

Does accreditation improve quality of care and patient safety in a Low- and Middle-Income Country? An observational study in healthcare organizations of India

Prashanth Nag

All India Institute of Medical Sciences, New Delhi

Vijaydeep Siddharth

vijaydeep@aiims.edu

All India Institute of Medical Sciences, New Delhi

Angel Rajan Singh

All India Institute of Medical Sciences, New Delhi

Nishant Sharma

All India Institute of Medical Sciences, New Delhi

Sanjay Arya

All India Institute of Medical Sciences, New Delhi

Research Article

Keywords: Accreditation, Certification, Healthcare Quality, Patient safety, Cost of quality, Joint Commission International (JCI), National Accreditation Board for Hospitals & Healthcare Providers (NABH), National Quality Assurance Standards (NQAS)

Posted Date: August 25th, 2026

DOI: <https://doi.org/10.21203/rs.3.rs-10789188/v1>

License:   This work is licensed under a Creative Commons Attribution 4.0 International License.
[Read Full License](#)

Additional Declarations: No competing interests reported.

Does accreditation improve quality of care and patient safety in a Low- and Middle-Income Country? An observational study in healthcare organizations of India

Prashant Nag nagunprecedented29@gmail.com, New Delhi, India. Senior Resident, Department of Hospital Administration, All India Institute of medical Sciences (AIIMS)

Vijaydeep Siddharth* vijaydeep@aiims.edu New Delhi, India. Professor, Department of Hospital Administration, AIIMS, New Delhi, India

Angel Rajan Singh angel@angelrajansingh.com New Delhi, India. Professor, Department of Hospital Administration, AIIMS

Nishant Sharma drnishant_sharma@aiims.edu New Delhi, India. Assistant Professor, Department of Hospital Administration, AIIMS

Sanjay Arya skarya96@hotmail.com New Delhi, India. Professor, Department of Hospital Administration, AIIMS

* Corresponding Author

Abstract:

Background: Current study aims to understand the impact of accreditation on quality of care, patient safety and its associated cost among accredited Healthcare Organisations (HCOs) in India.

Methods: An exploratory study was conducted from 2021 to 2023 among healthcare organizations accredited/certified under NABH, NQAS, and JCI in India. A semi-structured, validated questionnaire having 72 items on seven item Likert scale (1 being strongly disagree and 7 being strongly agree) was developed on parameters identified through the systematic review of existing literature (Pub Med, Scopus and Cochrane library) and expert consensus. Responses were collected from the Chief Executive Officer/ Managing Director/ Medical Superintendent/ Hospital Administrator/ Quality Team and inferential statistics (t-test, ANOVA) were applied.

Results: A total of 91 responses from HCOs (both public and private sector) from 14 different states and union territories of the country were included for analysis. An average score of 6.0 was observed for accreditation impacting structural aspects, while for process parameters it was 5.5 and 5.7 for outcome. Accreditation has a positive impact notably with regards to clarifying roles, defining patient rights, compliance to regulations, improving staff knowledge, and optimizing the management of engineering installations. It also has a positive impact on KPIs pertaining to quality of care and patient safety. Accreditation is perceived to be associated with increased expenditure on account of infection control, staff credentialing, and privileging. The analysis of mean scores indicates that mid-level managers perceived more favourable impact of accreditation on structure, process, and outcome parameters compared to the senior-level managers, however, both had similar observations with regards to the implications of accreditation on cost.

Conclusion: Accreditation positively impacts the various parameters pertaining to structure, process and outcome thereby positively impacting the quality of care and patient safety, though it comes with associated cost for achieving and maintaining the accreditation. Accreditation has been observed to be associated with positive impact studied key performance indicators (KPIs) for quality and patient safety.

Key Words:

Accreditation, Certification, Healthcare Quality, Patient safety, Cost of quality, Joint Commission International (JCI), National Accreditation Board for Hospitals & Healthcare Providers (NABH), National Quality Assurance Standards (NQAS)

Background

Healthcare Organisations (HCOs) across the globe strives for providing quality healthcare.(1) Changes in hospital reimbursement policies have been observed in many countries aimed at controlling spending and improving healthcare quality through accreditation. Accreditation has evolved into a cornerstone in today's healthcare delivery systems and throughout the world the number of healthcare accreditation programs are estimated at more than 70 (2). Accreditation entails external third-party independent peer review of the patient care practices and processes against the prescribed standards. (3) It enhances the quality of treatment and patient care, creates robust organizational structures and processes, strengthens staff competencies, promotes safety for both patients and healthcare workers, and fosters greater integration of health services thereby increasing patient satisfaction. Furthermore, accreditation encourages the adoption of evidence-based practices, stimulates new collaborations and partnerships, and increases awareness of the role of health departments/policy makers. Notably, it is reported with a reduction in hierarchical culture within institutions, improved facility management through data-driven decision-making, heightened awareness of statutory compliance, and measurable financial benefits. (4-10)

Accreditation has been also observed to improve the outcome of care, including the reduced average length of stay, increased hand hygiene compliance rates, decreased healthcare associated infections, identifying radiology reporting outliers, decreased pressure ulcer rates, increased rates of correctly identifying patients, increased critical lab reporting rates, and bed occupancy rates. However, it is also observed that increased workloads during the accreditation cycle can significantly affect patient care, which is a shortcoming of the accreditation process.(8,11) Various other challenges associated with its implementation includes confusion among staff members due to intricate standards, an excessive emphasis on documentation and obtaining concessions solely through documentation, compulsion to deceive evaluators, the potential bias of evaluators, and race against the timelines preventing holistic implementation of standards.(12)

