



American Journal of Economics and Business Innovation (AJEBI)

ISSN: 2831-5588 (ONLINE), 2832-4862 (PRINT)

VOLUME 4 ISSUE 3 (2025)

**PUBLISHED BY
E-PALLI PUBLISHERS, DELAWARE, USA**

Quality Control in the Healthcare Sector: A Comprehensive Literature Review

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Article Information

Received: August 20, 2025

Accepted: September 24, 2025

Published: November 28, 2025

Keywords

Accreditation of Hospitals, Data Quality, Digital Maturity, Health Systems, Patient-Centered Care, Quality Control of Healthcare, Quality Improvement, Staffing Nurse-To-Nurse And Patient-To-Nurse Ratio, The Patient Safety Culture, Value-Based Healthcare

ABSTRACT

The issue of quality control in the healthcare sector has become a crucial concern, ensuring the safety of patients, the effectiveness of their care, and the resilience of the system. In this extensive literature review, ten peer-reviewed articles published in the years 2021-2025 were synthesized and included themes of patient safety culture, accreditation, workforce adequacy, patient-centered care, digital maturity, and value-based healthcare. It has been pointed out that safety culture and accreditation systems are constantly working to enhance compliance and patient outcomes, whereas sufficient nurse staffing ratios have a strong impact on patient safety. Patient-centered methods enhance conventional metrics of quality, yet they do not offer standardized worldwide models, and digital maturity forecasts safety results by enhancing data quality, yet incorporation of artificial intelligence is not widespread. The value-based models have the potential of matching the expense to the outcomes, but their implementation is dominated in the high-income contexts. In spite of such developments, there are still big gaps. Little longitudinal evidence exists and the cost-effectiveness of accreditation remains under-investigated and is largely based on high-income nations, and hence cannot be generalized across the world. The only way to fill these gaps is to combine efforts to increase research in low and middle-income settings, combine multifaceted digital tools and establish results-oriented international standards. Such an increase in control of quality in healthcare would be important in attaining less unsafe, more sustainable, and equitable healthcare systems.

INTRODUCTION

The interdisciplinary model of quality control in healthcare is a model that integrates the dimensions of patient safety, accreditation, workforce sufficiency, digital transformation, and patient-centered models so that to achieve the achievement of safe, effective, and sustainable service delivery. "Quality in healthcare means doing the right thing, at the right time, in the right way, for the right person", which underscores the integration of these dimensions. Among the international factors that lead to compromised patient outcomes is failure of safety culture provisions, understaffing, and ineffective governance systems, which further accelerates the need to enhance quality systems (Alabdullah & Karwowski, 2024; Griffiths *et al.*, 2023).

In the last several years, international schemes, such as Joint Commission International (JCI) accreditation, patient-centered performance indicators and digital maturity measures have gained a considerable role in healthcare quality. As the World Health Organization emphasizes, "there is no quality without patient safety", highlighting the growing importance of these schemes. Even though some evidence shows that such frameworks are optimally linked with improved outcomes, these findings are inconclusive, usually in a high-income setting, and not cost-effective or sustainable (Hussein *et al.*, 2021; Vuohijoki *et al.*, 2025). In addition, both upcoming trends (value-based healthcare systems and the implementation of artificial intelligence) underline the dynamic and active

role of quality control in the field (Snowdon *et al.*, 2024).

Even with the growing interest in research, the literature is currently still uneven, with no evidence of low- and middle-income countries, and no comparative analyses across different healthcare systems. "Without measurement, there is no improvement", a principle that explains why recommended gaps should be resolved in quality control model development that is practical and flexible.

The objectives of this review are to summarize the current evidence on quality management of healthcare in the year 2021-2025, and critically assess the major domains identified: patient safety culture, accreditation, workforce, person-centered care, digital maturity, value-based models and describe the gaps and future directions that will support policy and practice as we make healthcare safer and more equitable.

MATERIALS AND METHODS

This review summarized the available evidence with both breadth and critical depth using a hybrid narrative-systematic methodology. Though this is not a complete systematic review, we added features that are structured so that it is transparent and reproducible.

Databases and Search Strategy

PubMed, Scopus, and Web of Science were searched intensively, as they were chosen due to the broad scope of peer-reviewed healthcare studies. The search terms were a combination of the keywords that were associated

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with quality control, patient safety, accreditation, staffing, digital maturity, and value-based healthcare. Studies that were eligible met the following criteria: English publication between 2021 and 2025 Published in refereed journals. Concentrated on quality control of healthcare, or patient safety, or improvement models References were filtered out based on being not peer-reviewed (e.g. conference abstracts, reports), not within the defined time range or not related to healthcare quality.

Study Selection Process

The initial search gave 68 records. Since the count of duplicates was eliminated, and the titles and abstracts have been screened, 22 full texts were estimated with regard to exclusion. Among these, 10 studies were selected that fit the inclusion criteria and were examined in the details. Figure 1 is a PRISMA flow diagram that was used to document the process.

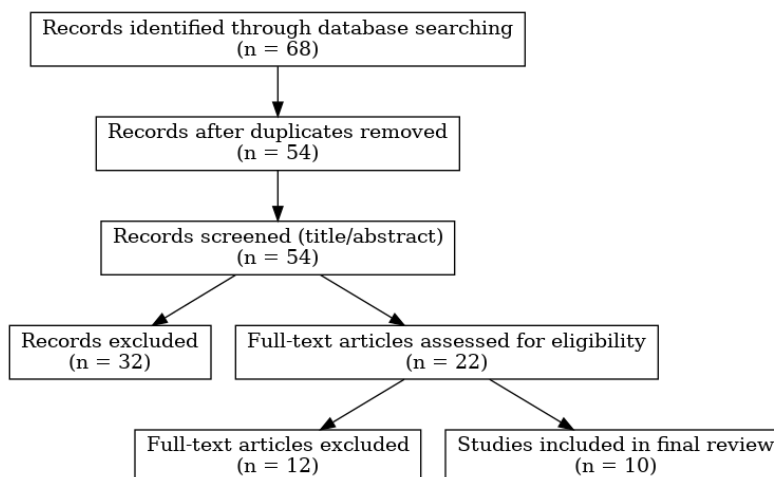


Figure 1: PRISMA flow diagram showing that the identification of the study, the screening and the eligibility assessment process were conducted and finally 10 studies were included in the review.

