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## Review

## The effectiveness of checklists and error reporting systems in enhancing patient safety and reducing medical errors in hospital settings: A narrative review

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## ABSTRACT

**Objectives:** This narrative review aimed to explore the impact of checklists and error reporting systems on hospital patient safety and medical errors.

**Methods:** A systematic search of academic databases from 2013 to 2023 was conducted, and peer-reviewed studies meeting inclusion criteria were assessed for methodological rigor. The review highlights evidence supporting the efficacy of checklists in reducing medication errors, surgical complications, and other adverse events. Error reporting systems foster transparency, encouraging professionals to report incidents and identify systemic vulnerabilities.

**Results:** Checklists and error reporting systems are interconnected. Interprofessional collaboration is emphasized in checklist implementation. In this review, limitations arise due to the different methodologies used in the articles and potential publication bias. In addition, language restrictions may exclude valuable non-English research. While positive impacts are evident, success depends on organizational culture and resources.

**Conclusions:** This review contributes to patient safety knowledge by examining the relevant literature, emphasizing the importance of interventions, and calling for further research into their effectiveness across diverse healthcare and cultural settings. Understanding these dynamics is crucial for healthcare providers to optimize patient safety outcomes.

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## What is known?

- Checklists, a widely recognized tool in hospital settings, have proven to be highly effective in reducing medical errors. Particularly in surgical and drug delivery contexts, checklists play a crucial role in standardizing operations and preventing the omission of critical tasks.
- Medical error reporting systems, a key component in promoting a safety culture, are highly regarded for their ability to foster a culture of safety within healthcare organizations. By encouraging the reporting of errors and near-misses, these systems facilitate the identification of trends and root causes of errors,

leading to overall improvements and preventive measures. This collaborative approach to medical error reporting fosters a sense of teamwork and shared responsibility among healthcare professionals.

- The utilization of checklists plays a crucial role in enhancing communication and cooperation among healthcare providers. Efficient checklist implementation necessitates synchronized endeavors from interdisciplinary teams, improving cooperation and diminishing the probability of errors resulting from misunderstanding. This underscores the importance of each healthcare provider's role in ensuring patient safety.

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## What is new?

- Recent progress indicates that combining checklists and mistake-reporting systems with electronic health records

(EHRs) and other digital platforms improves efficiency. This integration enables the immediate input, tracking, and examination of data, resulting in prompt interventions and enhanced patient results.

- Research shows that including patients in the checklist process can have significant benefits. Studies have demonstrated that involving patients in the process of confirming checklist items, particularly in perioperative settings, can effectively decrease medical errors and enhance patient satisfaction and safety. This patient-centric approach not only improves patient outcomes but also fosters a deeper connection between healthcare professionals and their patients, making them feel more involved in their own care.
- Recent research highlights the significance of tailoring checklists to suit particular hospital settings and divisions. Customized checklists that consider the distinct processes and difficulties of various units are more efficient in minimizing errors and improving patient safety compared to generic, universally applicable checklists.

## 1. Introduction

Patient safety is a fundamental concern in healthcare, encompassing the paramount goal of minimizing medical errors to ensure patients' well-being and optimal outcomes [1]. The World Health Organization's Global Patient Safety Action Plan 2021–2030 underscores the importance of engaging patients and their families as a crucial strategy in mitigating preventable patient harm [2].

Medical errors, ranging from medication administration mistakes to surgical mishaps, have profound consequences for patients, healthcare institutions, and the broader healthcare system [3]. Recognizing the critical need to address this challenge, healthcare organizations have implemented various patient safety initiatives, of which checklists and error reporting systems have garnered significant attention [4]. The multifaceted nature of patient safety calls for a comprehensive understanding of the strategies and mechanisms that can be employed to mitigate risks and errors. Initially developed in aviation and subsequently adapted to healthcare, checklists have emerged as promising aids in standardizing procedures, promoting communication, and reducing variability in clinical practices [5].

Error reporting systems can find and analyze mistakes and close calls, thus helping organizations prevent mistakes before they happen. Patient safety initiatives, such as checklists and error reporting systems, are pivotal components of a broader framework to create a safety culture within healthcare organizations [6]. Their effectiveness depends on various factors, including healthcare professionals' commitment, leadership support, and technology integration. The impact of these initiatives extends beyond individual patient encounters, influencing the overall safety climate and quality of care within hospitals.

The aim of this study was to assess the impact of checklists and error reporting systems on enhancing patient safety and reducing medical errors in hospital settings by systematically analyzing the supporting evidence. The study also identifies and analyzes the factors that impede the successful adoption of checklists and error reporting systems in healthcare, providing insights into the barriers and challenges. In addition, the study looks at how the culture of healthcare organizations affects efforts to keep patients safe, especially regarding checklists and error reporting systems, and how these cultural factors can help or hurt these efforts.

The rationale for looking at checklists and error reporting systems is to explore their interconnectedness and identify potential synergies in enhancing patient safety. They are critical components

of patient safety initiatives [7]. They serve different purposes but can complement each other in enhancing patient safety. Research on these topics can help identify best practices, implementation strategies, and areas for further research to optimize patient safety efforts [8]. By examining these two areas in tandem, the study seeks to contribute valuable insights into how their integration can collectively improve healthcare outcomes and contribute to a safer patient environment.

The research questions to extract relevant information, gain knowledge and understand this topic were:

1. Do checklists and error reporting systems improve patient safety and reduce hospital medical errors, and what is the supporting evidence?
2. What factors hinder the adoption of checklists and error reporting systems in healthcare?
3. How does healthcare organizational culture impact patient safety initiatives, particularly checklists and error reporting systems?

