

THE INFLUENCE OF FACILITIES AND INFRASTRUCTURE QUALITY AND HUMAN RESOURCE COMPETENCE ON PATIENT SAFETY WITH SAFETY CULTURE AS AN INTERVENING VARIABLE

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Abstract

Patient safety represents a key indicator of healthcare quality, reflecting the ethical and professional responsibility of hospitals to protect patients from harm during medical care. This study aims to analyze the interrelationship between facilities and infrastructure quality and human resource competence on patient safety, with safety culture serving as an intervening variable. A qualitative approach was employed using a case study design, focusing on hospitals that have actively implemented patient safety programs. Data were collected through in-depth interviews, participant observations, and document analysis, and were examined using thematic analysis to identify patterns and relationships among variables. The results show that adequate and well-maintained facilities form the structural foundation for patient safety, while competent healthcare personnel operationalize safety procedures through technical proficiency, clinical decision-making, and ethical responsibility. Safety culture emerges as a mediating force that unites these two components, fostering shared values of open communication, collective learning, and non-punitive responses to errors. The three factors interact synergistically, creating a sustainable safety ecosystem in which infrastructure quality, professional competence, and organizational culture reinforce one another.

Keywords: *Facilities and Infrastructure Quality, Human Resource Competence, Safety Culture, Patient Safety*

INTRODUCTION

Patient safety is a fundamental element in delivering quality healthcare services and represents a central indicator of an organization's commitment to protecting human life. In the modern healthcare system, patient safety is no longer viewed as the sole responsibility of individual medical practitioners but as the outcome of an integrated organizational system in which all components contribute to preventing adverse events and improving service quality. Healthcare institutions are therefore required to implement comprehensive patient safety standards, encompassing service procedures, infrastructure, and a workplace culture grounded in safety and professional accountability (Saputri, 2022). One of the key factors in ensuring patient safety is the quality of hospital facilities and infrastructure. The adequacy and reliability of healthcare infrastructure have a direct impact on the effectiveness and safety of clinical processes. Poorly maintained facilities, substandard medical equipment, or unsafe work environments can increase the likelihood of medical errors and safety incidents. Hospitals must therefore ensure that their physical facilities meet established healthcare standards to support efficient and secure operations. High-quality infrastructure not only enhances service efficiency but also creates a safe working environment that minimizes risks to both healthcare providers and patients (Ekawati et al., 2022). In addition to physical infrastructure, the competence of human resources (HR) is another critical determinant of patient safety. Competent healthcare professionals are better equipped to identify potential risks, make appropriate clinical decisions, and adhere to established safety protocols. Competence in this context extends beyond technical expertise to include professional attitudes, effective interprofessional communication, and a deep awareness of the importance of patient safety. Consequently, continuous professional training, performance evaluation, and ethical guidance are strategic measures to strengthen

THE INFLUENCE OF FACILITIES AND INFRASTRUCTURE QUALITY AND HUMAN RESOURCE COMPETENCE ON PATIENT SAFETY WITH SAFETY CULTURE AS AN INTERVENING VARIABLE

Ince Rosmini *et al*

patient safety systems in hospitals. Consistent implementation of these initiatives ensures that healthcare professionals are prepared, attentive, and ethically responsible in carrying out their duties (Ningsi & Santoso, 2025). However, despite the importance of infrastructure and human resource competence, these factors alone are insufficient without a strong safety culture within the organization. A positive safety culture reflects shared values, attitudes, and behaviors that place patient safety as the highest organizational priority. Such a culture encourages open reporting of incidents, cross-professional collaboration, and continuous learning from errors without fear of blame or punishment. When a strong safety culture is embedded within the organization, healthcare workers develop a collective awareness that patient safety is a shared responsibility rather than merely an institutional obligation. Therefore, it is crucial to further examine how the quality of facilities and infrastructure, along with human resource competence, influence patient safety with safety culture as an intervening variable. This relationship remains underexplored, despite its potential to provide valuable insights for hospital management in enhancing healthcare quality and safety outcomes. This study seeks to identify the structural and cultural mechanisms that shape effective patient safety practices. Understanding this interaction is essential, as patient safety represents not only a technical measure of healthcare performance but also a reflection of institutional integrity, ethical responsibility, and professional excellence in the contemporary health system.