Data Synthesis and Extraction

Each of the studies was read and their main findings, author(s), year, and setting extracted as key information. Thematic groups of studies were organized in six areas: patient safety culture, accreditation, nurse staffing, patient-centered care, digital maturity, and value-based healthcare. Comparison synthesis was subsequently pursued to bring out the commonalities, differences and gaps in the domains of research.

LITERATURE REVIEW

Patient Safety Culture

Patient safety culture is the extent to which an organization's culture supports and promotes patient safety. It refers to the values, beliefs, and norms that are shared by healthcare practitioners and other staff throughout the organization that influence their actions and behaviors. Patient safety culture can be measured by determining the values, beliefs, norms, and behaviors related to patient safety that are rewarded, supported, expected, and accepted in an organization. It is also important to note that culture exists at multiple levels, from the unit level to the department, organization, and system levels. Modern discussion of the quality of health care has been concerned with patient safety culture because it represents the beliefs, values, and patterns of behavior that determine organizational dedication to patient safety. As has often been said, "safety culture is not what is written in policies, but what people do when no

one is watching." The effective safety culture is considered the key to decrease the number of mistakes, improve the communication between the healthcare practitioners, and build the trust with the patients. Alabdullah and Karwowski (2024) or Al-Jabri *et al.* (2021) are helpful in studying this area since both of them represent the perceptions of the whole world, as well as represent the regional peculiarities of the Middle East.

Alabdullah and Karwowski (2024) conducted a systematic review of the studies in hospital settings in different continents delivering one of the most comprehensive syntheses of patient safety culture to date. They found significant variations in the regions, with the relatively greater maturity of the safety culture reported in the hospitals of North America and Europe, and the lower maturity of the error reporting systems, focus on teamwork, and organizational support in the institutions of the developing world. This is the worldwide practice of emphasizing the reality that safety culture is a construct that is influenced significantly by the local aspects, cultural aspects, and systemic aspects.

To add this international picture, Al-Jabri *et al.* (2021) have focused on Oman healthcare facilities; in this research, they surveyed patients and the medical staff regarding the perceived quality of care and patient safety. Their findings revealed the communication pattern gaps, particularly among doctors and patients and the challenge associated with integrating the safety measures into the routine work activities. As the Institute of Medicine

once stated, “to err is human, but to fail to learn from error is inexcusable,” a notion clearly reflected in the Omani context where communication gaps limited the integration of safety practices. The Oman study was also a rich account of how the immediate environment of institutions and cultural values affected the view of safety, in contrast with the greater synthesis of the international settings conducted by Alabdullah and Karwowski (2024). The inclusion of both professional and patient perspectives helped the enrichment of the findings as it turned out that procedural compliance is often valued by professionals, whereas the patients placed a higher value on interpersonal communication and trust.

Comparing the two studies, a convergence and a divergence is found. The pillars of the culture of patient safety mentioned by both emphasise communication, teamwork, and organizational support. But the global synthesis by Alabdullah and Karwowski (2024) highlighted systemic problems, that is, leadership commitment and error-reporting infrastructure, whereas the Omani research by Al-Jabri *et al.* (2021) revealed micro-level problems, i.e. the day-to-day interaction between healthcare providers and patients. It is often noted that “what gets measured gets improved,” and both studies emphasize that robust measurement—whether at systemic or interpersonal levels—is essential to enhancing patient safety.

Irrespective of these contributions, there are significant gaps in the literature. Both the studies are predominantly cross-sectional in nature, which means they present a picture of the perceptions at one point in time. This reduces the possibilities to measure the changes in safety culture over time or to examine the effectiveness of interventions that are focused on improvement. Surveys are useful but are heavily reliant upon self-reported perceptions of reality, which do not indirectly tie to safety outcomes. What is missing are longitudinal studies which would consider how patient safety culture would evolve over time after we introduce deliberate and systematic interventions as well as mixed-method studies which would integrate perceptions with objective measures of safety outcomes.

This section proposes a stronger foundation of ‘patient safety culture’ as a multi-faceted construct that is dynamic and erodes (and is a function of) regional context, profession, and, patient perceptions. Although much of the research evidence is descriptive, the new evidence could develop from capturing cross-sectional surveys towards interventional and longitudinal study designs to begin to grow the evidence base and provide practical sense of direction for sustainable improvements.

Accreditation and Quality Improvement

Accreditation has been historically positioned as one of the fundamental pillars of quality assurance in the healthcare system. As noted widely, “accreditation is not merely a technical process but a symbolic commitment to continuous quality improvement”. Accreditation processes are thought to enhance patient safety,

organizational performance, and the population’s trust in the healthcare delivery because of an external assessment against established standards. Over the last years more attention has turned to the recognition of the impact of international and national accreditation campaigns, especially the Joint Commission International (JCI), on quality and safety in the organizational aspect of medical institutions.