## 2. Methods

This review follows Jones's [9] extensive review process and spans the period from 2013 to 2023. A narrative review concerning a specific subject holds value when there is a discernible upsurge in interest and a growing body of research devoted to that topic. A narrative review helps enhance the depth of knowledge on a particular subject. As Jones's states, a review has to be well organized and make sense of all the previous research to be considered complete and logical [9]. Moreover, a thorough review fosters the development of new theoretical perspectives, bridging gaps in areas already saturated with research. It sheds light on previously unexplored areas where more research is necessary.

### 2.1. Search strategy

A well-structured search strategy was employed to conduct this comprehensive literature review. Following is a detailed description of that search strategy. 1) The search began by defining the research questions and aims. 2) To ensure a comprehensive search, we chose relevant academic databases, such as PubMed, CINAHL, Scopus, and Google Scholar. 3) Keywords and synonyms related to the research questions were determined; these were: patient safety, medical errors, checklists, error reporting systems, hospital settings, healthcare culture, organizational culture, and technological integration. 4) Boolean operators (AND, OR, NOT) were used to combine keywords effectively. In addition, we developed search strings using variations and synonyms of the terms, for example, ("Patient safety" OR "Medical errors") AND ("Checklists" OR "Error reporting systems") AND "Hospital settings"; ("Challenges" OR "Barriers") AND ("Adoption" OR "Implementation") AND ("Checklists" OR "Error reporting systems") AND "Healthcare". 5) Filters and limits to refine the search results, including publication date (e.g., the last 10 years), study types (e.g., systematic reviews, meta-analyses, empirical studies), and peer-reviewed journals were used. 6) Grey literature sources, such as conference proceedings, reports from healthcare organizations, and institutional repositories, were also used to gain valuable insights. 7) Inclusion and exclusion criteria for the selected articles focused on the relevance to the research questions by ensuring that the articles met the criteria for quality and reliability. 8) Citation management software (e.g., EndNote, Mendeley, Zotero) was used to organize and track the selected articles and their references. 9) Records of the search strategy, including search terms, databases searched, and the number of results at each stage, were kept for transparency and replication. 10) After gathering the articles, the review was carried

out systematically. Relevant data was extracted, and the findings were synthesized according to the research questions and aims. The search process is documented in Appendix A.

## 2.2. Inclusion and exclusion criteria

Inclusion and exclusion criteria guided the selection of articles for the literature review. These criteria ensured the chosen studies aligned with the research questions and aims. Appendix B lists the inclusion and exclusion criteria.

The initial search yielded 84,319 articles (Fig. 1). Subsequently, we eliminated duplicates and excluded instances of articles published in conference proceedings when their journal counterparts were available. This resulted in 466 articles that met the criteria. We excluded 392 articles because they did not primarily focus on checklists or error reporting systems, and some of them had insufficient information provided in the abstracts. The remaining articles ( $n = 74$ ) were subjected to a rigorous evaluation based on the criteria, which involved meticulously examining their abstracts, objectives, findings, and conclusions. Consequently, 74 articles that met the inclusion criteria remained and are included in the narrative review.

## 2.3. Data analysis

Data analysis was conducted to synthesize the findings of the articles. Following the search, a screening process was used to select articles that met predefined inclusion and exclusion criteria (Appendix B). The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines for systematic reviews were followed to assess study quality [10]. Articles that did not meet the criteria were excluded. After the screening, 74 articles remained for data analysis. Relevant data and findings from the selected articles were systematically extracted. Key information included study design, patient safety outcomes, the impact of checklists and error reporting systems, challenges in adoption, technological integration, and the role of organizational culture. The extracted data was organized into categories and subcategories

based on the identified themes (Table 1). Thematic analysis was conducted to identify recurrent themes and patterns in the literature. Important themes included how checklists affect standardization and communication and how they reduce medication and surgery mistakes; how error reporting systems identify weak spots in the system and how they encourage a safety culture; and the challenges of using checklists. The strengths and limitations of individual studies were considered. The implications of the findings were discussed in the context of the research questions and aims. Identified gaps in the existing literature were discussed, and directions for future research were proposed based on the data analysis. The data analysis gave a complete picture of how well checklists and error reporting systems work in hospitals. It looked at how they affect patient safety and the problems, risks, and opportunities that come with implementing them.

## 2.4. Trustworthiness

The trustworthiness of the results in this narrative review is underpinned by a rigorous methodology, a comprehensive literature search using the PRISMA flowchart (Fig. 1), meticulous inclusion criteria, and the transparent synthesis of findings. In adhering to these principles, the review aims to provide a reliable and valuable contribution to understanding the effectiveness of checklists and error reporting systems in promoting patient safety and reducing medical errors in hospital settings.

## 3. Findings

The findings were grouped into categories to provide a more structured overview. Section 3.1 covers the effectiveness of checklists and error reporting systems in healthcare (44 articles). Section 3.2 covers challenges and considerations (13 articles). Section 3.3 covers the potential for technological integration (9 articles). Section 3.4 covers the role of organizational culture (8 articles).