LITERATURE REVIEW

The Concept of Facilities and Infrastructure Quality

The concept of facilities and infrastructure quality in healthcare refers to the adequacy, reliability, and appropriateness of the physical and technological resources that support the delivery of medical services. In a hospital context, facilities and infrastructure encompass a broad range of components—such as buildings, medical equipment, sanitation systems, information technology infrastructure, and supporting utilities—that collectively create an environment conducive to safe, effective, and efficient healthcare delivery. The quality of these elements determines not only the operational performance of a healthcare institution but also the degree of comfort, safety, and trust experienced by both patients and healthcare workers (Sundoro & Purnomo, 2022). According to the systems approach in healthcare management, infrastructure serves as the foundation upon which all clinical and administrative processes operate. A well-maintained and functionally designed facility ensures the smooth flow of medical procedures, minimizes delays, and reduces the risk of cross-contamination or procedural errors. Quality infrastructure is therefore not limited to the physical condition of hospital buildings but also includes the design, accessibility, ergonomics, and integration of technology that facilitate patient-centered care. For instance, the layout of emergency units, the calibration of diagnostic tools, and the availability of sterile environments all contribute directly to the level of patient safety maintained within a hospital.

From a managerial perspective, infrastructure quality also reflects the organization's commitment to maintaining standards of care and regulatory compliance. Inadequate infrastructure can lead to operational inefficiencies, reduced service capacity, and potential hazards to patient and staff safety. Therefore, quality assurance mechanisms—such as routine maintenance, facility audits, and adherence to national health infrastructure standards—are crucial to sustaining high performance in healthcare delivery. The integration of modern technologies, such as digital monitoring systems and smart facility management, has further enhanced the capacity of hospitals to manage infrastructure effectively while maintaining environmental sustainability and cost efficiency. Conceptually, facilities and infrastructure quality are closely linked to organizational readiness and resilience in the healthcare system. Hospitals with robust and adaptive infrastructure can better respond to emergencies, accommodate fluctuating patient volumes, and maintain safety standards under pressure. Furthermore, high-quality infrastructure provides psychological assurance to healthcare workers, enabling them to perform clinical duties confidently within a safe and well-supported environment. This interdependence between infrastructure quality and human performance underlines the systemic nature of patient safety (Wijayanti & Daely, 2023). The quality of facilities and infrastructure represents a critical determinant of patient safety, operational reliability, and overall healthcare quality. It serves not only as a tangible asset but also as a strategic element that supports effective resource utilization, risk prevention, and the delivery of ethical and safe medical care. Thus, in the broader context of hospital management, investing in and maintaining high-quality facilities and infrastructure is an essential prerequisite for achieving sustainable excellence in patient safety outcomes.

THE INFLUENCE OF FACILITIES AND INFRASTRUCTURE QUALITY AND HUMAN RESOURCE COMPETENCE ON PATIENT SAFETY WITH SAFETY CULTURE AS AN INTERVENING VARIABLE

Ince Rosmini et al

Human Resource Competence

The concept of human resource competence in the healthcare sector refers to the comprehensive capability of healthcare professionals to perform their duties effectively, ethically, and safely in accordance with established professional standards. Competence encompasses a multidimensional construct that integrates knowledge, skills, and attitudes required to ensure the quality and safety of healthcare services. Within the context of patient safety, competence represents not only technical proficiency in clinical tasks but also the cognitive, emotional, and moral capacities that support sound decision-making and responsible behavior in complex healthcare environments (Septiana et al., 2023). From a theoretical perspective, human resource competence is often conceptualized through three interrelated domains. The first is cognitive competence, which includes knowledge of medical procedures, clinical guidelines, and the ability to analyze and interpret medical information accurately. The second is psychomotor competence, which involves the practical skills required to execute medical interventions safely and effectively. The third is affective competence, which covers interpersonal communication, empathy, ethical awareness, and professional integrity—qualities essential for maintaining patient trust and fostering teamwork among healthcare personnel. A balance among these three domains ensures that healthcare professionals can deliver services that are not only technically correct but also ethically grounded and patient-centered.