Alhawajreh *et al.* (2023), Hussein *et al.* (2021), and Vuohijoki *et al.* (2025), are three of the most relevant contributions to this body of literature which highlight and impact on a variety of healthcare contexts. Alhawajreh *et al.* (2023) provided a systematic review of the effectiveness of hospital accreditation on quality improvement programs in general. They found that accreditation had the greatest association with improving adherence to clinical guidelines, organizational structure, and patient safety. Accreditation had improved training provided to staff, leader participation, and standardization of care across the accredited hospitals. It has been said that “accreditation works best when it becomes embedded in the organizational culture rather than treated as a one-off compliance exercise”. Interestingly, the review also identified accreditation as a catalyst for creating a culture of continuous improvement where there was a decision of the hospitals to take self-assessment and corrective action even though they had already completed the formal evaluation process.

However, Alhawajreh *et al.* (2023) also acknowledged that the evidence was generally stronger in high-income countries compared to low-income countries or regions where resources may not have been sufficient to meet accreditation requirements. Hussein *et al.* (2021) reported a systematic literature review about the effect of hospital accreditation on health care quality. The analysis was consistent with Alhawajreh *et al.* (2023) that accreditation programs posted generally enhanced patient safety, clinical performance, and organization efficacies. Hussein *et al.* (2021) also said, accreditation is an important factor in improving the collaboration of multidisciplinary teams, establishing more effective communication channels, and improving accountability in medical personnel. As one review puts it, “the strength of accreditation lies in its ability to institutionalize accountability and transparency”. However, they also warned that it should not be assumed that a uniform success can be expected, as the study designs and context are heterogeneous. The condition of the healthcare system maturity, the degree of the governmental support, and the infrastructure of the quality assurance mechanisms determined the results of accreditation.

Although the two reviews covered the overall quality and patient safety, Vuohijoki *et al.* (2025) concentrated on a narrower field, which is the effect of the JCI accreditation on occupational health and patient safety. They found that the systematic review revealed that JCI accreditation was linked to practical changes in the work safety levels of healthcare providers, such as decreased occupational

trauma and enhanced adherence to the health and safety procedures. The research also discovered that other patient safety indicators like reporting of medication errors and other indicators like infection control practices improved significantly after the accreditation. In this regard, “safe workplaces are inseparable from safe patient care,” which reinforces the dual benefit of accreditation for both staff and patients.

A review of these three studies reveals both the range and complexity of the influence of accreditation. Alhawajreh *et al.* (2023) and Hussein *et al.* (2021) provided strong evidence for general quality indicators improving and developing a culture of responsibility and collaboration post accreditation, whereas Vuohijoki *et al.* (2025) indicated an occupational health aspect that had not been significantly discussed previously. Overall, the studies imply that accreditation had multi-dimensional outcomes in influencing policies of an institution, the

professional practices of employees, and the safety of some patients and health care workers. However, in spite of these advances, the current evidence base is still not evenly constituted. The majority of studies were only drawn from high resource contexts, and it still remains unclear as to the efficacy of the findings based in low- and middle-income countries. As many scholars observe, “the cost of accreditation can itself be a barrier to equity and sustainability.” While immediate outcomes of accreditation tend to be better documented, long-term sustainability or cost-benefit analysis remains almost unimaginable when considering the considerable monetary and human resource opportunity cost associated with compliance.

To summarize the findings from these studies, Table 1 describes the main outcomes of accreditation noted across these studies divided between quality of care, patient safety, and occupational health effects.

Table 1: Reported outcomes of accreditation on quality, patient safety, and occupational health

Author(s), Year	Accreditation System	Outcomes on Quality	Outcomes on Patient Safety	Outcomes on Occupational Health	Limitations
Alhawajreh <i>et al.</i> (2023)	Mixed national and international systems	Improved compliance with guidelines, strengthened organizational structure	Enhanced staff training and standardized care	Not addressed	Evidence uneven across contexts; stronger in high-income countries
Hussein <i>et al.</i> (2021)	National and international systems	Better clinical performance, improved efficiency, stronger teamwork	Clearer communication and accountability	Not addressed	Heterogeneity in study designs and healthcare contexts
Vuohijoki <i>et al.</i> (2025)	JCI accreditation	Indirect improvement through better institutional policies	Enhanced medication error reporting and infection control	Improved occupational safety, reduced workplace injuries	Lack of longitudinal evidence on sustainability

Although the results were promising, there is a large gap in the literature. All three studies lacked the extensive information on the cost-effectiveness of accreditation, which is of great concern to the policymakers, particularly in resource limited setups. It is limited evidence on the sustainability of accreditation impacts. Improvements post-accreditation are often only short term and it is not known whether they persist in the long term. There is, therefore, a need to examine longitudinal studies and cost-effectiveness studies to examine whether accreditation is providing comparable value based on the requirement for the economic investment.

In brief, accreditation can be an effective but complex quality improvement tool in healthcare. The evidence presents value in relation to patient safety, organizational performance and occupational health. However, the existing literature tends to focus on high-income countries, relies on short term evaluations of accreditation, and predominantly neglects economic considerations.

Addressing these concerns is essential to developing accreditation models that are sustainable, cost-effective and equitable in different context of health systems.

Nurse Staffing/Impact Workforce

Accessibility, allocation, and sufficiency of nursing staff is one of the most significant factors of patient safety and quality of care in hospitals. The correlation between the level of nurse staffing and patient outcomes has been a long-standing debate over the decades, but the current evidence still proves that the staffing ratios are directly related to the adverse events which can be prevented, patient satisfaction, and their safety. In this respect, Griffiths *et al.* (2023) offer one of the most powerful and timely contributions and offer one of the strongest existing studies regarding the connection between nurse staffing and patient safety in acute hospitals in England. Griffiths and colleagues (2023) conducted a cross-sectional study and systematically measured the staffing

ratios of nurses working in acute care hospitals, and the relationship between patient outcomes and staffing was evaluated. Their results supported the ancient claim that inadequate staffing is associated with worse clinical outcomes, such as increased mortality, morbidity of hospital-acquired infections and occurrence of medical errors. In particular, the research has indicated that the incidence of adverse outcomes was much lower in hospitals with a greater nurse to patient ratio. This fact aligns with the past research (international) yet adds greater weight to the argument by providing more and more current and comprehensive information on a national level where the issue of staffing shortage has been increasingly becoming acute.