Implementation of accreditation comes at a cost to the healthcare organisations which is variable depending upon the accreditation systems and the maturity of the HCOs. Commonly observed direct costs associated with the accreditation process includes fees for application, surveys and renewal fees after a certain number of years, while, indirect costs includes staff being diverted to secondary activities, service fee of consulting firms supporting accreditation process, infrastructural modifications, license fees for statutory compliances etc.(2,9) However, it has been also observed that after one year of achieving accreditation there has been an enhanced utilization of resources, increased competitiveness for funding, and the acquisition of new funding. (13) In a systematic review comprising of 61 studies, 21 (34%) studies reported a positive or mixed-positive association, thereby meaning higher cost was associated with higher quality and 18 studies (30%) reported a negative or mixed-negative association, indicating that the higher quality can be achieved with lower cost, while in rest 22 studies (36%), variation of cost with quality was not found to be significant, or the association was uncertain or mixed. (14) In India, a study to explore the financial impact of undergoing accreditation reported that it has a favourable long-term impact on financial outcomes. (9)

Indian Healthcare is a \$372 billion industry with Compound Annual Growth Rate (CAGR) of 39%, which still leaves a lot of scope for expansion to cater to its population (15). The National Accreditation Board for Hospitals and Healthcare Providers (NABH) in India provides accreditation for various types of healthcare providers and hospitals across different systems of medicine, (16) while the Ministry of Health & Family Welfare, Government of India has come up with the National Quality Assurance Standards (NQAS), which is similar to accreditation in terms of process but is in the form of a certification system for public health facilities (excluding medical colleges) to enhance quality and patient safety in public health facilities.(17) Certification under NQAS lends financial benefits to the HCOs achieving certification under the scheme which can be utilised for enhancing the HCOs functioning and also leads to increased morale of the healthcare workers. Some of the hospitals have also acquired accreditation from international accrediting body like Joint Commission International for gaining competitive advantage in attracting patients from other countries desirous of availing quality care at affordable

price. Coming together of all three above mentioned systems has enveloped both public and private sector HCOs thereby enhancing quality of care and improved patient safety, however, the evidence for the same is inadequate from Lower-Middle Income Countries. In India, there has been no large scale study that has explored the role of accreditation in improving the quality of care and patient safety. With a significant ingress of the accreditation and certification system in the country the time is ripe to look into its impact on the HCOs on abovementioned aspects.

Methodology

An observational and qualitative study was conducted from November 2021 to June 2023 by the Department of Hospital Administration, All India Institute of Medical Sciences (AIIMS), New Delhi, India. It was established as an Institute of National Importance, in the year 1956 and is the leading medical institute in India for teaching, research and patient care. For the purpose of the study accredited HCOs are defined as HCOs which are accredited/certified under NABH, NQAS and JCI. It was targeted to include at least ten percent of all the accredited HCOs in India, at the time of study commencement through referrals and professional groups given huge landscape of healthcare delivery in India, while accredited Small HCOs (bed strength less than 50 beds), NABH accredited HCOs having only entry level certification, AYUSH Hospitals and HCOs with expired validity were excluded from the study.

Table 1 Details of accredited HCOs in India and number of HCOs included in the study

Accreditation Body	NABH	NQAS	JCI	Total
No. of Accredited HCOs*	823	147	37	1007
Sample size	82	15	04	101

**Source: Websites of respective accreditation bodies as on August 2021.*

A semi-structured questionnaire was developed for the data collection which was filled by Vice President (VP)/ Chief Executive Officer (CEO)/ Managing Director (MD)/ Medical Superintendent (MS)/ Deputy Medical Superintendent (DMS)/ Assistant Medical Superintendent (AMS)/ Hospital Administrator/ Quality Team or equivalent designations from the participating HCO. The process of tool development underwent various stages beginning with the systematic review of literature from year 1951 to 2022 in three scientific databases namely PubMed, Scopus and Cochrane library to identify the various parameters that gets impacted by the accreditation. These identified parameters were then deliberated upon by the subject experts; and finally face and content validity of the tool was established. (18) Systematic review was carried out on the Rayyan Software/Platform utilising its free version given the funding limitation (19). The search utilising multiple combination of key words yielded 15,408 research articles, which were then independently evaluated by two reviewers for inclusion. A total of 62 articles were shortlisted, which were then reviewed in detail for identifying the parameters impacted by the accreditation (positively, negatively and unequivocal).

Subsequently, a focused group discussion (FGD) involving subject experts was conducted for reviewing these parameters. The panellists were requested to provide their inputs and validate the results of the systematic review and a consensus was achieved for individual parameters. Following receipt of comprehensive feedback, a final version of the questionnaire having three sections was prepared. Section A to collect comprehensive background information regarding the healthcare organization and the respondent. Section B consisted of 53 questions that focus on the impact of accreditation. These were categorized into four groups: Structure, Process, Outcome, and Costs. Section C was designed to evaluate the performance of 19 specific indicators (Key Performance Indicators) after the HCO has achieved accreditation. The parameters used a seven point Likert scale i.e. 7 was strongly agree, 6 was agree, 5 was slightly agree, 4 was neither agree nor disagree, 3 was slightly disagree, 2 was disagree and 1 was strongly disagree to rate the impact of accreditation.

To assess the face and content validity, experts and potential respondents were involved in validation process. For wider and easier dissemination the questionnaire was converted into a Google Form, which was then distributed to 800 accredited HCOs (through emails, WhatsApp messages, text messages) for collecting the desired number of responses. Descriptive and summary statistics were calculated and statistical analyses were performed at $\alpha = 0.05$ significance level. Student t-test or ANOVA test were used to measure significant change between the various study groups. The study was carried out as a part of post graduate residency programme in hospital administration and was approved by the Institute Ethics Committee for Post Graduate Research, All India Institute of Medical Sciences, New Delhi on 29.10.2021 vide Ref. No. IECPG-585/28.10.2021. Participant Information Sheet (PIS) and Participant Informed Consent Form (PICF) were provided to all the participants along with the questionnaire.