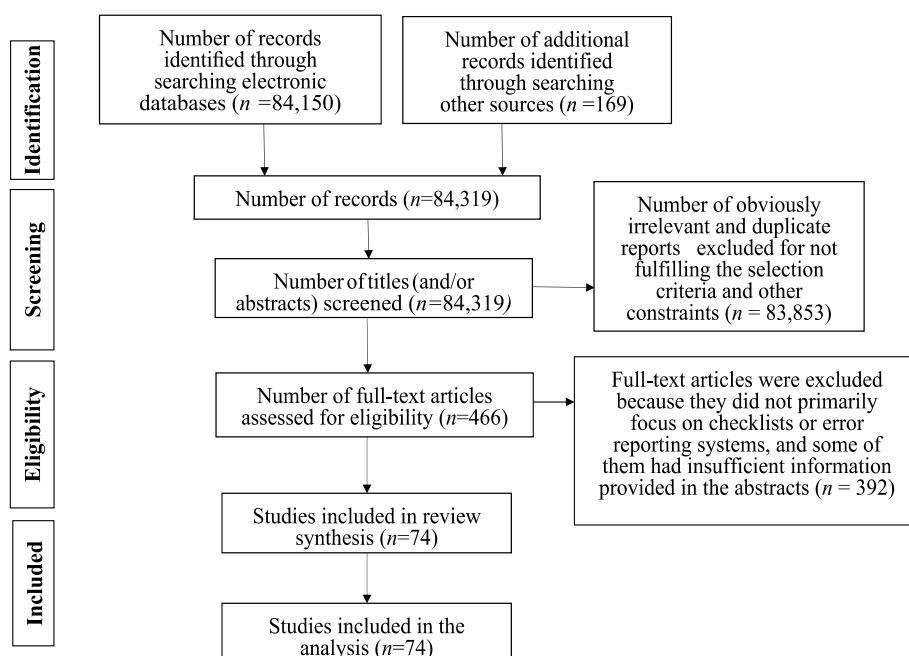


Fig. 1. PRISMA flow diagram.

**Table 1**  
A structured overview of the categories and subcategories based on the research analysis.

Categories	Subcategories
Effectiveness of checklists	Improved standardization Enhanced communication Surgical error reduction Medication error reduction
Effectiveness of error reporting systems	Identifying system weaknesses Promoting a culture of safety Encouragement of reporting near misses and adverse events Increased organizational learning and error prevention
Challenges and considerations	Challenges in adoption Need for ongoing training and support Concerns about liability
Potential for technological integration	Integration of technology Use of emerging technologies like electronic health records and AI Enhancements in identifying and preventing errors
Role of organizational culture	Organizational culture matters Influence of culture on the success of patient safety initiatives Emphasis on transparency, open communication, and continuous improvement

### 3.1. Effectiveness of checklists and error reporting systems in healthcare

Table 2 lists the articles pertaining to the effectiveness of checklists and error reporting systems in healthcare. It provides information about each study, including the author(s), the publication year, and the themes discussed.

Initially inspired by the aviation industry, checklists have emerged as crucial tools in healthcare delivery by standardizing medical procedures and effectively reducing variations [11–14]. Their implementation ensures consistent adherence to established protocols, minimizing deviations in clinical practice [15]. In addition, checklists have become valuable instruments for enhancing patient safety [16,17]. Thus, the integration of checklists in healthcare has yielded promising outcomes [18–21]. For example, surgical safety checklists have significantly reduced surgical errors, such as wrong-site surgeries and instrument mishaps [22–25]. Checklists serve as cognitive aids for healthcare professionals, ensuring the consistent following of critical steps [26–29].

Furthermore, checklists facilitate effective communication among healthcare teams, reducing the risk of misunderstandings and errors [30–34]. Effective communication within healthcare teams is essential for patient safety [35,36]. Checklists are pivotal, as they provide a structured framework for information sharing and task delegation, further reducing the risk of misunderstandings and communication breakdowns [30,37–39].

Checklists and medication reconciliation processes are also effective in minimizing medication administration errors, including dosage errors and drug interactions [40,41]. The studies by Boyd et al., Feleke et al., and Hayes et al. underscore the efficacy of checklists in this regard [42–44].

Error reporting systems are an essential aspect of patient safety initiatives [45] and are valuable in identifying weaknesses and error patterns and facilitating targeted improvements. McKaig et al. [46] illustrates how error reporting systems have led to systematic enhancements in healthcare organizations. These systems foster a safety culture by encouraging healthcare workers to report near misses and adverse events, ultimately promoting organizational

**Table 2**  
The list of articles about the effectiveness of checklists and error reporting systems.

Authors, Publication year	Themes
Lancaster & Wick, 2021; Martins et al., 2023	Effectiveness of checklists in standardizing medical procedures and reducing variations in healthcare delivery
Frank et al., 2021	Importance of checklist implementation in ensuring adherence to established protocols
Ghaferi et al., 2016; Pugh et al., 2023	The role of checklists in enhancing patient safety in healthcare
Webster, 2017; Fuentes & Chung, 2023; Reijers et al., 2017; Low et al., 2013	The aviation industry’s inspiration for integrating checklists in healthcare and the positive outcomes
Fingrut et al., 2022; Al Abbas et al., 2022	The standardization of procedures by checklists and reduction of variations in care delivery
Ragusa et al., 2016; Romig et al., 2016	The significant reduction in surgical errors, including wrong-site surgeries, due to surgical safety checklists
Duffy & Lane-Fall 2023; Delaney & Eiswerth, 2023; Lefebvre et al., 2023; Treloar et al., 2022	Checklists as cognitive aids for healthcare professionals and ensure consistent adherence to critical steps
Halverson & Scott Tilley, 2022; Bearman et al., 2023	The role of checklists in facilitating effective communication among healthcare teams and the importance of communication in patient safety
Burgener, 2020; von Vogelsang et al., 2020	The essential nature of effective communication within healthcare teams
Solsky et al., 2020; Verdi et al., 2024; Bearman et al., 2023	The contribution of checklists to team communication and reducing the risk of misunderstandings and errors
Conroy et al., 2023; Fuzier et al., 2023; Kelly et al., 2023	Checklists for enhancing communication and reducing the risk of misunderstandings and errors
Germani et al., 2023	The role of checklists in providing a structured framework for information sharing and task delegation, leading to more effective coordination
Sassoli and Day, 2017; Quality Chasm SERIES, 2018; Boyd et al., 2017; Hayes et al., 2015; Feleke et al., 2015	The effectiveness of checklists in reducing medication administration errors, including dosage errors and drug interactions
McKaig et al., 2014; McFarlane & Turner, 2015; Weaver and Edrees, 2017	The valuable role of error reporting systems in identifying system weaknesses, fostering a culture of safety, and promoting organizational learning and error prevention
Wawersik et al., 2023; Goekcimen et al., 2023; Voorde & France, 2002	The essential aspects of error reporting systems in enhancing patient safety, promoting a culture of safety, and analyzing reported incidents to improve patient safety