The fact that the study discusses the acute hospitals of England as a whole can be used to estimate the strengths of the Griffiths *et al.* (2023) study. Using a huge dataset, the researchers were able not only to record variability on a cross-hospital level, but also on the level of at least two or more hospital units. Using the example of the intensive care units, the associations between the staffing levels and the outcomes were stronger, whereas the effect was not as notable in the less acute wards. This implies that staffing is very important at any time but it becomes even more important in environments where the patients are in need of constant care, responsiveness to emergency, and or very complicated care needs.

The implications do not just have implications within the British context. Nursing staffing shortage is an international issue that is being worsened by the rise of aging and growing population, health care demands, and employee turnover. According to Griffiths *et al.* (2023), it should be kept in mind that the workforce shortage does not represent a logistics crisis, but a patient and health system performance safety issue. The study presents a perfect justification to the policy makers and the case supporting a workforce investment based on the established direct correlation between the nurse staffing and safety outcomes that can be utilized in the process of persuading individuals to focus on investments in the workforce as part of quality improvement.

When comparing the acute hospitals, the study also pointed out various differences between the acute hospitals which could retain the good staffing ratios and the acute hospitals which were struggling to meet the minimum requirements. The variations were usually associated with funding, resource distribution and organisation running of the organisation. The larger teaching hospitals were able to keep staffing levels at a better but the smaller district hospitals were at a disadvantage. Such a distinction means that staffing is not a clinical issue, but a structural issue that relies on the general standard of governance and resource distribution in the health system. Regardless of its contributions, the literature on nurse staffing has some major shortcomings. The evidence of the relationship between the staffing ratios and the outcomes in a high-resource environment is solid (Griffiths *et al.*, 2023), and the evidence base in low- and middle-income

countries is limited. Staffing issues in a large number of these settings are further aggravated by chronic under-investment, inadequate capacity to train their workforce, and low turnover rates, which is much more acute than in England or other high-income environments. However, there is a lack of strong empirical research to measure the impact of staffing of nurses in such settings on patient outcomes. Such a gap is a major weakness of the world evidence base because settings that are most vulnerable to shortages of the workforce are the least researched.

The other limitation is connected to the cross-sectional character of the study by Griffiths *et al.* (2023). Although the results are very strong indicators of the relationship between staffing ratios and patient outcomes, the design does not allow one to make a causal conclusion. The base of evidence would be further bolstered by longitudinal studies that follow changes in staffing over time and assess their effect on the indicators of patient safety. Also, we require intervention studies on the outcomes impact of intentional modifications in our staffing policy.

The key conclusion of Griffiths *et al.* (2023) is the extreme significance of patient safety in acute hospitals concerning the level of nurse staffing. Their findings are that the staffing in nurse units correlate with varied outcomes especially in high acuity units and that disparities in staffing are demonstrations of inequity in the healthcare systems as an aggregate. Nevertheless, there still are significant gaps particularly in relation to the numerous low-resource environments where the effects of staffing crisis may be most relevant. Such gaps will require subsequent literature, prolonged policy undertakings and global partnerships in order to ensure that safe staffing becomes a long-standing global norm of patient care and not just a luxury of funded systems.

Patient Centric Care and Quality Evaluation

Quality evaluation in this context focuses on patient-reported experiences and outcomes, such as understanding, communication, dignity, and the degree to which patient expectations are met, using standardized tools like the CAHPS surveys, to measure and improve the quality of the care experience. The concept of patient-centered care has become one of the pillars of quality assessment frameworks in the healthcare sector during the last few years. Compared to the previous models of quality, in which structural inputs and clinical outcomes were considered, patient-centered models are based on the lived experiences of the patients, and they lay emphasis on dignity, communication, respect, and shared decision-making. This paradigm change is particularly significant in the contemporary healthcare systems that are increasingly being assessed in relation to performance not just based on the clinical, but also based on the degree in which the care is responsive to patient values and expectations, and to their satisfaction.

The study by Guzmán-Leguel and Rodríguez-Lara (2025) in this field is both timely and holistic offering empirical information on the use of the narratives about

patient experience and patient satisfaction as useful tools in monitoring the quality of healthcare services. They discovered that traditional levels of surveys are insensitive to the nuances of patient experience, such as trust perceptions, empowerment and empathy during the care encounter. Guzmán-Leguel and Rodríguez-Lara (2025) focus on the qualitative aspects of the evaluation methods that are not directly based on the numeric scale of satisfaction rate. The ability to evoke, in varying patients and diverse health care settings, the way individuals perceive or see things is considered one of the most useful lessons learned in this study. In their commentary, the authors have established that patients do not have a universal experience and perception of healthcare and that such factors as the socio-cultural context, previous experiences, and the type of their health conditions can change their perceptions. Use the acute care patients as an example since they are generally influenced by timeliness and responsiveness and the chronic care patients may be influenced by continuity, care coordination and emotional support. The ability to isolate these forms of care and the aspects that influence patients demands an assessment strategy that is not rigid, socially-sensitive and in a position to accommodate both narrative and quantitative information. The second interesting input that the research by Guzmán-Leguel and Rodríguez-Lara (2025) has introduced is the determination of the differences between institutional quality measures and patient perceptions. Even there are hospitals, whose clinical quality ratings are good, but overall that are rated low, due to the fact that they have overlooked interpersonal care variables. This disconnection demonstrates that the placement of patient voices alongside quality measurement are an equally significant principle opposing not only marginal to quality assessment, but rather, being in the middle of quality measurement indicators. Patient experience gives information on those areas of care that directly influenced patient satisfaction and adherence, Are their autonomy was respected? And was there effective communication and the providers cultural competence? On a larger scale, the patient-centered care literature demonstrates that there continue to be difficulties in the creation of standardized international measures of patient experience and satisfaction. On the one hand, the idea of integrating the narratives presented by Guzmán-Leguel and Rodríguez-Lara (2025) seems quite reasonable but, on the other hand, the authors admit that the universality of the results in different countries and health systems is limited because there are no universally accepted frameworks. As one example; instruments created in high-income environments might not give enough attention to the priorities of patients in the low- and middle-income nations, where the problems of access, affordability, and general dignity may take precedence over the issue of personalization of care. It is this variability that impedes the attempt to benchmark patient-centered quality at international levels. Although patient-centered care has gained widespread