Results:

In India, 38 HCOs have achieved JCI Accreditation and a total of 960 HCOs have been accredited by NABH, while only 134 District Hospitals were certified by NQAS. A total of 121 responses were received from all HCOs combined and after data cleaning process 91 responses from HCOs were included for the data analysis, which were distributed through various States and Union Territories of India. (Figure 1) (Table 2)

Table 2 Background characteristics of the participating HCOs

Ownership of Hospital		
	Frequency	Percentage
Private	72	79.1
Government	11	12.1
Charitable	8	8.8
Total	91	100
Level of Care		
Primary	8	8.8
Secondary	19	20.9
Tertiary	64	70.3
Total	91	100
Hospital Specialty		
Multi-Specialty	58	63.7
Super Specialty	33	36.2
Total	91	100
Hospital Bed Strength		
<=100 bedded	19	20.9
101-500 bedded	54	59.3
>500 bedded	18	19.8
Total	91	100

Accrediting Organization		
JCI	9	9.9
NABH	72	79.1
NQAS	10	11
Total	91	100
Respondent's designation		
Top Level*	20	22
Mid-Level*	71	78
Total	91	100

* Top Level Managers (VP/CEO/MD/MS) and Mid-Level Managers (DMS/AMS/Quality head/Quality Manager).

With regards to the structural parameters, an average score of six was observed, with accreditation helping in clarifying roles, defining patient rights, ensuring compliance with regulations, improving staff knowledge, and optimizing the management of engineering installations. In process parameters, an average score of 5.5 (between somewhat agree to agree) was observed with the perceived impact of accreditation on creating a culture of safety; better management of support and outsourced services; decreased risk of process and outcome variations; higher level of compliance with infection control and clinical safety standards; improved clinical governance; enhanced prevention of occupational hazards; improved risk mitigation and proactive risk management; improved quality of documentation; and standardization of care & supports processes. For outcome parameters, an average score of 5.7 was observed with perceived impact of accreditation on competitive advantage; improved quality of care; enhances the reputation of a hospital; increased utilization and decreased downtime of medical equipment; high standards of quality and dependability; and positive impact on clinical outcomes. With regards to the cost, HCOs with JCI and NABH accreditation had similar mean scores with increased expenditures on account of infection control, staff credentialing, and privileging, while NQAS had a lower mean score, indicating potentially lower costs for achieving certification. (Table 3)

Overall the Mid-level Managers gave higher score to most of the identified parameters compared to the Senior-Level Managers, with significant differences observed for parameters clearly defining rights for patients receiving medical care (p-value 0.01), creating a culture of safety (p-value 0.03), higher level of compliance with infection control and clinical safety standards (p-value 0.03), increase patient awareness about their treatment process (p-value 0.02) and standardization of care and support processes (p-value 0.02). The analysis of mean scores indicates that mid-level managers perceived a stronger impact of accreditation in terms of structure, process, and outcome compared to the senior-level managers. However, both groups have similar perceptions regarding the cost implications of the accreditation. (Table 3)

A total of 18 KPIs pertaining to quality and patient safety were identified to be impacted by the accreditation. Study findings reveal that accreditation has a positive impact on quality and patient safety KPIs notably with regards to adherence of surgical safety checklist; patient return to emergency department within 72 hours with similar presenting complaints; catheter associated urinary tract infection rate; surgical site infection rate; compliance to hand hygiene practice; rate of needle stick injuries; and percentage of medical records having incomplete and/or improper consent. (Table 4)

Table 4 Impact of Accreditation on Key performance indicators of quality of care and patient safety

Sl. No.	Key Performance Indicator	Downtrend (%)	No trend (%)	Uptrend (%)	Not measuring (%)
---------	---------------------------	---------------	--------------	-------------	-------------------

1	Average Length of stay	52.7	18.7	24.2	4.4
2	Bed occupancy rate	15.4	19.8	64.8	-
3	Reporting of Incidence of medication errors	45	11	42.9	1.1
4	Reporting of Percentage of in-patients developing adverse drug reaction(s)	42.8	17.6	36.3	3.3
5	Adherence to surgical safety checklist	4.4	7.7	85.7	2.2
6	Percentage of transfusion reactions	53.8	23.1	19.8	3.3
7	Return to ICU within 48 hours	63.7	16.5	11	8.8
8	Return to emergency department within 72 hours with similar presenting complaints	70.6	15.6	10.2	3.6
9	Incidence of bed sores after admission	69.2	22	6.6	2.2
10	Catheter associated Urinary tract infection rate	71.8	15.7	10.1	2.4
11	Ventilator associated Pneumonia rate	67	18.7	8.8	5.5
12	Central line associated Blood stream infection rate	69.2	15.4	12.1	3.3
13	Surgical site infection rate	74.7	12.1	12.1	1.1
14	Compliance to Hand hygiene practice	17.6	5.5	76.9	-
15	Percentage of re-scheduling of surgeries	60.4	15.4	15.4	8.8
16	Nurse-patient ratio for ICUs and wards	12.1	30.8	51.6	5.5
17	Percentage of medical records having incomplete and/or improper consent	71.4	11	16.5	1.1
18	Rate of needle stick injuries	76.9	9.9	11	2.2