learning and error prevention [47]. Weaver and Edrees [48] emphasize the important role of error reporting systems in cultivating a safety-oriented culture.

In the realm of healthcare, errors can range from minor and inconsequential to catastrophic, potentially resulting in significant morbidity or even the loss of a patient's life [49]. Medical error is a failure to act or a failure in planning or implementation that plays a role or has the potential to lead to an unintended outcome. This definition includes all measurable bad outcomes and "near misses" because of planning and implementation mistakes, including acts of commission [50–53]. Error reporting systems contribute to a culture of safety by encouraging healthcare workers to share information about errors and adverse events [54]. These systems help identify errors and support organizational learning and error prevention. Analyzing reported incidents allows healthcare organizations to identify trends and root causes and to implement preventive measures, which is essential to improve patient safety in hospital settings [55].

### 3.2. Challenges and considerations

Table 3 lists the articles pertaining to the challenges and considerations relating to checklists and error reporting systems in healthcare. It provides information about the articles, including the author(s), the year of publication, the issues under discussion, and the themes related to the challenges, hindrances, and considerations in implementing patient safety initiatives in healthcare settings. The challenges include resistance to change on the part of healthcare professionals, concerns about liability, and the necessity for continuous training and support [56–58]. Harris et al. [59] found that patients value having patient safety checklists (PASCs) before surgery and adequate time for their proactive use. Timing—not too soon before or too late after hospital admission—is crucial. Patients have voiced concerns about the design of PASCs, including having questions that are too similar, the need for an electronic version, the need for an adjustable checklist, and the need to clarify item understanding. The impetus to communicate with healthcare professionals has driven PASCs utilization, thus providing guidance regarding the surgical pathway and enhancing safety. While PASCs have increased the sense of control, patients desire more involvement from healthcare professionals, emphasizing the importance of safety and control [59].

Healthcare professionals may exhibit reluctance to adopt new initiatives due to their comfort and familiarity with established practices and concerns regarding potential disruptions to the workflow [60–62]. There is also apprehension among healthcare providers that reporting errors or near misses through error reporting systems might lead to legal consequences, thereby inhibiting the reporting process [63–65].

Additionally, some healthcare workers may lack awareness of the existence or significance of patient safety initiatives, which

limits their adoption [66,67]. Inadequate training and education regarding the use of checklists and error reporting systems can result in improper utilization, further hindering adoption [68,69]. Integrating technology, particularly electronic health records (EHRs), may also be resisted by healthcare providers who are either uncomfortable with or unwilling to use technology-based solutions [70,71].

### 3.3. Potential for technological integration

Table 4 lists the key authors, themes, and publication dates of the articles pertaining to the potential for technological integration to enhance patient safety and reduce medical errors in hospital settings. Emerging technologies, including EHRs and artificial intelligence (AI), hold promise in augmenting the effectiveness of checklists and error reporting systems for error identification and prevention [72–74]. Krishnamoorthy et al. [75] have explored the integration of technology and its role in error identification and prevention, emphasizing the shift from traditional in-person doctor visits to remote health monitoring and predictive disease diagnosis facilitated by technologies such as telehealthcare and software-defined networking. Technology integration offers innovative ways to enhance error identification and prevention in healthcare [76,77]. For example, Kawamoto et al. [78] and Vellela et al. [79] have investigated the integration of EHRs with checklist systems, finding that EHR-integrated checklists improve the accuracy and completeness of patient data. This empowers healthcare providers to make more informed decisions and reduces errors associated with data entry [78,79].

Alowais et al. [80] and Shahid and Khattak [81] conducted studies on the use of AI for error prediction. AI algorithms, through the analysis of extensive datasets, identify error-related patterns, enabling healthcare organizations to proactively prevent errors with targeted interventions.

Technology offers multiple mechanisms to enhance error identification and prevention in healthcare [82]. Integrating EHRs with checklists and error reporting systems ensures the accuracy and currency of patient data, minimizing data-related errors such as medication administration errors stemming from incorrect patient information [83,84]. AI and machine learning can analyze vast healthcare datasets to identify trends and predict potential errors, enabling proactive interventions by healthcare organizations [85,86].

Moreover, technology can provide real-time alerts to healthcare providers when they are on the brink of making potential errors, such as prescribing medications that might interact unfavorably with a patient's existing drugs [87,88]. It facilitates streamlined communication among healthcare teams, reducing the risk of misunderstandings and errors in patient care. Secure messaging systems and digital checklists enable instantaneous updates and information sharing [89–91].

**Table 3**

The list of articles about challenges and considerations.