support in policy and rhetoric, the systematic implementation of patient-centered care is still largely a fragmented body of evidence. A majority of the research, such as Guzmán-Leguel and Rodríguez-Lara (2025), is only confined to a country or region. There are hardly any cross-national comparative studies, and there are not many longitudinal studies which can assess the impact of patient-centered initiatives on the outcomes over time. This is a serious gap in the literature because of the absence of standardization and longitudinal data.

The implication of patient-centered care in the quality assessment systems is not only a conceptual leap but also a practical requirement of current health care systems. Guzmán-Leguel and Rodríguez-Lara (2025) show that patient narratives are unconventional and add value to the standard measures, yet the presence of an absence of internationally standardized measures is still a challenge in the field. To fill this gap, international cooperation will be needed to come up with the flexible and yet similar tools that recognise cultural variation and promote a unified system of quality measurement in the perspective of the patient.

Data Quality and Digital Maturity

The company maintains strong data quality, which is essential for sustained and profitable operations. Data Quality and Digital Maturity Data Quality: The company has good quality data, which is necessary to ensure long-term profitable operations.

The increasing adoption of digital health systems has made data quality and digital maturity some of the key elements of healthcare quality measurement. The availability of data is not the only crucial factor that determines effective clinical decision-making, but its completeness, accuracy, timeliness, and interoperability are also important. Medical errors, care delivery inefficiencies, and impaired patient safety have always been directly or indirectly associated with poor quality of data. On the other hand, good-quality data enables clinicians and administrators to track performance, determine risks, distribute resources more efficiently, which leads to better patient outcomes and organizational responsibility.

Hosseinzadeh *et al.* (2025) is the most extensive study of data quality evaluation conducted in health systems. Their findings indicated that the stringent process of data validation including measures of completeness, and using standardized code set, are very effective in reducing diagnostic delays and improving accountability of performance measures. Hosseinzadeh *et al.* (2025) have been clear that, when considering data quality, it is not sufficient to only assess the accuracy of data because data quality has many dimensions. They created a framework to evaluate several dimensions in their context including data consistency across platforms, timeliness of data entry and relevancy to clinical use. Even in the hospitals that had a formal data quality audit, Hosseinzadeh *et al.*, noted that the clinicians trust in digital systems improved

from their audits which decreased the number of errors in documentation. Trust in the systems subsequently increased the use of evidence-based decision making by clinicians. Snowdon *et al.* (2024) have expanded knowledge of the relationship between digital maturity and safety outcomes by looking at the effect of level of digital capability on patient safety in hospitals with different levels of infrastructure. Their findings determined that patient safety outcomes were always comparatively better in organizations with greater digital maturity, defined as having an integrated electronic health record (EHR), an advanced analytics capability, and having that data interoperate across departments. E.g., hospitals that had high-quality clinical decision support systems had a

lower adverse drug event rate and smaller clinical practice variance. It was also discovered that digital maturity was a powerful indicator of organizational resilience, which slowed recovery and response to safety events.

Figure 2 is a conceptual map that characterizes this relationship by depicting the path between the digital maturity and patient safety via the mediating variable of data quality. With digital infrastructure, interoperability, and workforce digital literacy investment, hospitals are in a better situation to create reliable data, which in its turn will inform safer clinical decisions and better care delivery. This model emphasizes the value of considering digital maturity and data quality as mutually reinforcing components of a comprehensive approach to quality of healthcare.

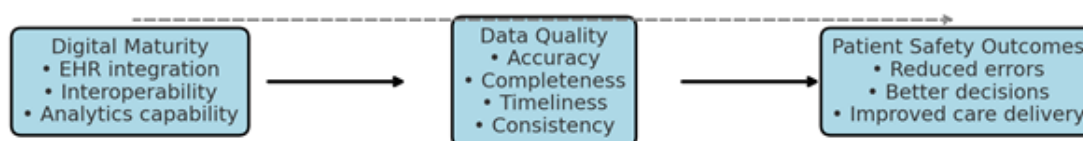


Figure 2: Conceptual framework demonstrating the connection between digital maturity and patient safety outcomes through data quality as a mediating factor.

However, with these developments a number of holes still exist in the literature. Although both Hosseinzadeh *et al.* (2025) and Snowdon *et al.* (2024) offer very useful information, the artificial intelligence (AI) and machine learning (ML) application into the data quality assessment is understudied. The existing systems are mostly dependent on the manual audits and rule-based checks that are resource-demanding and subject to human errors and omissions, though they are more efficient. The possibilities of AI and ML-based solutions are to detect anomalies, biases, and validate large-scale data in real-time. There is little empirical evidence of how they have been methodically integrated into healthcare systems, however. This gap is especially critical to be addressed now that health systems produce exponentially growing amounts of data based on electronic records, wearables, or other remote monitoring platforms.

Altogether, as shown by Hosseinzadeh *et al.* (2025) and Snowdon *et al.* (2024), data quality measurement and digital maturity are a top priority in enhancing the quality of healthcare and patient safety. Although hospitals with developed digital systems have better results, the sustainability of the results will be based on the introduction of new AI-based methods to guarantee ongoing, accurate, and real-time data verification.