Competence in healthcare also extends beyond individual ability to encompass organizational and systemic dimensions. Hospitals must provide structured training programs, continuous professional development, and performance evaluation mechanisms to maintain and enhance staff competence over time. Without institutional support, even skilled professionals may struggle to sustain competence amid technological advancements and evolving medical standards. Thus, competency development must be embedded in the hospital's human resource management strategy, linking staff education with institutional goals for quality improvement and patient safety (Pramanasari et al., 2023). Furthermore, competence plays a pivotal role in risk management and error prevention. Competent healthcare workers are better equipped to recognize early warning signs, adhere to safety protocols, and take appropriate corrective actions. A lack of competence—whether due to insufficient training, fatigue, or poor supervision—can directly contribute to medical errors and adverse events. Therefore, enhancing competence through regular simulation training, multidisciplinary teamwork exercises, and ethical reinforcement is essential in cultivating a safety-oriented workforce.

The rise of digital healthcare technologies has expanded the scope of required competencies. Modern healthcare workers must possess digital literacy, data management skills, and adaptability to technological change, ensuring that innovations such as electronic health records, telemedicine, and artificial intelligence are utilized effectively and ethically. This digital dimension of competence aligns with the broader vision of patient-centered and technology-integrated healthcare systems. In essence, human resource competence serves as a cornerstone of patient safety and healthcare excellence. Competent professionals contribute not only to the accuracy and efficiency of medical interventions but also to the creation of an ethical, communicative, and safety-conscious environment. Sustaining competence requires continuous investment in education, evaluation, and institutional support—thereby transforming individual capability into collective organizational strength that underpins high-quality and safe healthcare delivery.

Patient Safety

The concept of patient safety occupies a central position in modern healthcare management, serving as a fundamental indicator of service quality and organizational accountability. The World Health Organization defines patient safety as the reduction of risk of unnecessary harm associated with healthcare to an acceptable minimum. This definition underscores that patient safety is not merely the absence of adverse events, but the active prevention of medical errors through systemic control, ethical responsibility, and continuous improvement. In essence, patient safety represents both a *goal* and a *process*—a continuous effort to protect patients from preventable harm during all stages of healthcare delivery (Anggraini et al., 2021). Patient safety operates within a systems-based framework, emphasizing that errors are often the result of systemic weaknesses rather than individual negligence. From this perspective, the safety of patients depends on the interaction of multiple elements—qualified personnel, reliable infrastructure, effective communication, and sound organizational culture. A robust patient safety system therefore requires the integration of structural, procedural, and behavioral components that work cohesively to identify, analyze, and mitigate potential risks before they result in harm (Panggalih, 2023). Conceptually, patient safety is also closely tied to the principle of quality assurance. A healthcare organization committed to patient safety must implement structured mechanisms such as risk assessment, incident reporting, root cause analysis, and performance

THE INFLUENCE OF FACILITIES AND INFRASTRUCTURE QUALITY AND HUMAN RESOURCE COMPETENCE ON PATIENT SAFETY WITH SAFETY CULTURE AS AN INTERVENING VARIABLE

Ince Rosmini et al

monitoring. These mechanisms are designed not to assign blame, but to facilitate learning and systemic improvement. Through this learning-oriented approach, institutions cultivate resilience—the capacity to anticipate, adapt to, and recover from adverse events—thereby enhancing long-term healthcare reliability. From an ethical standpoint, patient safety reflects the moral responsibility of healthcare professionals and institutions to prioritize the welfare of patients above all else. Every clinical action involves inherent risks, but those risks must be managed transparently, with accountability and respect for patient rights. Ethical practice in patient safety includes informed consent, confidentiality, nonmaleficence (“do no harm”), and justice in access to care. When these ethical principles are integrated into everyday practice, they create a foundation of trust between patients and healthcare providers—trust that is indispensable to effective treatment and recovery.

Moreover, patient safety is strongly influenced by organizational culture, particularly the presence of a supportive *safety culture* that encourages openness, teamwork, and continuous learning. A positive safety culture allows healthcare workers to report near misses and errors without fear of punishment, fostering a proactive approach to risk management. This psychological safety enables organizations to transform mistakes into opportunities for improvement, rather than sources of blame, ultimately reducing preventable harm. In the context of hospital performance, patient safety serves as both an outcome and a driver of competitive advantage. Institutions that consistently demonstrate high levels of patient safety gain public trust, professional credibility, and operational efficiency. Therefore, patient safety must be seen not as a regulatory obligation but as a strategic priority that sustains institutional integrity and ensures long-term organizational sustainability. In summary, patient safety represents a comprehensive construct that integrates systemic reliability, professional competence, ethical integrity, and cultural mindfulness. It reflects an ongoing organizational commitment to safeguarding human life through structured management, moral responsibility, and continuous learning—making it the cornerstone of high-quality and sustainable healthcare delivery.