Discussion

This study is the largest study in India exploring the perceived impact of accreditation on healthcare organisations with regards to quality of care, patient safety and its associated costs. It also lays out a comparison between the homegrown accreditation standards for HCOs vs the oldest existing accreditation standards for HCOs internationally and latest homegrown standards for public sector HCOs i.e. JCI, NABH & NQAS respectively. Both the accreditation and certifications standards prescribed by NABH and NQAS respectively are accredited by International Society for Quality in Healthcare (ISQUA). Journey of accreditation of HCOs in India with JCI and NABH accreditation systems is almost two decades old and at times, there are added incentives in reimbursements if the treatment is provided by an accredited hospital compared to a non-accredited hospital. Also, NQAS certification system is a decade old system but quality push from the top has resulted in rapid uptake of NQAS certification by public health facilities. There is limited understanding on the impact of accreditation on structure, process, outcome, and cost aspects of HCOs in LMICs. Our research adds to a very limited and mixed body of evidence on accreditation and the related outcomes in the Indian healthcare delivery system.

Despite the complexity of accreditation effects on structural measures, several studies showed a consistent positive impact of accreditation on structural, process and outcome measures in HCO, including on nursing organizations and physical facilities. It demonstrates high quality patient care and optimal resource utilization, thus contributing to the overall improvement in the functioning of hospitals.(20-22) Consistent with the existing literature, this study reveals that accreditation supports and clarifies the roles of healthcare workers, promote patient rights, ensure regulatory compliance, enhances staff knowledge, facilitates professional development, optimizes the management of engineering installations, and encourages organizational change. Additionally, it was observed that the JCI accreditation obtained the highest mean score on structural factors compared to the others, however, it was not statistically significant. Majority of the published literature focused on assessing the impact of JCI accreditation on quality outcomes at organizational structural factors. However, a few drawbacks of JCI accreditation process, such as high cost and increased workload, have been highlighted in literature in addition to the above mentioned advantages. (23) Despite the abundance of literature on this topic, the effectiveness of JCI accreditation in improving the structural measures remains debatable (24).

Several studies have also examined the impact of hospital accreditation on process-related performance measures and a positive association has been observed with regards to but not limited to improved hospital reputation, increased personal gains, enhanced quality and patient safety, improved patient care and satisfaction, better average length of stay, hospital efficiency, and safety culture (25,26,27). Similarly, a positive correlation has also been noted with measures such as better information and communication with patients, a satisfactory monitoring system, democratization of decision-making, improvements in administrative services, enhanced hospital reputation, increased opportunities for improving working, economic, training, and research conditions, work optimization, optimal utilization and allocation of available resources, significant improvements in patient safety outcomes, enhanced commitment and sensitivity among the staff, minimization of medical errors, and overall improvement in healthcare outcomes have been observed. (28,29) In sync with the abovementioned findings, the current study observed that accreditation plays a favourable role in creating a culture of safety, better management of outsourced and support services, improved communication with patients, better grievance handling, reduced process and outcome variations risk, strengthened healthcare and other stakeholder relationships, enhanced prevention of occupational hazards, infection control and clinical safety standards, and improved clinical governance, risk mitigation, quality of documentation, staff integrity, while promoting patient centred care.

The study observed that accreditation of healthcare organizations (HCOs) showed a positive impact on outcome measures, such as clinical outcomes, competitive advantage in the market, quality of care, supply chain management, reputation enhancement, staff satisfaction, utilization of medical equipment, availability of patient services, decreased medical/non-medical errors, and reduced legal suits. These results are comparable to the study wherein improvement in the work environment, decreased conflict at work, clarity in mission and vision,

enhanced communication, better management of errors, improved culture of accountability, and a more efficient documentation process were observed with the accreditation.(33) NABH-accredited healthcare organizations (HCOs) reported the highest scores on process measures compared to JCI and NQAS. Similarly, JCI and NABH-accredited HCOs showed a positive impact on competitive advantage, quality of care, supply chain management, reputation enhancement, and staff satisfaction. These results are consistent with a recent study conducted among healthcare workers from tertiary care centres in India, where more than 80% of participants reported a positive effect of NABH accreditation on hospital services and noted an improvement in processes following NABH accreditation (34). However, accreditation was found to be associated with higher stress among the healthcare workers (30-32), with higher levels of anxiety and depression among the nursing officers during the accreditation preparation phase, followed by a significant improvement in job satisfaction and sleep function after accreditation.

Though accreditation is seen as an opportunity to improve healthcare practice, the perceived cost and financial implications of accreditation is often viewed as a barrier, especially for small-scale HCOs seeking accreditation (35,36,37). For instance, in a study majority of the survey respondents (75%) reported spending over 100 days on accreditation, suggesting a hidden expense. (38) Despite the demand for financial resources, several studies have shown a positive impact of accreditation on various economic outcomes, particularly improved healthcare efficiency, cost reduction, and increased share of output revenue (39,40). On the contrary, accreditation has also been found to have a negative effect on higher staffing demand and investment in equipment (41). Additionally, several performance barriers of accreditation were identified in university and military hospitals in an LMIC setting, including the prioritization of financial gains over quality improvement, absence of a cost-effective approach, resource mismanagement, incorrect documentation, insufficient funding, lack of unity in command, inadequate remuneration for non-medical personnel, high workload, reduced performance, and physician non-participation (42). These barriers highlight the challenges and areas that need to be addressed to optimize the impact of accreditation on hospital performance.