Healthcare Models on Values

Value-based healthcare (VBHC) is a paradigm shift of the previous volume-based service delivery towards the models that focus on the outcomes relative to the costs. The idea of patient-centered outcomes and the alignment of incentives among healthcare providers can enable VBHC to make efficient, higher-quality, and more effective use of resources. The past few years have seen an increase in the interest regarding the adoption

of VBHC, yet the implementation of the concept is still mostly limited to the high-income countries, where the structured infrastructures and financing systems are already in place.

The research by Westernink *et al.* (2024) contributes to the evidence base since it examines multidisciplinary team performance focused on VBHC implementation in the Netherlands. The authors emphasized that burning and catalysts such as the capacity of teams are critical to effective implementation because clinicians from different specialties will be asked to work together toward common outcome measures. Their results showed that multidisciplinary teams who adopted VBHC models had improved communication channels, less duplication of service, and smoother patient care channels. Their research provides evidence that outcome based monitoring networks provided actionable information that allowed hospitals to identify areas of inefficiency and redirected resources to the interventions that benefitted patients the most.

The use of standardized measures of performance, in this case complication rates, recovery times, and patient-reported outcome measures (PROMs) were one of the core elements of the Dutch model as introduced by Westernink *et al.* (2024). These measures encouraged transparency through the use of performance metrics, and provide accountability to providers. Multidisciplinary teams also indicated an increased job satisfaction since they were able to clearly relate their work in a team to improvements with patient outcomes. The quantitative analysis of the study showed that those hours of service that encompassed the elements of VBHC recorded a measurable increase in efficiency and less variation in the provision of care, along with a higher level of patient satisfaction, than those hours of service that were still

using traditional service-based models.

Table 2 summarizes the results of the VBHC implementation, it includes quality of care, cost management and teamwork. The evidence is a useful

way of emphasizing the potential of VBHC, which is quite radical, particularly with a sound performance measurement framework and the cultural readiness of clinical teams.

Table 2: Outcomes of value-based healthcare implementation

Outcome Domain	Findings from Westerink <i>et al.</i> (2024)	Implications
Quality of Care	Reduction in complication rates; improved recovery times; enhanced PROMs	Higher patient satisfaction and trust in providers
Efficiency and Resource Use	Decreased duplication of services; streamlined care pathways	More cost-effective use of hospital resources
Team Collaboration	Stronger multidisciplinary cooperation; shared accountability for outcomes	Improved communication and reduced clinical variation
Cost Management	Outcome-driven allocation of resources; cost savings in long-term treatment	Potential sustainability of VBHC models
Professional Satisfaction	Increased clinician engagement and job satisfaction under outcome-linked systems	Better workforce retention and performance

The literature indicates that there is a significant disparity in the universalization of VBHC models, despite these positive findings. The application is not as widespread in non-higher-income countries, mainly because of structural barriers, including poor financing systems, low health information infrastructure, and limited training of medical workers on the use of outcomes. The low and middle-income countries have other issues regarding the resources scarcity and other health priorities, which disrupt the sustainability of the VBHC initiatives. Besides, in the high-income context, problems with expanding VBHC frameworks past pilot programs and their cost-effectiveness over time in complicated healthcare settings remain.

Overall, the results provided by Westerink *et al.* (2024) show that VBHC can facilitate the use of considerable improvements in clinical and organizational outcomes in case of being implemented by means of multidisciplinary interaction and formalized performance measures. the unequal introduction of this model to the health systems of the world indicates that additional studies on flexible frameworks that consider variability in resources and different contexts of healthcare are urgently required.

RESULTS AND DISCUSSION

Ten studies were incorporated into the review (Figure 1). Their thematic allocation points to a greater theme of accreditation and patient safety culture than other

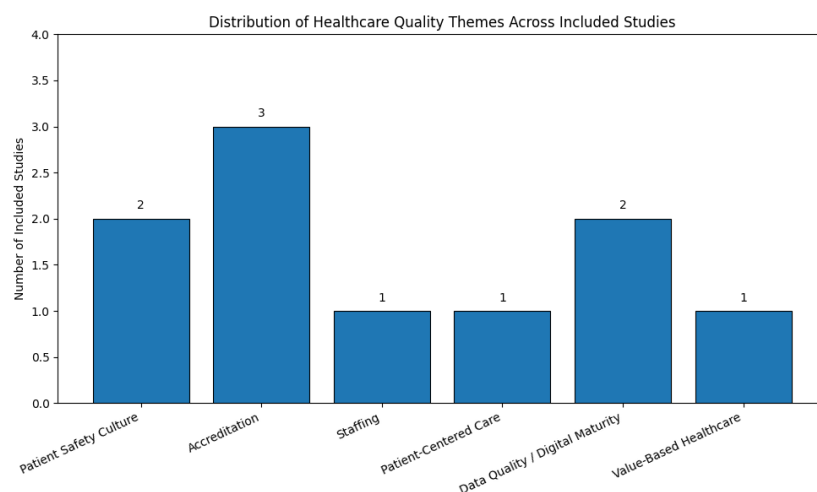


Figure 3: Themes related to health care quality across the ten included studies outlined in this review categorized into patient safety culture, accreditation, staffing, patient centered care, data quality/digital maturity, and value-based health care.

themes, like staffing or value-based care (Figure 3).

This review synthesized ten peer-reviewed articles published in 2021-2025 that addressed a wide range of thematic areas of healthcare quality, patient safety,

accreditation, workforce management, patient-centered care, data quality, and value-based models. Together, the pieces of research allow us to have a multidimensional perspective of what drives healthcare quality

improvement.