Authors, Publication year	Themes
Cheema & Robertsson, 2023; Petersson et al., 2022; Curran et al., 2022	Resistance to change among healthcare professionals in adopting patient safety initiatives, like checklists and error reporting systems
Hamdan et al., 2023; Benevento et al., 2023; Yali & Nzala, 2022	Concerns about potential legal consequences associated with reporting errors or near misses through error reporting systems, acting as a barrier to reporting
Abraham et al., 2022; Whig et al., 2023	Lack of awareness among healthcare workers regarding the existence and significance of patient safety initiatives
Renouard et al., 2023; Nyamtema et al., 2022	Inadequate training and education on the proper usage of checklists and error reporting systems, lead to improper utilization
Talwar et al., 2023; Heath et al., 2022; Harris et al. 2023	Resistance from healthcare providers towards technology-based solutions, particularly electronic health records



**Table 4**  
The list of articles about the potential for technological integration.

Authors, Publication year	Themes
Kawamoto et al., 2023; Vellela et al., 2023	Integration of Electronic Health Records (EHRs) with checklist systems, enhancing the accuracy and completeness of patient data
Alowais et al., 2023; Shahid & Khattak, 2022	Utilizing Artificial Intelligence (AI) for error prediction, analyzing extensive datasets to identify error-related patterns
Dhinakaran et al., 2022; Shumba et al., 2022	Technology providing real-time alerts to healthcare providers to prevent potential errors, such as medication interactions
Robinson, 2023; Tailor et al., 2023; Mathias, 2023	Technology's role in enhancing communication among healthcare teams, reducing misunderstandings and errors

### 3.4. Role of organizational culture

Table 5 provides information about the authors, themes, and dates of publication of the articles pertaining to the role of organizational culture in patient safety initiatives. The effectiveness of patient safety initiatives, for example through the use of checklists and error reporting systems, is intricately linked to the organizational culture prevalent in healthcare settings [66,92–94]. An organizational culture that values transparency, open communication, and a commitment to continuous improvement is more likely to benefit substantially from these initiatives. The organizational culture establishes the framework for prioritizing safety and integrating it into daily operations [95,96].

Riaz et al. Vadil and Apostol, and Ismail et al. [97–99] conducted research at a hospital renowned for its robust safety-oriented culture, and their findings underscored the pivotal role of the safety culture in the effective implementation of patient safety initiatives, including checklists and error reporting systems. The organization's unwavering commitment to transparency, open communication, and continuous improvement significantly contributed to fostering a culture of safety [97,99].

Similarly, Lee et al. DiCuccio, and Jylhä et al. [100–102] investigated the influence of organizational culture on patient safety outcomes within healthcare systems. They found that a culture valuing transparency, ensuring efficient information management, encouraging open reporting of errors and near misses, and promoting a culture of continuous learning and improvement was associated with reduced patient harm and improved healthcare quality.

A culture of transparency creates an environment where healthcare workers feel comfortable openly reporting errors and near misses without fear of retribution. This openness ensures that incidents are documented and promptly addressed, reducing the likelihood of recurrence [103,104]. Open communication within this culture fosters effective teamwork and information sharing among healthcare teams, significantly decreasing the risk of misunderstandings and errors by ensuring the accurate and timely conveyance of critical information [105].

Furthermore, a culture of continuous improvement encourages a proactive approach to patient safety [106,107]. Healthcare organizations that embrace this culture consistently evaluate their processes, pinpoint areas for enhancement, and implement changes to prevent errors. A patient safety-centric culture

**Table 5**  
The list of articles about the role of organizational culture.

Authors, Publication year	Themes
Riaz et al., 2023; Vadil, & Apostol, 2023; Ismail et al., 2023	Significance of a safety-oriented culture in healthcare organizations, emphasizing transparency, open communication, and continuous improvement
Cruz, 2023; Aldughmi, 2023	Role of transparency and open communication in creating a safe environment for reporting and addressing errors within the culture
Lee et al., 2019; DiCuccio, 2015; Jylhä, 2017	The impact of a culture that values continuous learning and improvement in reducing patient harm and enhancing healthcare quality

prioritizes patient well-being and seeks ways to minimize patient harm [97]. It ensures patient safety is at the forefront of decision-making and care delivery.

## 4. Discussion

Patient safety is a major concern in healthcare. This narrative review delves into the effectiveness of checklists and error reporting systems in enhancing patient safety in hospital settings. These tools have become valuable instruments for standardizing medical procedures, improving communication among healthcare teams, and identifying and preventing errors. However, their implementation can be challenging, including resistance or hindrances to change and liability concerns. Additionally, the potential for technological integration offers new avenues for error identification and prevention. At the same time, the role of organizational culture in shaping the success of patient safety initiatives cannot be understated. This review examines these aspects in detail, providing valuable insights into the complex landscape of patient safety in healthcare settings.

### 4.1. Effectiveness of checklists and error reporting systems

The findings of this narrative review shed light on the critical role of checklists and error reporting systems in enhancing patient safety and reducing medical errors in hospital settings. This comprehensive analysis encompasses a range of studies, each contributing to a more profound understanding of the effectiveness of these tools.

The integration of checklists in healthcare is seen as a breakthrough in standardizing medical procedures. These tools effectively reduce variations in healthcare delivery, as noted by Lancaster and Wick [11] and Martins et al. [12]. The standardization achieved by checklists ensures consistent adherence to established protocols, minimizing deviations in clinical practice, as Frank et al. [15] have emphasized. This uniformity is paramount in promoting patient safety and helps in reducing the likelihood of human error in healthcare processes.

The inspiration for incorporating checklists in healthcare stems from the aviation industry. The positive outcomes resulting from this integration have been evidenced in a number of studies [18–21]. The transfer of this concept from aviation to healthcare highlights the adaptability and effectiveness of checklists in

improving safety in diverse settings.