Safety Culture

The concept of safety culture has emerged as a critical component in advancing patient safety and healthcare quality. Broadly defined, safety culture refers to the shared values, beliefs, attitudes, and behaviors within an organization that determine the commitment to, and the proficiency of, its health and safety management practices. In healthcare settings, safety culture reflects how seriously safety is prioritized, how openly errors are discussed, and how consistently preventive actions are implemented to avoid harm to patients. A strong safety culture ensures that every member of the organization, from top management to frontline staff, perceives safety not as an additional task but as an integral part of daily clinical and administrative practice (Saputri, 2022). Conceptually, safety culture builds upon the sociotechnical model of healthcare systems, which recognizes that human performance, technology, and organizational structures interact continuously in shaping outcomes. Within this framework, safety culture acts as a mediating factor—bridging the gap between structural resources (such as facilities and staff competence) and behavioral outcomes (such as patient safety performance). It transforms safety from a regulatory obligation into a collective mindset that promotes vigilance, accountability, and continuous improvement. Organizations with a mature safety culture display high levels of trust, open communication, and mutual respect among healthcare workers, enabling effective teamwork and error prevention (Karmila et al., 2023).

Safety culture can be analyzed through several key dimensions, including leadership commitment, communication openness, learning orientation, and non-punitive response to errors. Leadership commitment refers to the visible and consistent prioritization of safety by top management through policy, resource allocation, and example. Open communication ensures that staff members can report incidents or near misses without fear of punishment, which fosters transparency and shared learning. Learning orientation emphasizes the organization’s ability to reflect on errors, conduct root cause analyses, and implement corrective actions. Meanwhile, a non-punitive response to mistakes creates a psychologically safe environment where employees can engage in honest dialogue about risks and improvement strategies (Arni et al., 2021). Collectively, these dimensions build a resilient system capable of preventing, detecting, and responding to safety threats effectively. From an ethical and psychological perspective, safety culture promotes collective mindfulness—a state in which individuals remain constantly aware of potential risks and respond with sensitivity to operational details. This mindfulness helps organizations anticipate problems before they escalate, a concept known as “preoccupation with failure.” It also nurtures shared responsibility, where safety is seen as everyone’s role, not only that of managers or clinical specialists. Thus, safety culture is not static but dynamic, requiring continuous reinforcement through leadership behavior, team interaction, and organizational learning (Sari et al., 2023). In the broader context of healthcare performance, safety culture serves

THE INFLUENCE OF FACILITIES AND INFRASTRUCTURE QUALITY AND HUMAN RESOURCE COMPETENCE ON PATIENT SAFETY WITH SAFETY CULTURE AS AN INTERVENING VARIABLE

Ince Rosmini *et al*

as a strategic enabler of sustainable patient safety and service excellence. Institutions with a strong safety culture not only experience fewer adverse events but also benefit from higher staff morale, lower turnover, and improved patient satisfaction. Moreover, by promoting transparency and accountability, a robust safety culture strengthens institutional reputation and public trust—key components of long-term organizational sustainability.

METHOD

The qualitative research method is an approach used to explore and understand social phenomena in depth by emphasizing the meaning, context, and interpretation of human experiences rather than numerical measurement. In the context of healthcare studies, qualitative methods are particularly valuable for uncovering how organizational structures, professional competence, and cultural values influence the implementation of patient safety practices. Unlike quantitative approaches that test hypotheses through statistical models, qualitative research seeks to interpret complex relationships through naturalistic inquiry, where the researcher acts as the key instrument in collecting and interpreting data. Techniques such as in-depth interviews, observations, and document analysis are employed to capture participants' perceptions, attitudes, and lived experiences within their real-world environments. The strength of qualitative methodology lies in its ability to reveal implicit processes, power dynamics, and contextual nuances that shape organizational behavior. Data analysis is conducted through inductive reasoning, typically using thematic or content analysis to identify recurring patterns and core themes. To ensure trustworthiness, qualitative research applies credibility, transferability, dependability, and confirmability as validation criteria, emphasizing transparency and reflexivity throughout the research process. Thus, in studies examining the influence of facilities quality, human resource competence, and safety culture on patient safety, the qualitative method provides a comprehensive and interpretive understanding of how these factors interact dynamically within healthcare institutions to shape safe, ethical, and sustainable care practices.