This study indicates that accreditation may be associated with increased overall expenditure, increased costs associated with infection control, staff credentialing and privileging, skill training and development of staff, structural safety, facility management, and staff health and safety. Furthermore, certain challenges have been recognised in terms of the high cost associated with retrofitting and renovation, additional recruitment of skilled manpower, and implementation/maintenance of the accreditation process. Both JCI and NABH accreditation are being associated with increased expenditures compared with NQAS, while the cost of obtaining and maintaining JCI accreditation was higher compared to NABH and NQAS. This could be attributed to higher fees and the higher cost of training staff at JCI-accredited hospitals. Our data support the hypothesis that NQAS certification has the potential to serve as a quality management system with minimal expenditure at least for public health facilities in LMIC countries. Also, the HCOs adapts JCI accreditation for opening doors of hospital to international patients with cost of treatment being much lower compared to developed countries with similar outcome of care. NABH accreditation is widely popular in the country for various kinds and sizes of HCOs.

This study has shed light on the perspectives of different stakeholders regarding the influence of accreditation on hospital functioning, healthcare quality, patient safety and its related costs. To provide a more comprehensive understanding, further research should be conducted to quantify the financial implications of accreditation. Moreover, it would be valuable to assess the observed on ground changes in key performance indicators (KPIs) in order to draw a definitive conclusion regarding the impact of accreditation on healthcare quality. By measuring specific KPIs such as patient outcomes, patient satisfaction, adherence to clinical guidelines, and the occurrence of adverse events, a clearer picture can be obtained regarding the direct influence of accreditation on enhancing healthcare quality. By conducting extensive research in these areas, we can gain authentic insights into the financial aspects of accreditation and its correlation with improved healthcare quality. This information would be instrumental in guiding policy decisions, resource allocation, and strategic planning within the healthcare industry. It is recommended that the sensitization of healthcare organizations (HCOs), especially in the public health sector, which is lagging behind in terms of accreditation, is essential and further research is needed in this area as it has not been extensively studied, with limited evidence available in an Indian setting. Understanding

the perspectives of healthcare providers regarding the costs and benefits of accreditation is crucial for shaping policies and strategies that promote quality improvement initiatives. By evaluating the perceived benefits and costs associated with accreditation, healthcare organizations and policymakers can make informed decisions regarding the implementation and promotion of accreditation programs.

Conclusion

Accreditation among HCOs is widespread in India, particularly with homegrown accreditation standards like NABH and NQAS, whereas JCI accreditation is less prevalent, usually present in hospitals supporting medical tourism. Our findings indicate that accreditation positively impacts the various structure, process and outcome measures thereby positively impacting the quality of care and patient safety. Additionally, achieving and maintaining accreditation requires resource commitment, which is less expensive with homegrown accreditation process. It can also be concluded that accreditation leads to improved efficiency and effectiveness in the treatment process, as the studied HCOs have reported an upward trend in various studied key performance indicators (KPIs).

References:

1. Häkkinen, U., Rosenqvist, G., Iversen, T., Rehnberg, C., & Seppälä, T. T. (2015). Outcome, use of resources and their relationship in the treatment of AMI, stroke and hip fracture at European hospitals. *Health Economics*, 24(Suppl 2), 116–139.
2. Saleh, S. S., Sleiman, J. B., Dagher, D., Sbeit, H., & Natafqi, N. (2013). Accreditation of hospitals in Lebanon: Is it a worthy investment? *International Journal for Quality in Health Care*, 25(3), 284–290.
3. Brubakk, K., Vist, G. E., Bukholm, G., Barach, P., & Tjomsland, O. (2015). A systematic review of hospital accreditation: The challenges of measuring complex intervention effects. *BMC Health Services Research*, 15, 280.
4. Algunmeeyn, A., Alrawashdeh, M., & Alhabashneh, H. (2020). Benefits of applying for hospital accreditation: The perspective of staff. *Journal of Nursing Management*, 28(6), 1233–1240.
5. Al-Alawy, K., Moonesar, I. A., Obaid, H. A. M., Gaafar, R., & Bawadi, E. I. A. (2021). A mixed-methods study to explore the impact of hospital accreditation. *Inquiry*, 58, 0046958020981463.
6. Tabrizi, J. S., Gharibi, F., & Wilson, A. J. (2011). Advantages and disadvantages of health care accreditation models. *Health Promotion Perspectives*, 1(1), 1–31.
7. Andres, E. B., Song, W., Schooling, C. M., & Johnston, J. M. (2019). The influence of hospital accreditation: A longitudinal assessment of organisational culture. *BMC Health Services Research*, 19(1), 467.
8. Hussein, M., Pavlova, M., Ghalwash, M., & Groot, W. (2021). The impact of hospital accreditation on the quality of healthcare: A systematic literature review. *BMC Health Services Research*, 21(1), 1057.
9. Thomas, A., Raghunath, S., Rana, B. K., & Nagpal, S. (2017). An exploratory study on the benefits of quality accreditation: Financial impact and Chief Executive Officer perspectives. *International Journal of Research Foundation of Hospital and Healthcare Administration*, 5(2), 60–67.
10. Carrasco-Peralta, J. A., Herrera-Usagre, M., Reyes-Alcázar, V., & Torres-Olivera, A. (2019). Healthcare accreditation as trigger of organisational change: The view of professionals. *Journal of Healthcare Quality Research*, 34(2), 59–65.