A key theme that comes out after reviewing the literature is the need to develop a powerful patient safety culture. The experience in Oman indicates that safety culture is still a key driver of good performance, but the lack of progress is still evident due to underreporting of negative incidents and disjointed safety policies (Al-Jabri *et al.*, 2021). A more current study focuses on the multidimensionality of safety culture by connecting organizational, professional and systemic elements with patient safety outcomes but outlines the absence of longitudinal and intervention studies (Alabdullah and Karwowski, 2024). All these researches contribute to the significance of ongoing cultural change and technical safety programs.

Quality improvement frameworks and accreditation also became important levers used to improve the healthcare standards. Joint Commission International (JCI) accreditation has been linked with enhanced adherence to safety measures and a positive clinical outcome in the introduction to the Middle East hospitals, but its sustainability is a controversial topic (Hussein *et al.*, 2021). Likewise, national accreditation systems, including those considered in Jordan, were identified to stimulate structural and process-level changes, although there was little evidence about their sustainability over time in terms of their effect on occupational health and financial sustainability (Alhawajreh *et al.*, 2023). Continuing on this topic, a European study found accreditation improved any systemic quality by promoting professional accountability and interprofessional collaboration, and further support accreditation as a systemic quality improvement tool (Vuohijoki *et al.*, 2025). The research faces an obstacle because it lacks proper cost-effectiveness analysis which prevents policymakers from making informed decisions when resources are limited.

The healthcare system depends on workforce and staffing ratios as one of its fundamental quality standards. The 2023 study by Griffiths and his colleagues confirmed the fact that improved patient outcomes such as reduced mortality and fewer avoidable healthcare complications occur due to better nurse-to-patient ratios in acute hospital environments. Although it provides evidence of the strong association between the healthcare delivery system and the high-income setting, the scientific base of staffing deficiency and resource-prompted issues is limited in low-income and middle-income countries (LMICs). This is a sphere which demands locational and context oriented workforce plans and flexible staffing paradigms.

Guzmán-Leguel and Rodriguez-Lara (2025) explained that patient stories are critical in demonstrating those experiences that are not normally measured by traditional measures of patient centered care. Their input shaped the differences in patient expectations with regards to quality of care and how much patient satisfaction measures based on standardized and internationally validated measures are needed. In the absence of standardized and valid indicators of patient satisfaction, cross-

country comparisons would not be feasible, and that is most important to the global agenda relating to patient centered healthcare.

The new importance of digital maturity and data-driven decision-making also re-placed the quality discourse in the healthcare systems, as more advanced levels of digital maturity proved very effective predictors of improved safety outcomes through better information management and clinical choice assistance (Snowdon *et al.*, 2024).

In addition to this, Hosseinzadeh *et al.* (2025) had found that the systematic data quality assessment increased the efficiency of the clinical performance monitoring and decision-making. However, both articles found the absence of an implementation of more sophisticated artificial intelligence (AI) and machine learning (ML) solutions in standard validation procedures as a research gap that requires immediate research.

Lastly, value-based healthcare (VBHC) models have been promising to match the performance of multidisciplinary teams with patient-centered outcomes. Westerink *et al.* (2024) revealed that the implementation of VBHC resulted in better coordination, accountability, and efficiency in delivering care and hence better quality and cost-effectiveness. Although these results are positive, the review also shows that VBHC is still predominantly limited to the high-income nations, with fewer instances of it being used in LMICs because of the infrastructural and financial limitations.

In general, the conclusions about findings in these thematic areas demonstrate a number of similarities. Good patient safety cultures, solid accreditation systems, sufficient staff to patient ratios, valuable patient interactions, quality data, and value-driven models have been continually linked to better outcomes. Nevertheless, contradictions also arise, especially with sustainability of accreditation, variability of patient satisfaction measures and generalization of workforce results to the resource-limited environments.

The policy and practice implication are also obvious. The policies to be adopted by policymakers include focusing on institutionalizing patient safety cultures, achieving accreditation even beyond compliance with continuous learning, long-term workforce planning, patient stories into standardized measures, and rapid digital transformation. There are highly important gaps to be filled in future studies, such as cost-effectiveness studies of accreditation, longitudinal studies of patient safety culture, workforce research in LMICs, and the implementation of AI-based data quality systems.

Concrete evidence was found across all thematic synthesis, as mentioned in Table 3, that endorses the beneficial influence of safety culture, accreditation, workforce adequacy, patient engagement, digital maturity, and value-based care. But there are still gaps in the areas of sustainability, cost-effectiveness, and generalization to low-resource contexts.

Figure 4 provides a comparative picture of the relative impacts of nurse staffing, data quality, and digital maturity

Table 3: Overview of included studies: settings, main findings and gaps.

Author(s), Year	Setting	Methodology	Key Findings	Identified Gaps
Al-Jabri <i>et al.</i> (2021)	Oman	Cross-sectional survey	Highlighted importance of patient safety culture, underreporting of incidents	Lack of longitudinal research
Alabdullah & Karwowski (2024)	Global	Conceptual/empirical analysis	Multidimensional model of patient safety culture	Limited intervention-based studies
Hussein <i>et al.</i> (2021)	Middle East hospitals	Accreditation impact study	JCI linked to improved compliance and outcomes	Weak evidence on sustainability
Alhawajreh <i>et al.</i> (2023)	Jordan	Accreditation evaluation	National accreditation improved structures and processes	Limited cost-effectiveness evidence
Vuohijoki <i>et al.</i> (2025)	Europe	Mixed-method study	Accreditation enhanced collaboration and accountability	Lack of financial outcome data
Griffiths <i>et al.</i> (2023)	Acute hospitals (UK/Europe)	Quantitative outcomes study	Higher nurse staffing ratios → lower mortality, better outcomes	Insufficient LMIC data
Guzmán-Leguel & Rodríguez-Lara (2025)	Latin America	Narrative qualitative study	Patient narratives provided nuanced view of satisfaction	Absence of standardized global metrics
Snowdon <i>et al.</i> (2024)	Multi-country	Digital maturity assessment	Digital maturity predicted safety outcomes	Limited integration of AI tools
Hosseinzadeh <i>et al.</i> (2025)	Healthcare systems (Iran)	Data quality assessment	Stronger data governance improved decision-making	Need for ML-based validation
Westerink <i>et al.</i> (2024)	Netherlands	Case study in VBHC	Value-based care improved coordination and cost-effectiveness	Limited adoption outside HICs

on important patient safety outcomes. The findings indicate that, although staffing is still vital for avoiding errors, digital maturity and data quality have greater contributions to decision making and patient satisfaction.