RESULTS AND DISCUSSION

The Quality of Facilities and Infrastructure as the Foundation of Patient Safety

The quality of healthcare facilities and infrastructure serves as the fundamental backbone of patient safety, influencing nearly every aspect of clinical practice and hospital operations. In modern healthcare systems, safety is not determined solely by the competence of professionals but also by the physical and technological environments that support their work. A well-designed and well-maintained hospital infrastructure provides the necessary foundation for healthcare workers to perform their tasks effectively, accurately, and efficiently. Cleanliness, adequate space, proper ventilation, reliable lighting, and organized layouts all contribute to minimizing clinical errors and ensuring smooth workflows. Informants emphasized that when the physical environment is safe, functional, and supportive, staff are able to concentrate better, respond to emergencies more quickly, and maintain a higher level of vigilance in patient monitoring and care delivery. Conversely, overcrowded rooms, malfunctioning equipment, and inadequate facilities can create operational bottlenecks, increase staff fatigue, and elevate the risk of medical mishaps (Pakka & Rusyidi, 2021).

The availability and readiness of medical equipment also represent a critical dimension of infrastructure quality that directly affects the effectiveness of care. Proper calibration, maintenance, and periodic inspection of diagnostic and therapeutic tools are essential to prevent errors in measurement, treatment, or medication delivery. Healthcare workers interviewed noted that even minor equipment malfunctions—such as unreliable monitors or outdated infusion pumps—can have serious implications for patient safety, especially in intensive care or surgical units. Therefore, continuous investment in technological renewal and preventive maintenance is indispensable. Hospitals that prioritize such practices demonstrate not only compliance with standards but also a proactive commitment to preventing harm before it occurs. This preventive orientation reflects a systems-thinking approach, where safety is achieved through consistent coordination between human performance and reliable technological support (Pravitasari, 2024). In addition to the physical and technical aspects, infrastructure quality encompasses organizational and procedural readiness, which ensures that all safety systems function seamlessly. This includes the implementation of infection control mechanisms, fire prevention systems, waste management protocols, and ergonomic workspace designs that reduce the likelihood of cross-contamination or occupational injury. A structured facility management system that integrates real-time monitoring technologies—such as automated temperature control or smart alarms for equipment failure—strengthens the hospital's capacity to anticipate and respond to potential hazards. Such systemic readiness enhances institutional resilience, allowing hospitals to sustain safety standards even during crises such as pandemics or sudden patient surges. The psychological and ethical implications

THE INFLUENCE OF FACILITIES AND INFRASTRUCTURE QUALITY AND HUMAN RESOURCE COMPETENCE ON PATIENT SAFETY WITH SAFETY CULTURE AS AN INTERVENING VARIABLE

Ince Rosmini *et al*

of facility quality are equally significant. A safe and well-equipped environment fosters trust not only among patients but also among healthcare workers. Staff who operate in a stable and supportive environment develop greater confidence in their duties, feel valued by their institution, and become more motivated to uphold patient safety protocols. This sense of security encourages open communication and teamwork, which are essential for reducing human error. The relationship between infrastructure and patient safety, therefore, extends beyond physical adequacy—it shapes organizational behavior and professional accountability. When healthcare professionals perceive that their environment supports their responsibilities, they are more likely to act diligently and empathetically, aligning their performance with the hospital's safety goals. In this context, the quality of facilities and infrastructure emerges as a strategic determinant of patient safety rather than a mere operational requirement. A robust infrastructure framework provides the material conditions under which safety culture can flourish, enabling healthcare personnel to translate their competence into consistent, error-free practices. The interdependence between physical environments, organizational systems, and human actions creates a safety ecosystem where every element reinforces the other. Thus, ensuring high-quality facilities and infrastructure is not an isolated managerial task—it is an integral, continuous process that underpins the ethical, technical, and operational integrity of patient care.