11. Al Shawan, D. (2021). The effectiveness of the Joint Commission International accreditation in improving quality at King Fahd University Hospital, Saudi Arabia: A mixed methods approach. *Journal of Healthcare Leadership*, 13, 35–42.
12. Tashayoei, N., Raeissi, P., & Nasiripour, A. A. (2020). Challenges of implementation of hospital accreditation in Iran: An exploratory factor analysis. *Journal of the Egyptian Public Health Association*, 95, 5.
13. Heffernan, M., Kennedy, M., Gonick, S. A., & Siegfried, A. L. (2021). Impact of accreditation on health department financial resources. *Journal of Public Health Management and Practice*, 27(5), 501–507.
14. Hussey, P. S., Wertheimer, S., & Mehrotra, A. (2013). The association between health care quality and cost: A systematic review. *Annals of Internal Medicine*, 158(1), 27–34.
15. Ouzzani, M., Hammady, H., Fedorowicz, Z., & Elmagarmid, A. (2016). Rayyan - a web and mobile app for systematic reviews. *Systematic Reviews*, 5, 210.
16. Chatterjee, A. (2017). Accreditation of Armed Forces Hospitals: An imperative now. *Medical Journal Armed Forces India*, 73(3), 213–215.
17. National Health Systems Resource Centre. (2016). Operational guidelines for quality assurance in public health facilities. Ministry of Health and Family Welfare, Government of India.
18. Nag, P., Siddharth, V., Singh, A. R., Sharma, N., & Arya, S. (n.d.). Accreditation and its impacts on hospital functioning, quality of care including patient safety and healthcare costs: A scoping review [Unpublished manuscript].
19. Donabedian, A. (1988). The quality of care: How can it be assessed? *JAMA*, 260(12), 1743–1748.
20. Greenfield, D., & Braithwaite, J. (2009). Developing the evidence base for accreditation of healthcare organisations: A call for transparency and innovation. *Quality and Safety in Health Care*, 18(3), 162–163.
21. Lám, J., Merész, G., Bakacsi, G., Belicza, É., Surján, C., & Takács, E. (2016). [Changing of the patient safety culture in the pilot institutes of the Hungarian accreditation program]. *Orvosi Hetilap*, 157(42), 1667–1673.
22. Lee, E. (2016). Safety climate and attitude toward medication error reporting after hospital accreditation in South Korea. *International Journal for Quality in Health Care*, 28(4), 508–514.
23. Yildiz, A., & Kaya, S. (2014). Perceptions of nurses on the impact of accreditation on quality of care: A survey in a hospital in Turkey. *Clinical Governance: An International Journal*, 19(2), 69–82.
24. 김미란, & Kim, M. (2019). Awareness, job stress, turnover intention, safety management perception change of nurses in a general hospital: Before and after medical institution certification system. *Journal of the Korea Contents Association*, 19(1), 385–395.
25. Al-Faouri, I., Al-Dmour, A., Al-Ali, N., AbuALRub, R., & Abu Moghli, F. (2019). Effect of Health Care Accreditation Council survey site visit on perceived stress level among Jordanian healthcare providers. *Nursing Forum*, 54(1), 30–37.
26. Elkins, G., Cook, T., Dove, J., Markova, D., Marcus, J. D., Meyer, T., & others. (2010). Perceived stress among nursing and administration staff related to accreditation. *Clinical Nursing Research*, 19(4), 376–386.
27. Yadav, N., Anchalia, P., & Preetham, K. (2018). A cross-sectional study on effectiveness of implementation of NABH standards among health care workers in a tertiary care centre in India. *International Journal of Current Research*, 10(12), 76417–76419.
28. Øvretveit, J., & Gustafson, D. (2002). Evaluation of quality improvement programmes. *Quality and Safety in Health Care*, 11(3), 270–275.
29. Mumford, V., Greenfield, D., Hogden, A., Forde, K., Westbrook, J., & Braithwaite, J. (2015). Counting the costs of accreditation in acute care: An activity-based costing approach. *BMJ Open*, 5(9), e008850.

30. Lindlbauer, I., Schreyögg, J., & Winter, V. (2016). Changes in technical efficiency after quality management certification: A DEA approach using difference-in-difference estimation with genetic matching in the hospital industry. *European Journal of Operational Research*, 250(3), 1026–1036.
31. Okumura, Y., Inomata, T., Iwagami, M., Eguchi, A., Mizuno, J., Shiang, T., & Murakami, A. (2019). Shortened cataract surgery by standardisation of the perioperative protocol according to the Joint Commission International accreditation: A retrospective observational study. *BMJ Open*, 9(6), e027620.
32. Saquetto, T. C., & Araujo, C. A. S. (2019). Efficiency evaluation of private hospitals in Brazil: A two-stage analysis. *RAM. Revista de Administração Mackenzie*, 20(5), eRAMR190183.
33. Wagner, L. M., McDonald, S. M., & Castle, N. G. (2012). Joint Commission accreditation and quality measures in U.S. nursing homes. *Policy, Politics, & Nursing Practice*, 13(1), 8–16.
34. Williams, S. C., Morton, D. J., Braun, B. I., Longo, B. A., & Baker, D. W. (2017). Comparing public quality ratings for accredited and nonaccredited nursing homes. *Journal of the American Medical Directors Association*, 18(1), 24–29.
35. Schroeder, M. C., Gao, X., Lizarraga, I., Kahl, A. R., & Charlton, M. E. (2022). The impact of Commission on Cancer accreditation status, hospital rurality and hospital size on quality measure performance rates. *Annals of Surgical Oncology*, 29(4), 2527–2536.
36. Zapata-Vanegas, M. A., & Saturno-Hernández, P. J. (2020). Contextual factors favouring success in the accreditation process in Colombian hospitals: A nationwide observational study. *BMC Health Services Research*, 20, 776.
37. Nandraj, S., Khot, A., Menon, S., & Brugha, R. (2001). A stakeholder approach towards hospital accreditation in India. *Health Policy and Planning*, 16(Suppl 2), 70–79.
38. Sack, C., Lütke, P., Günther, W., Erbel, R., Jöckel, K. H., & Holtmann, G. J. (2010). Challenging the holy grail of hospital accreditation: A cross sectional study of inpatient satisfaction in the field of cardiology. *BMC Health Services Research*, 10, 120.
39. Al Tehewy, M., Salem, B., Habil, I., & El Okda, S. (2009). Evaluation of accreditation program in non-governmental organizations' health units in Egypt: Short-term outcomes. *International Journal for Quality in Health Care*, 21(3), 183–189.
40. Duckett, S. J. (1983). Changing hospitals: The role of hospital accreditation. *Social Science & Medicine*, 17(20), 1573–1579.
41. Inomata, T., Mizuno, J., Iwagami, M., Kawasaki, S., Shimada, A., Inada, E., Shiang, T., & Amano, A. (2018). The impact of Joint Commission International accreditation on time periods in the operating room: A retrospective observational study. *PLOS ONE*, 13(9), e0204301.
42. Nomura, A. T. G., da Silva, M. B., & Almeida, M. de A. (2016). Quality of nursing documentation before and after the Hospital Accreditation in a university hospital. *Revista Latino-Americana de Enfermagem*, 24, e2813.

