|
| Inpatient Satisfaction | 74.6 | 88.4 |
| Outpatient Satisfaction | 72.0 | 86.7 |

In medication safety, better pharmacovigilance measures and reporting systems were shown to decrease the percentage of adverse drug reactions (ADRs) from 1.33% in 2012 to 1.12% in 2015. The proportion of patients receiving high-risk medications also fell from 4.6% to 3.9%. Hence, this proves the enhanced monitoring protocols and stricter oversight in high-alert drug management. Significant gains in procurement efficiency accompanied these improvements.

Local purchases of drugs, often indicative of formulary non-adherence or urgent supply needs, reduced sharply from 3.0% to 0.08%, stockouts from 2.2% to 0.18%, and drug rejections from 2.9% to 0.22%. Overall, the hospital's success in vendor oversight was highlighted. These findings are presented in Table 2. The accreditation processes have a measurable impact on improving patient-facing and operational medication safety and management dimensions.

Table 2. Medication Safety and Procurement Indicators

| Indicator | 2012 (Pre) | 2015 (Post) |
|---|---|---|
| ADR (%) | 1.33 | 1.12 |
| High-Risk Meds (%) | 4.6 | 3.9 |
| Local Purchase (%) | 3.0 | 0.08 |
| Stockouts (%) | 2.2 | 0.18 |
| Rejections (%) | 2.9 | 0.22 |

Stakeholder interviews further supported these quantitative findings. Pharmacists, nursing supervisors, and department heads reported greater adherence to standard operating procedures, more frequent participation in prescription audits, and improved management of high-risk and emergency medications. Nursing staff also stressed that enhanced crash cart readiness and clear labelling of look-alike, sound-alike (LASA) drugs improved workflow efficiency and reduced the risk of medication errors.

These results align closely with several core elements of the NABH 5th Edition Management of Medication (MOM) standards. Improvements in procurement and formulary management correspond with MOM.1 and MOM.2. At the same time, enhancements in prescribing accuracy and documentation reflect compliance with MOM.4 and MOM.5. Strengthened ADR monitoring and high-risk medication

protocols further correspond to MOM.3 and MOM.8. Taken together, these outcomes demonstrate the real time conversion of accreditation standards into practical, measurable quality gains.

## Discussion

The study results demonstrate that NABH accreditation, with methodical implementation, can lead to measurable improvements in medication safety, procurement efficiency, and patient satisfaction. These findings show that accreditation is not a static exercise but is a dynamic catalyst for organisational change, and we focused particularly on the framework of the NABH 5th Edition Management of Medication (MOM) standards.

Our results align with prior evidence showing that accreditation enables standardised processes to improve adherence to formulary specifications, reduce adverse drug reactions (ADRs), and better control over high-risk medications. This reflects the operationalisation of MOM standards within routine hospital workflows. Similar benefits have been reported in other accredited hospitals, in both the private and public sectors.(3) Our findings also conform to the World Health Organisation's "Medication Without Harm" initiative, which is a structured plan for systems of procurement, prescribing, dispensing, and monitoring as critical levers for reducing preventable medication-related harm.(5)

Workforce engagement is a key principle aimed at sustained quality gains. Existing literature suggests that successful accreditation requires process redesign, continuous staff education, and ownership of quality initiatives to maintain sustainability. Innovative training strategies, including interdepartmental workshops, competitions, and recognition programs, have improved staff adherence to NABH standards.(6) Greater participation in audits and stronger compliance with SOPs support the opinion that embedding a culture of accountability is essential for sustaining improvements over the long run.

One more dimension to take into account is the role of clinical pharmacologists. Clinical pharmacologists have shown to reduce ADR burden, optimise polypharmacy, and generate cost savings by simplifying drug use.(7) Integrating such expertise into NABH accreditation and implementation would strengthen outcomes, particularly for MOM standards related to prescribing audits, high-risk drug supervision, and deprescribing initiatives. Hospitals with structured pharmacology-led review programs have reported significant reductions in ADRs and medication costs, and this would be a clear opportunity for institutions from Low and middle-income countries to scale such models within accreditation frameworks.

Public hospitals often face resource constraints and staffing shortages that limit their ability to meet NABH standards.(8) While our study was conducted in a large private tertiary facility, the observed benefits could be adapted to the public sector through entry-level accreditation pathways and phased implementation of MOM standards. Using digital tools, including computerised physician order entry (CPOE) and automated ADR reporting, would help mitigate staffing gaps and standardise the current processes.(9)

Considering the single-centre design, the generalizability of the study may be a limitation. The absence of a control group also prevents definitive causation between accreditation and outcome improvements. We have addressed key elements of the MOM strategies in the NABH guidelines and have found that there are still areas, such as medication reconciliation during transitions of care (MOM 10), that remain partially implemented and represent future priorities for quality improvement.

The findings of our study carry important implications for hospital administrators and policymakers. Accreditation-linked quality initiatives should focus not only on compliance audits but also on sustaining the improvements over time. By doing so, accreditation can move on to creating a dynamic framework for improving patient care and optimising operational performance. In the process, hospitals can achieve lasting gains for patients and institutions.

# Conclusion

This study emphasises that accreditation can act as a structured pathway for enhancing medication safety from merely a series of isolated initiatives into an integrated, sustainable system within healthcare. Beyond the improvements in quality indicators, the true value of NABH lies in its ability to create a culture of accountability, continuous learning, and multidisciplinary collaboration.

By enforcing evidence-based standards into daily practice and encouraging engagement among staff, accreditation enables hospitals to move from reactive error correction to farsighted risk prevention. Integrating clinical pharmacologists, expanding the scope of audit-driven feedback, and adopting digital tools for real-time monitoring offer future opportunities in the area to strengthen these gains.

The findings will provide a usable framework for other institutions, especially those in resource-limited settings, to adapt accreditation as a scalable tool for system-wide improvement in healthcare delivery.

# Declarations

This study was conducted as an internal quality improvement initiative and did not involve human participants, patient-identifiable data, or biological samples; hence Institutional Ethics Committee review approval was not mandated.

Informed consent to participate was obtained from the participant (primarily employees) through the In-charges and HR heads of departments.

### Ethics Approval and Consent to Participate:

This study was conducted as an internal quality improvement initiative using de-identified institutional data. Formal ethical approval was not required, and informed consent was not applicable.

### Consent for Publication:

Not applicable.

**Availability of Data and Materials:**

All data generated or analysed during this study are included in this published article.

**Competing Interests:**

The authors declare that they have no competing interests.

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**Authors' Contributions:**

M.Shubhodip and G.S contributed to the conception, design and interpretation of data.

M. Suneel contributed to review of the data

S.H contributed to the review of the data and preparation of the manuscript.

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