A stand-out illustration of the impact of checklists is in the realm of surgical safety. Surgical safety checklists have been instrumental in significantly reducing surgical errors, including wrong-site surgeries and instrument mishaps, as demonstrated by Ragusa et al. [22] and Romig et al. [23]. Such reductions have direct and immediate implications for patient safety, emphasizing the critical role of checklists in preventing potentially catastrophic errors. Effective communication within healthcare teams is a linchpin of patient safety. Checklists emerge as valuable tools in this respect, as highlighted by Bearman et al. [30] and Halverson and Scott Tilley [31].

The pivotal role of both checklists and error reporting systems in facilitating communication ensures that critical health information is shared and understood, significantly reducing the risk of misunderstandings and errors. Checklists are also valuable in minimizing medication administration errors, including dosage errors and drug interactions. The studies by Sassoli and Day [40] and Series [41] underscore the effectiveness of checklists in this context. Reducing medication errors is paramount to patient safety, and checklists are a practical solution to achieve this goal.

Error reporting systems emerge as a complementary component in the quest for patient safety. They play a pivotal role in identifying system weaknesses and error patterns, as exemplified by the work of McKaig et al. [46]. These systems contribute to the development of a safety culture, as emphasized by McFarlane and Turner [47] and Weaver and Edrees [48]. Encouraging healthcare workers to report near misses and adverse events promotes organizational learning and error prevention.

Analyzing reported incidents, a key function of error reporting systems, allows healthcare organizations to identify trends and root causes. This insight enables the implementation of preventive measures, a proactive approach that is fundamental in improving patient safety, as seen in the study by Voorde and France [55]. According to Shekar and Brennan [49], the emphasis has consistently been on transforming the attitudes of healthcare professionals in the context of medical errors. A shift is required in the overarching organizational culture that aligns with the principles of duty of care and transparency, extending not only to patients but also to the clinical staff. Collaborative efforts among healthcare providers are crucial for prescribing, administering, and monitoring medications. Establishing a robust interdisciplinary collaboration is essential to ensuring the safe use and distribution of medications. An advantage of such collaboration is implementing an effective error reporting system, which enhances overall patient safety by identifying and addressing potential issues in medication-related processes [50–53].

A solid grasp of patients' comprehension and perceived risk regarding medical errors is essential. The findings presented in this narrative review collectively emphasize the profound impact of checklists and error reporting systems in enhancing patient safety and reducing medical errors in hospital settings. The interconnection between checklists and medical error systems lies in their collaborative efforts to enhance patient safety and mitigate risks within healthcare settings. Medical error systems rely on accurate and timely reporting, often facilitated by checklists, to identify potential risks and areas for improvement [69,108].

The standardization of procedures, reduction of surgical errors, improved communication, minimization of medication errors, and promotion of a safety-oriented culture are all integral components of these tools' effectiveness. The connection between checklists and medical error systems becomes apparent, as checklists contribute to the proactive prevention of errors by standardizing procedures and reducing the likelihood of oversight. Healthcare organizations should take note of these findings and continue to prioritize the

implementation of checklists and error reporting systems to safeguard patient well-being and improve patient care and the overall quality of healthcare delivery.

#### 4.2. Challenges and considerations

As discussed in section 4.1, the effectiveness of checklists and error reporting systems in enhancing patient safety and reducing medical errors is unquestionable. However, the successful implementation of these patient safety initiatives in healthcare settings has its fair share of challenges and considerations, as highlighted in this section.

One of the foremost challenges in implementing patient safety initiatives, such as checklists and error reporting systems, is resistance to change among healthcare professionals. This resistance is rooted in healthcare practitioners' familiarity with established practices. The comfort of routine can often hinder the adoption of new tools and procedures, as observed in the studies by Cheema and Robertson [60], Curran et al. [61], and Petersson et al. [62].

Overcoming resistance, challenges, and hindrances requires a well-thought-out strategy that includes training and clear communication on the benefits and importance of patient safety initiatives.

In the study conducted by Harris et al. [59], patients attached much importance to receiving PASCs before surgery. They specifically valued having enough time to use the checklist proactively. Timing is critical, and patients prefer receiving the checklist promptly before being admitted to the hospital to ensure adherence to its recommendations. Regarding the design of PASCs, patients raised concerns about specific questions being too similar, the need for an electronic version, the importance of having an adjustable checklist, and challenges in understanding checklist items. Adjusting a checklist can be done by adding or removing items based on specific requirements or by enabling users to prioritize checklist items based on urgency or importance. The study noted that the checklist contained more items than deemed necessary. It also found that the main driver for utilizing PASCs is the impetus, it provides for patients to communicate with healthcare professionals. In this context, PASCs serve as a tool that prompts patients to seek more information, offering guidance on the surgical pathway and highlighting information that they might not otherwise have considered necessary. While PASCs contribute to an increased sense of safety and control by providing structured information, patients expressed a desire for greater involvement on the part of healthcare professionals. The findings indicate that PASCs foster a heightened focus on safety and control over patients' situations.

Healthcare practitioners often express concerns regarding the potential legal repercussions of reporting errors or near misses through error reporting systems. This apprehension can act as a significant barrier to reporting. The studies conducted by Benevento et al. [63], Hamdan et al. [64], and Yali and Nzala [65] underscore the real concerns among healthcare professionals regarding liability. To address this, healthcare organizations must establish safe reporting environments where individuals can report errors without fear of punitive measures. Legal protections and safeguards can also be implemented to encourage error reporting without undue consequences.

Some healthcare workers may need to be made aware of the existence or significance of patient safety initiatives. This absence of awareness can limit the adoption of these valuable tools. The studies by Abraham et al. [66] and Whig et al. [67] emphasize the need for comprehensive education and awareness programs within healthcare organizations. Increasing awareness about the importance of patient safety initiatives is crucial for their successful

implementation.