Declarations:

Ethics approval and consent to participate: The study did not involve any human experiments or intervention and was carried out as a part of post graduate residency programme in hospital administration in accordance with the Declaration of Helsinki. This study was approved by the Institute Ethics Committee for Post Graduate Research, All India Institute of Medical Sciences, New Delhi on 29.10.2021 vide Ref. No. IECPG-585/28.10.2021. Participant Information Sheet (PIS) and Participant Informed Consent Form (PICF) were provided to all the participants along with the questionnaire.

Consent for publication: Manuscript does not contain any individual person's data in any form

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

Funding: No Funding Information to declare

Authors' contributions:

PN: Conceptualization, design, data collection, analysis, decision to publish

VS: Conceptualization, design, decision to publish, or preparation of the manuscript

ARS: Conceptualization, design, decision to publish

NS: Data collection, analysis

SA: Conceptualization, design, decision to publish

Acknowledgements: None

Authors' information (optional)

Table 3 **Impact of accreditation on various studied parameters pertaining to quality of care, patient safety and costs associated with accreditation** *(An average score of six was taken as the parameters getting impacted by the accreditation which have been highlighted in bold along with parameters where significant variations have been observed with regards to the kind of accreditation and senior versus middle manager responses)*

			Accreditation System				Mid-Level	Senior Level	P-value
	Identified Parameters	Mean score	JCI	NABH	NQAS	P-value			
Structure									
1	Clarifies roles and responsibilities for the healthcare workers	6.2	6.6	6.2	5.9	0.51	6.3	5.6	0.01
2	Clearly defined rights for patients receiving medical care	6.5	6.8	6.4	6.2	0.44	6.5	6.2	0.34
3	Compliance to statutory regulations is ensured	6.5	6.3	6.6	6.7	0.56	6.7	6.3	0.06
4	Improved knowledge and expertise of staff/employees	6.2	6.4	6	6.2	0.59	6.1	6	0.51
5	Optimal utilization & management of engineering installations	6.0	6.4	5.8	5.8	0.38	6	5.6	0.17
6	Better Capacity building and research environment	5.6	5.6	5.6	5.6	1	5.8	5.1	0.09
7	Increased commitment of staff/employees	5.5	5.8	5.5	5.3	0.77	5.7	5.1	0.12
8	Requires significant organizational structural changes	5.2	5.4	5.6	4.5	0.17	5.6	5	0.2
9	Provides sense of direction and a platform for change within the HCO	6.1	6	6.1	6.1	0.97	6.2	5.8	0.11
	Structure Total	6.0	6.1	6	5.8	0.72	6.1	5.6	0.04
Process :									
10	Create a culture of safety	6.0	6.3	6.1	5.5	0.26	6.2	5.6	0.03
11	Better management of outsourced services	5.8	6	5.9	5.4	0.53	5.9	5.5	0.22
12	Improved communication with patients	5.7	5.7	5.9	5.4	0.39	5.9	5.6	0.31
13	Better management of support services (Laundry, CSSD, Kitchen, Security etc.)	6.0	6.1	5.9	5.9	0.92	6	5.7	0.28
14	Better grievance handling	5.8	5.9	5.9	5.6	0.8	5.9	5.8	0.77
15	Decreased risk of process and outcome variations	5.8	5.7	6.1	5.5	0.24	6.1	5.6	0.07
16	Strengthens relationships between healthcare & other stakeholders	5.4	5.2	5.7	5.3	0.41	5.7	5.3	0.21
17	Higher level of compliance with infection control and clinical safety standards	6.2	6.3	6.2	6.1	0.9	6.3	5.8	0.03
18	Improved clinical governance	5.9	6.1	5.9	5.6	0.66	6	5.6	0.16
19	Prevention of occupational hazards is enhanced	6.0	6.1	6	5.9	0.92	6.2	5.5	0.02
20	Improved risk mitigation and proactive risk management	5.9	6.2	6	5.5	0.35	6	5.6	0.13