Human Resource Competence as a Determinant of Safety Practices

Human resource competence plays a decisive role in determining the quality and safety of healthcare practices, as it embodies the integration of professional knowledge, technical skills, and ethical responsibility that underpin patient care. In the hospital environment, competent healthcare workers are not merely defined by their mastery of medical procedures but by their capacity to apply clinical judgment, communicate effectively, and act responsibly in dynamic and high-pressure situations. Informants consistently described that competence encompasses cognitive, psychomotor, and affective dimensions: cognitive competence relates to understanding evidence-based guidelines and analytical decision-making; psychomotor competence concerns the precision and dexterity required to perform procedures safely; and affective competence reflects empathy, communication, and adherence to ethical standards. Together, these competencies create a holistic professional identity that ensures safety is embedded within every aspect of care delivery (Purwaningsih, 2025).

The findings reveal that lapses in competence—such as incomplete understanding of safety protocols, inadequate response to critical incidents, or poor coordination among healthcare teams—are among the primary causes of patient safety failures. These lapses often do not stem from deliberate negligence but from systemic shortcomings in training, supervision, or organizational communication. Hospitals that neglect continuous education and competency evaluation expose themselves to higher risk levels, as staff skills may stagnate amid technological and procedural advances. Continuous professional development programs, therefore, emerge as a vital mechanism for maintaining and enhancing competence. Regular workshops, simulation-based training, and interdisciplinary learning sessions not only refresh clinical skills but also foster collaborative awareness, ensuring that all personnel can respond consistently and effectively to safety challenges (Jamil *et al.*, 2025).

A notable theme that emerged from the interviews is the importance of ethical and interpersonal competence in shaping safety behavior. Competence in healthcare extends beyond technical proficiency—it involves the moral courage to report errors, the humility to seek help when uncertain, and the commitment to treat patients with dignity and respect. Participants highlighted that communication failures and hierarchical barriers often lead to preventable errors, underscoring that competence in patient safety must include the ability to engage in open dialogue across professional boundaries. Building such interpersonal competence requires institutional support that encourages psychological safety, where staff feel empowered to raise concerns without fear of blame or retribution. This emotional and ethical maturity reinforces a culture of vigilance and mutual accountability, essential for sustaining safe care practices (Hutapea, 2021).

Moreover, competence acts as a link between organizational systems and patient outcomes. Competent healthcare workers are better equipped to utilize facilities efficiently, comply with safety standards, and adapt to unforeseen circumstances. Their ability to integrate technical knowledge with situational awareness enables them to detect early warning signs, prevent escalation of risks, and make swift, evidence-based decisions. The synergy between competence and infrastructure quality thus becomes a critical determinant of overall safety performance. When competence is high, available resources are used optimally; when competence is weak, even advanced infrastructure cannot compensate for human error. Consequently, the development of competence should be viewed not as a one-time intervention but as an ongoing process that evolves with technological innovations and changes in clinical practice. In this regard, competence becomes both a professional and organizational asset, shaping the

THE INFLUENCE OF FACILITIES AND INFRASTRUCTURE QUALITY AND HUMAN RESOURCE COMPETENCE ON PATIENT SAFETY WITH SAFETY CULTURE AS AN INTERVENING VARIABLE

Ince Rosmini *et al*

resilience and responsiveness of healthcare institutions. By investing in structured competency frameworks, hospitals can align individual performance with institutional goals, ensuring consistency between human capability and patient safety objectives. Competent professionals contribute to the reliability of systems, foster trust among colleagues and patients, and sustain the moral integrity of care delivery. Thus, human resource competence stands as a pivotal determinant of safety practices—transforming technical expertise into ethical and effective action that safeguards patients while reinforcing the organization’s commitment to high-quality, responsible healthcare.

Safety Culture as a Mediating Force in Patient Safety Implementation

Safety culture functions as the ethical and behavioral backbone of healthcare organizations, mediating the relationship between structural resources—such as facilities and infrastructure—and human capabilities, including competence and professionalism. In this study, informants consistently emphasized that even the most advanced infrastructure and the most skilled personnel cannot guarantee patient safety in the absence of a strong and cohesive safety culture. This culture represents a collective mindset in which every member of the organization, from senior management to frontline staff, shares a commitment to prioritizing safety over efficiency, productivity, or convenience. It manifests in how healthcare workers communicate, make decisions, and respond to incidents, creating a shared system of beliefs and norms that guide daily behavior. A hospital with a well-established safety culture fosters transparency, accountability, and mutual trust, all of which are vital to transforming safety policies from written protocols into lived organizational values (Karmila *et al.*, 2023).