Inadequate training and education on checklists and error reporting systems can lead to improper utilization and hinder adoption. Proper training is essential for healthcare professionals to understand the correct use of these tools and their potential benefits. The studies conducted by Renouard et al. [69] and Nyamtema et al. [68] highlight the significance of comprehensive training programs. These programs should be ongoing to ensure that healthcare staff are continually updated on the best practices related to these initiatives.

Integrating technology, particularly EHRs, may require more support from healthcare providers who are either uncomfortable with or resistant to technology-based solutions. The studies by Talwar et al. [71] and Heath et al. [70] draw attention to this challenge. To address this, organizations must invest in training and support systems that help healthcare professionals become proficient with technology-based solutions. Additionally, involving healthcare professionals in designing and selecting technology tools can help mitigate resistance and improve acceptance.

Successful implementation of patient safety initiatives such as checklists and error reporting systems in healthcare settings is essential to enhance patient safety. However, healthcare organizations must proactively address the challenges and considerations discussed in this section. Overcoming resistance to change, addressing liability concerns, increasing awareness, providing adequate training and education, and effectively integrating technology are all critical steps towards ensuring the effective adoption of these valuable tools, ultimately contributing to improved patient safety and reduced medical errors in hospital settings.

#### 4.3. Potential for technological integration

Integrating emerging technologies, such as EHRs and AI, into healthcare settings holds substantial promise for enhancing the effectiveness of checklists and error reporting systems in identifying and preventing errors. The potential of technological integration in healthcare is a crucial topic with far-reaching implications for patient safety and error reduction.

Integrating EHRs with checklist systems is a significant step forward in healthcare. The studies by Kawamoto et al. [78] and Vellela et al. [79] reveal that EHR-integrated checklists can potentially improve patient data completeness and accuracy. This integration empowers healthcare providers to make more informed decisions, ultimately reducing errors associated with data entry. EHRs, when linked with error reporting systems, can offer a comprehensive view of patient information, enabling better-informed decisions and reducing the chances of medical errors. The accuracy and completeness of patient data are critical for error prevention, and EHRs integration is a substantial leap in this direction. The use of AI for error prediction is a cutting-edge development with immense potential. The studies by Alowais et al. [80] and Shahid and Khattak [81] demonstrate the capability of AI algorithms to analyze extensive datasets and identify error-related patterns. This proactive approach allows healthcare organizations to prevent errors through targeted interventions. AI can analyze historical data to detect patterns that human oversight might miss, helping to predict and prevent errors. AI-powered predictive models can offer real-time insights into potential errors, allowing healthcare providers to take preventive measures promptly.

Technology can provide real-time alerts to healthcare providers when they are on the verge of making potential errors, such as prescribing medications that might interact unfavorably with a patient's existing drugs. This real-time support can be a game changer in preventing errors, as highlighted by the studies by Dhinakaran et al. [87] and Shumba et al. [88]. By offering immediate

feedback and warnings, technology can help healthcare professionals make more informed decisions, reducing the likelihood of errors. Real-time alerts act as a safety net, catching potential mistakes before they result in harm. The use of technology significantly contributes to the enhancement of communication among healthcare teams. Secure messaging systems and digital checklists enable instantaneous updates and information sharing, as observed in the studies by Mathias [89], Robinson and CPXP [90], and Taylor et al. [91]. Establishing effective communication is key to ensuring patient safety, and technology reduces the risk of misunderstandings and errors. By ensuring that critical information is shared promptly and accurately, technology enhances teamwork and coordination among healthcare providers.

The potential of technological integration in healthcare is promising in terms of enhancing patient safety and reducing medical errors. The integration of EHRs, the application of AI for error prediction, real-time alerts, and improved communication through technology are innovative ways to identify and prevent errors. When effectively implemented, they can revolutionize patient safety in hospital settings, ensuring a higher standard of patient care. However, when employing these tools, it is essential to ensure they are user-friendly and to integrate them seamlessly into healthcare workflows to maximize their benefits for patients and healthcare providers.

#### 4.4. Role of organizational culture

The significance of organizational culture in healthcare must be balanced, particularly regarding the effectiveness of patient safety initiatives such as checklists and error reporting systems. A healthcare organization's culture sets the stage for prioritizing, practicing, and integrating safety into daily operations. The studies and findings mentioned in this section shed light on the crucial role of organizational culture in patient safety.

The studies by Riaz et al. [97], Vadil and Apostol [98], and Ismail et al. [99] within a hospital renowned for its robust safety-oriented culture underscores the pivotal role this culture plays in the effective implementation of patient safety initiatives. The organization's unwavering commitment to transparency, open communication, and the pursuit of continuous improvement significantly contributes to fostering a culture of safety. A safety-oriented culture prioritizes patient well-being and seeks ways to minimize patient harm. It ensures patient safety is at the forefront of decision-making and care delivery. Both checklist and error reporting systems contribute to a culture of safety within healthcare organizations, ultimately enhancing patient outcomes and satisfaction [109]. They also support continuous quality improvement efforts by providing valuable data and insights into areas where processes can be refined or enhanced to minimize the risk of errors and adverse events [110].

A culture of transparency creates an environment where healthcare workers feel comfortable openly reporting errors and near misses without fear of retribution. This openness ensures that incidents are documented and promptly addressed, reducing the likelihood of recurrence. The studies by Cruz [104] and Aldughmi [103] emphasize the importance of this aspect of culture in creating a safe environment for reporting and addressing errors. Open communication within this culture fosters effective teamwork and information sharing among healthcare teams, significantly decreasing the risk of misunderstandings and errors by ensuring the accurate and timely conveyance of critical information. Promoting a culture centered on continual improvement fosters a proactive stance toward ensuring patient safety.