21	Improved the quality of documentation	6.1	6.2	6.3	5.8	0.47	6.3	6	0.22
22	Improves integration and stimulates a spirit of teamwork	5.7	5.7	5.9	5.6	0.78	5.9	5.6	0.4
23	Increased patient awareness about their treatment process, thereby promoting patient centred care	5.6	5.8	5.8	5.2	0.51	5.9	5.1	0.02
24	Standardization of care & supports processes	6.2	6.2	6.1	6.2	0.92	6.3	5.5	0.02
25	Requires doctors and nurses to allocate more time towards administrative tasks	5.0	4.7	5.7	4.6	0.04	5.6	5.2	0.33
26	Pressure on staff from leadership to improve performance levels and meet specific quality standards	5.1	4.7	5.6	5.1	0.23	5.5	5.4	0.81
27	Increased documentation leads to distraction from patient care activities	4.7	5	5.1	4.1	0.27	5.1	4.6	0.22
28	The accreditation/certification process ultimately decreases the performance quality of healthcare staff due to the increased workload (second victim)	3.1	3	4	2.2	0.03	3.7	3.9	0.72
29	There are chances of incorrect documentation due to increased workload & pressure of the accreditation/certification process	3.6	3.7	4.2	3	0.26	4	3.8	0.59
	Average Score for all parameters	5.5	5.5	5.7	5.2	0.17	5.7	5.3	0.06
Outcome :									
30	Competitive advantage in the market	5.8	5.9	6	5.4	0.41	5.9	5.8	0.66
31	Improved quality of care	6.0	6.1	6.1	5.7	0.62	6.1	5.9	0.4
32	Increased effectiveness in supply chain management (Reduced stock outs)	5.5	5.2	5.7	5.5	0.57	5.7	5.4	0.29
33	Enhances the reputation of a hospital, signalling that it meets high standards of quality and dependability	6.2	6.7	6.3	5.7	0.23	6.3	6	0.35
34	Increased staff satisfaction	5.4	5.7	5.4	5.1	0.73	5.5	5.1	0.3
35	Increased utilization and decreased downtime of medical equipment	5.8	5.7	5.6	6	0.64	5.7	5.7	1
36	Increases the number of patients availing services	5.4	5.8	5.5	4.9	0.43	5.6	5	0.09
37	Reduced incidence of both medical and non-medical errors	5.8	5.8	5.9	5.6	0.86	5.9	5.5	0.17
38	Positive impact on clinical outcomes	6.0	6.1	5.9	5.9	0.91	6	5.8	0.55
39	Reduces legal suits	5.4	5.3	5.7	5.3	0.57	5.6	5.7	0.97
40	Reduces negative media reports	5.0	5.1	5.3	4.7	0.54	5.3	5.1	0.57
	Outcome Total	5.7	5.8	5.8	5.4	0.68	5.8	5.5	0.32
	Cost :								

41	Reduced overall expenditure	4.0	4	4	4.1	0.99	4.1	4	0.83
42	Increased budgeting outlay for hospital infection control	5.6	5.9	5.5	5.4	0.68	5.5	5.7	0.51
43	Increased cost on staff credentialing & privileging	5.0	5.2	5.3	4.6	0.46	5.1	5.6	0.3
44	Increased costs associated with compliance to statutory and legal requirements.	5.1	4.9	5.2	5.3	0.89	5.2	5	0.59
45	Increased costs associated with skill training and development of the staff	5.1	5.6	5.7	3.9	0	5.4	5.8	0.36
46	Increased costs associated with the installation and maintenance of signage	5.1	5.3	5.3	4.8	0.67	5.3	5.1	0.53
47	Increased costs for ensuring structural safety	5.3	5.9	5.5	4.5	0.17	5.4	5.4	0.87
48	Increased expenditure on additional recruitment of skilled manpower	4.9	5.3	5.7	3.6	0	5.4	5.5	0.8
49	Increased expenditure on facility management and infrastructure maintenance	5.5	5.8	5.7	4.9	0.28	5.7	5.5	0.54
50	Increased expenditure on staff health & safety	5.0	5.8	5.4	3.7	0.01	5.3	5.1	0.59
51	Increases cost of retro fitting, repair, & renovation	5.4	6	5.5	4.6	0.13	5.5	5.4	0.9
52	Significant amount spent on achieving accreditation/certification	5.2	6	5.6	4	0.03	5.6	5.1	0.25
53	Significant amount spent on maintaining accreditation/certification	5.3	6	5.7	4.3	0.05	5.7	5.2	0.25

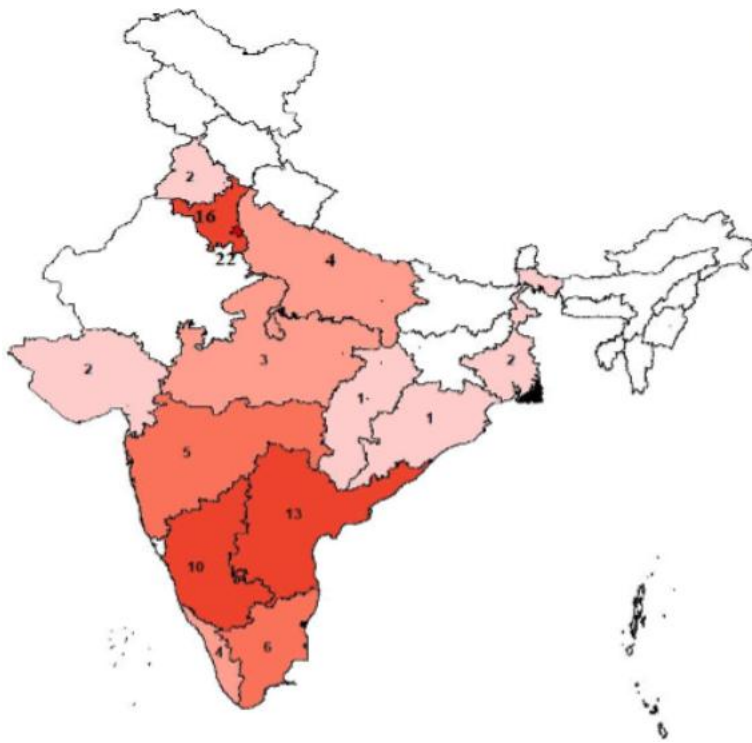


Figure 1 Distribution of responses received from various HCOs across India