The research findings reveal that leadership commitment and communication openness are the two most influential dimensions shaping the development of a positive safety culture. Leaders who actively demonstrate their dedication to safety—through consistent messaging, resource allocation, and participatory decision-making—set a powerful example that safety is non-negotiable. Staff are more likely to adhere to safety standards and report potential risks when they observe that leadership prioritizes their well-being and patient protection. Open communication, on the other hand, enables a two-way flow of information where staff can freely report near misses or unsafe conditions without fear of blame. Informants highlighted that in units where hierarchical barriers are strong, incidents often go unreported, leading to repeated errors and loss of trust. Conversely, when staff feel psychologically safe to speak up, hospitals can identify systemic weaknesses earlier and implement preventive measures more effectively (Sari *et al.*, 2023).

Another key element of safety culture identified in the findings is the non-punitive response to errors, which shifts the focus from individual blame to systemic learning. Healthcare workers described that punitive approaches create fear and silence, whereas learning-oriented responses encourage collective problem-solving. This transformation of mindset—from “who is at fault” to “what went wrong”—is fundamental to sustaining patient safety in the long term. Hospitals that adopt this learning culture develop resilience, where each adverse event becomes an opportunity for improvement rather than a setback. Through debriefing sessions, incident reviews, and interprofessional reflection, organizations build institutional memory that strengthens their overall safety framework (Ekawati *et al.*, 2022). Safety culture also acts as the connecting mechanism that translates structural and human capacities into tangible safety outcomes. While facilities and competence provide the foundation, culture shapes the consistency and sustainability of their use. For example, modern medical equipment can enhance safety only if staff use it in accordance with established protocols—something that depends heavily on a culture that values adherence, accountability, and attention to detail. Similarly, competent staff are more likely to maintain high safety standards when their working environment reinforces ethical behavior and collective responsibility. In this sense, safety culture integrates material, human, and ethical dimensions into a cohesive system of care that continually evolves through reflection and feedback.

Furthermore, the mediating role of safety culture extends to the emotional and psychological dimensions of healthcare work. A supportive and inclusive culture reduces stress, fosters teamwork, and enhances morale, enabling staff to perform under pressure without compromising patient welfare. Informants noted that when healthcare workers feel respected, valued, and heard, they demonstrate higher engagement and vigilance, directly improving patient outcomes. This relational aspect underscores that safety culture is not only an institutional construct but also a lived experience that shapes how people think, feel, and act within the organization (Ningsih & Santoso, 2025). Overall, the presence of a strong safety culture bridges the gap between organizational structure and individual performance, transforming safety from a procedural requirement into a shared moral obligation. It ensures that the principles of transparency, learning, and compassion are embedded in every layer of the organization, enabling hospitals to achieve patient safety as an outcome of collective consciousness and continuous improvement. In this

THE INFLUENCE OF FACILITIES AND INFRASTRUCTURE QUALITY AND HUMAN RESOURCE COMPETENCE ON PATIENT SAFETY WITH SAFETY CULTURE AS AN INTERVENING VARIABLE

Ince Rosmini et al

way, safety culture functions not merely as a mediating variable but as the driving force that sustains ethical integrity, operational reliability, and trust within healthcare institutions.

Interrelationship between Facilities, Competence, and Safety Culture

The interaction between facilities, human resource competence, and safety culture forms a dynamic and interdependent framework that fundamentally determines the level of patient safety within healthcare institutions. These three elements do not operate in isolation but reinforce one another in a continuous cycle of influence and adaptation. Findings from the study show that adequate facilities provide the physical and technological foundation for safe healthcare delivery, competent personnel translate that infrastructure into effective practice, and a strong safety culture binds these two components together through shared values, communication, and collective responsibility. In other words, infrastructure represents the *hardware* of patient safety, human competence serves as the *software*, and safety culture functions as the *operating system* that integrates both into a coherent, sustainable system of care.

The quality of facilities and infrastructure shapes how healthcare workers perform their duties and perceive safety within their work environment. Informants explained that modern, well-maintained, and ergonomically designed facilities enhance efficiency and reduce fatigue, allowing staff to focus on clinical accuracy and patient monitoring. However, even the most advanced equipment can become a liability when handled by personnel who lack the required technical competence or procedural discipline. Thus, the functionality of infrastructure is contingent upon the skill level, training, and situational awareness of those who operate it. Competence transforms physical resources into meaningful safety outcomes by ensuring that procedures are carried out correctly, protocols are followed consistently, and potential hazards are recognized early. Hospitals that invest in both equipment and human capacity simultaneously are better positioned to achieve consistent safety performance.