Healthcare organizations that embrace this culture consistently evaluate their processes, pinpoint areas for enhancement, and



implement changes to prevent errors. The studies conducted by DiCuccio [100], Jylhä et al. [101], and Lee et al. [102] underscore the positive impact of a culture that values continuous learning and improvement. This culture focuses on addressing errors and actively seeks opportunities to enhance healthcare quality and patient safety.

The findings mentioned in this section highlight the indispensable role of organizational culture in patient safety initiatives. An organizational culture that values transparency, open communication, and a commitment to continuous improvement is more likely to benefit substantially from these initiatives. Such a culture sets the tone for how safety is integrated into daily operations and ensures that patient safety remains a fundamental aspect of healthcare activities. As healthcare organizations strive to enhance patient safety and reduce medical errors, fostering a culture that embodies these principles becomes paramount.

## 5. Recommendations

This narrative review on the effectiveness of checklists and error reporting systems in improving patient safety and reducing medical errors within hospital settings yields the following recommendations.

- (1) Healthcare organizations should prioritize the development of a culture of safety that values transparency, open communication, and continuous improvement. This culture should be embedded at all levels of the organization to encourage reporting, learning from errors, and proactive prevention.
- (2) Healthcare professionals should receive comprehensive training on checklists and error reporting systems. Regular training updates and educational programs should be provided to ensure that staff are well informed about these initiatives.
- (3) To overcome resistance to change among healthcare professionals, organizations should implement strategies that include clear communication about the benefits and importance of patient safety initiatives. Involving healthcare staff in designing and selecting tools and systems can also mitigate resistance.
- (4) Healthcare organizations should establish safe reporting environments where individuals can report errors without fear of punitive measures. Legal protections and safeguards should be in place to encourage error reporting without undue consequences.
- (5) Emerging technologies, such as EHRs and AI, should be employed to enhance the effectiveness of checklists and error reporting systems. Healthcare organizations should ensure that technology is user-friendly and seamlessly integrated into healthcare workflows to maximize the benefits.
- (6) Healthcare organizations should continuously evaluate and improve patient safety initiatives. They should regularly assess the effectiveness of checklists and error reporting systems, identify areas for enhancement, and implement changes to prevent errors.
- (7) Healthcare organizations should encourage interdisciplinary collaboration and effective communication among healthcare teams. Digital checklists, secure messaging systems, and real-time alerts can facilitate instantaneous updates and information sharing, reducing the risk of misunderstandings and errors in patient care.
- (8) Healthcare organizations should leverage data analytics to identify trends and patterns in patient safety incidents. They should implement data-driven decision-making to address

potential issues and continuously and proactively enhance patient safety.

- (9) Healthcare organizations should involve patients in safety by encouraging them to report any concerns or errors. Patient engagement is a valuable aspect of a comprehensive patient safety program.
- (10) Healthcare organizations should use benchmarking activities to compare patient safety outcomes with other institutions. Learning from high-performing institutions' best practices can improve patient safety.
- (11) Leadership within healthcare organizations should be committed to patient safety and actively promote and support patient safety initiatives. This commitment sets the tone for the entire organization.
- (12) Healthcare organizations should stay current with regulatory requirements and standards related to patient safety. Compliance with these standards is essential to maintaining high patient safety.

When implemented thoughtfully and comprehensively, these recommendations enhance the quality of care, ensure patient safety, and mitigate medical errors in hospital settings. They reflect the essential findings and themes highlighted in the literature review.

## 6. Conclusion

Checklists and error reporting systems enhance hospital patient safety by standardizing care, improving communication, and identifying system weaknesses. They are integral in fostering a culture of continuous improvement and learning from mistakes to prevent their recurrence. Adoption challenges persist, and therefore technology integration and a supportive organizational culture are mandatory to maximize the impact of checklists and error reporting systems. Resisting change and the need for continuous training and support are key hurdles. Integrating emerging technologies and fostering a culture of continuous improvement can further enhance the efficiency and effectiveness of these tools in reducing medical errors and improving patient care. In the complex hospital environment, these tools are of utmost importance in ensuring patient safety and elevating the standard of care. Prioritizing patient safety remains imperative, with checklists and error reporting systems being instrumental in achieving this crucial objective.

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Nothing to declare.

## Data availability statement

The datasets generated during and/or analyzed during the current study are available from the corresponding author upon reasonable request.

## CRediT authorship contribution statement

**Emmanuel Aoudi Chance:** Conceptualization, Methodology, Validation, Formal analysis, Investigation, Data curation, Writing - original draft, Writing - review & editing, Project administration.  
**Dia Florence:** Methodology, Formal analysis, Writing - review & editing.  
**Innocent Sardi Abdoul:** Methodology, Formal analysis, Writing - review & editing.

## Declaration of competing interest

We, Dia Florence, Innocent Sardi Abdoul, and Emmanuel Aoudi Chance, solemnly declare that we have no financial competing interests to disclose. This declaration is a testament to our unwavering commitment to transparency and the highest ethical standards in our research. Furthermore, we have no financial competing interests, such as personal or professional relationships, affiliations, memberships, or other relevant associations, that could be perceived as influencing this research. We affirm that no competing interests could compromise the objectivity and integrity of the research presented in this article. The study, meticulously conducted following ethical standards and guidelines, is a testament to our commitment to delivering valid and reliable findings.

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## Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.ijnss.2024.06.003>.

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