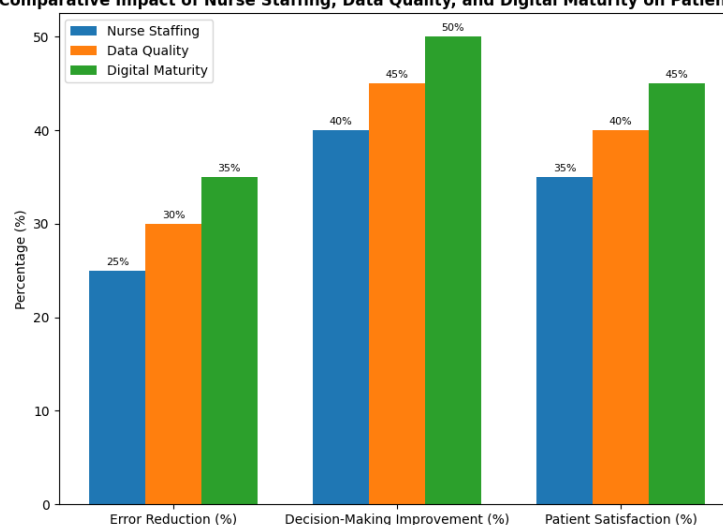
Comparative Impact of Nurse Staffing, Data Quality, and Digital Maturity on Patient Safety

Figure 4: Level of nurse staffing, quality of data and level of digital maturity in relation to patient safety outcome (reducing errors, promoting improved decision making and enhancing patient satisfaction)

Figure 5 presents a stacked representation of the total impact of nurse staffing, data quality, and digital maturity on patient safety outcome. It demonstrates how, in the

majority of patient safety outcome categories, particularly decision-making and patient satisfaction, digital maturity usually has a greater overall impact.

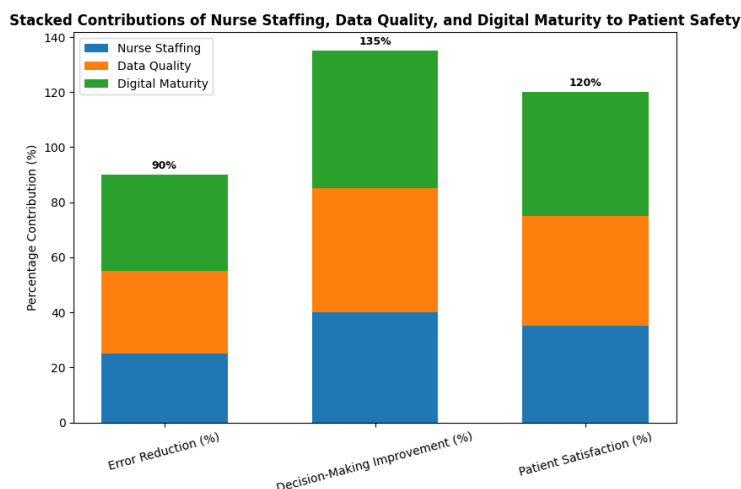


Figure 5: shows the stacked effects of digital maturity, data quality, and nurse staffing on patient safety outcomes.

The starting values for each factor across different outcome areas are shown in Figure 4's initial results, but Figure 5 shows these values as the total factor contributions across all outcome domains.

CONCLUSION

The analysis shows that the healthcare quality control is viewed as a multifaceted system that is influenced by cultural factors and organizational frameworks and staffing processes and technological improvements. The practice demonstrates that the patient safety culture combined with accreditation models and sufficient nursing staff and digital preparedness and patient-focused treatment results in the enhanced patient outcome and enhanced system functionality. The evidence base available today is biased in its results. The accreditation systems produce immediate benefits that researchers are yet to examine with regards to their long-term effect and financial value. High income countries keep a close association between the staffing of nurses and the safety outcomes but the countries of low and middle income do not have enough evidence to support this connection. There are no global uniform evaluation tools of patient-centered programs, and this poses significant challenges when trying to make comparisons of various programs. Digital maturity and data quality are important components of safety that organizations have to rely on but less development has been made in terms of adopting artificial intelligence materials in quality systems.

Overall, the quality control of healthcare is in need of the interdisciplinary system that involves the cultural change and integration of structural changes and digital advancement and outcome-based assessment schemes. The future research area should be based on longitudinal studies and cost-effectiveness analysis of accreditation and comparative research in LMICs and systematic

integration of AI tools. These guidelines are key instruments to developing healthcare systems that would become more sustainable and fair to all around the globe.

Limitations

Throughout its structure, this analysis has several limitations. Since this method might have overlooked crucial information from earlier periods and foreign-language sources, the research selection process started by selecting studies that were published in English within the previous five years. Second, only ten studies were used to develop the synthesis, which limits the broad applicability of the findings. Third, the majority of the studies in the review relied on cross-sectional or self-report data, which may not be the most effective means of determining causal relationships or long-term effects. Finally, it may be impacted by publication bias and design heterogeneity, just like the majority of narrative systematic reviews. When reading and developing future research agendas, it is important to keep these limitations in mind.

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