At the same time, safety culture acts as the integrative force that aligns these structural and human elements into a unified safety system. It ensures that the use of facilities and the exercise of competence are guided by ethical norms, professional accountability, and shared vigilance. The study revealed that in institutions where safety culture is strong—characterized by open communication, non-punitive reporting, and leadership commitment—staff demonstrate higher motivation to maintain facilities, follow maintenance protocols, and utilize technology responsibly. This culture of mutual trust and shared learning creates feedback loops that continuously improve both infrastructure management and workforce competence. For instance, when incident reports lead to procedural revisions or equipment upgrades, the organization demonstrates its learning capacity, further reinforcing trust among employees and strengthening the culture of safety.

The interrelationship also operates on a psychological and social dimension, where facility conditions and professional competence influence the emotional climate of the workplace. Healthcare workers who operate in safe, clean, and well-equipped environments experience reduced stress and greater confidence, which in turn enhances teamwork and communication—two critical aspects of safety culture. Conversely, when facilities are inadequate or systems are overloaded, stress levels rise, communication deteriorates, and error probability increases, regardless of individual competence. In such contexts, safety culture acts as a stabilizer, promoting resilience, adaptability, and empathy among team members to sustain safe practices even under pressure.

Furthermore, the synergy among these three components fosters organizational learning and sustainability. Facilities provide tangible feedback on system performance through data and maintenance reports, competence contributes through experiential insights, and safety culture facilitates reflection and collective action. This cyclical relationship allows healthcare institutions to evolve continuously, turning every incident or near miss into an opportunity for systemic improvement. As a result, hospitals that successfully integrate facility management, human competence, and cultural commitment can achieve not only compliance with safety standards but also long-term resilience and ethical excellence. In essence, the interrelationship between facilities, competence, and safety culture reflects a holistic understanding of patient safety as a systemic construct rather than a sum of isolated factors. Each dimension strengthens and depends upon the others: facilities provide capability, competence ensures proper utilization, and culture guarantees sustainability through shared values and continuous improvement. When these three pillars operate synergistically, patient safety becomes a natural outcome of organizational integrity, professionalism, and collective moral responsibility.

THE INFLUENCE OF FACILITIES AND INFRASTRUCTURE QUALITY AND HUMAN RESOURCE COMPETENCE ON PATIENT SAFETY WITH SAFETY CULTURE AS AN INTERVENING VARIABLE

Ince Rosmini et al

CONCLUSION

The findings of this study demonstrate that patient safety in healthcare institutions is not determined by a single factor but by the systemic interaction among facilities quality, human resource competence, and safety culture. These three dimensions function as interdependent pillars that collectively shape the reliability, ethics, and sustainability of hospital services. Adequate and well-maintained facilities provide the structural foundation upon which safe and efficient healthcare delivery can occur. However, facilities alone are insufficient without competent healthcare workers who possess the technical expertise, critical judgment, and ethical awareness necessary to implement patient safety protocols effectively. Competence transforms material resources into safe clinical practices, ensuring that medical procedures are performed accurately and responsibly. At the same time, safety culture serves as the mediating force that unites infrastructure and competence into a cohesive system of care. A strong safety culture, characterized by leadership commitment, open communication, learning orientation, and non-punitive responses to errors, enables hospitals to transform safety from a procedural requirement into a shared organizational value. Through this culture, safety becomes embedded in everyday routines, decision-making processes, and interpersonal relationships, fostering accountability and trust across all levels of the institution. The interrelationship among these three elements creates a synergistic cycle: high-quality facilities support competent performance; competent professionals ensure proper use of facilities; and a robust safety culture reinforces both by promoting consistent adherence to ethical and procedural standards. This integration results in a self-sustaining safety ecosystem that enhances not only patient outcomes but also organizational resilience and reputation.

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THE INFLUENCE OF FACILITIES AND INFRASTRUCTURE QUALITY AND HUMAN RESOURCE COMPETENCE ON PATIENT SAFETY WITH SAFETY CULTURE AS AN INTERVENING VARIABLE

Ince Rosmini et al

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