Original Article

EXPLORING THE CHALLENGES OF PAPER-BASED DOCUMENTATION IN CLINICAL AND ADMINISTRATIVE DEPARTMENTS AT EDWARD FRANCIS SMALL TEACHING HOSPITAL, THE GAMBIA.

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Abstract: Effective records management is essential for quality health care delivery, administrative efficiency, and institutional accountability. Despite global progress toward digital health systems, many health care facilities in low- and middle-income countries continue to rely on paper-based documentation. This study investigated the challenges associated with paper-based documentation within the clinical and administrative departments of the EFSTH in the Gambia. A qualitative descriptive cross-sectional study design was employed. Primary data were collected across all hospital departments using structured visual inspections and face-to-face interviews with Heads of Departments (HoDs), who were purposively selected based on their managerial roles and experience with records management. An inspection checklist was used to assess the availability of digital infrastructure, storage capacity, documentation practices, and the safety and security of patient data. The qualitative inquiry was guided by a standardized interview schedule. Interview data were analyzed thematically and triangulated with observational findings.

The study revealed significant challenges associated with the continued use of paper-based records, such as high volumes of manual documentation, inadequate storage space, lack of secure filing infrastructure, and absence of designated records personnel. These challenges contributed to the frequent loss, misplacement, and damage of patient records, delayed information retrieval, and disruption of clinical and administrative workflows. Poor documentation practices, such as illegible handwriting, incomplete entries, and inconsistent record-keeping, further undermined communication, collaboration, and clinical decision-making, increasing the risk of medical errors. Patient confidentiality and data security concerns were evident due to unrestricted access and insufficient physical safeguards. The paper-based systems increased staff workload, delay reporting, and reduce the time available for direct patient care.

The findings highlight the inadequacy of paper-based documentation systems in meeting a tertiary and teaching hospital's operational demands. The study recommends strengthening records governance, investing in secure storage infrastructure, designating and training records personnel, streamlining procurement processes, and gradually transitioning to an EHR system to improve efficiency, patient safety, and overall healthcare outcomes at EFSTH.

Keywords: Paper-based documentation, Health information systems, Records management, Electronic health records, EFSTH, Digital health, The Gambia

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Introduction

Health information systems are a critical component of modern health care delivery, providing the foundation for effective patient care, administration, monitoring, and strategic decision-making. However, in many low- and middle-income countries (LMICs), healthcare institutions continue to rely heavily on paper-based documentation systems, which are increasingly viewed as inefficient, error-prone, and unsustainable (WHO, 2016; Mikkelsen-Lopez et al., 2017). The Edward Francis Small Teaching Hospital (EFSTH)**,** the Gambia's premier tertiary and teaching hospital, remains largely dependent on such paper-based systems for both clinical and administrative functions. This study explores the challenges associated with paper-based documentation in both the clinical and administrative departments of EFSTH, highlighting systemic and operational inefficiencies that may hinder service delivery and institutional development.

Although historically essential, paper-based documentation has several inherent limitations, such as difficulties in storage and retrieval, high vulnerability to damage or loss, and an increased risk of human error (Nguyen et al., 2014). These systems are often characterized by fragmented record-keeping, illegible handwriting, data duplication, and delayed access to critical patient and administrative information (Odekunle et al., 2017). In clinical settings, such inefficiencies can result in compromised continuity of care, delayed diagnoses, medication errors, and overall reduced quality of care (Chaudhry et al., 2006). In administrative contexts, paper records impede timely decision-making, auditing, and reporting, thereby affecting overall hospital performance.

The World Health Organization (2016) emphasized the importance of transitioning to digital health systems to improve data quality, enhance service efficiency, and support universal health coverage. However, the shift from paper-based to digital systems is often met with structural and systemic challenges, particularly in resource-constrained settings such as the Gambia. These include inadequate ICT infrastructure, lack of trained personnel, resistance to change, and limited institutional readiness (Akanbi et al., 2012; Fraser et al., 2017).

At EFSTH, anecdotal evidence indicates that the persistent use of paper-based systems has created administrative bottlenecks and clinical delays, especially in high-demand departments such as Outpatient Services, Pharmacy, and Records. Moreover, the dual role of EFSTH as a clinical service provider and a training institution for health professionals underscores the importance of reliable and efficient data systems for academic supervision, research, and performance evaluation. The absence of an integrated digital documentation system may negatively impact the quality of patient care and the learning experience of students**.**

Several studies have documented the negative consequences of the prolonged use of paper-based systems in similar contexts. For example, Odekunle et al. (2017) conducted a study in Nigeria and revealed that 64% of hospital workers considered paper records cumbersome, while 78% believed digital systems would improve efficiency. Similarly, in Kenya, Fraser et al. (2017) found that digitizing medical records significantly reduced waiting times and improved clinical workflow. These findings underscore the need to critically examine the continuing use of paper systems and identify actionable strategies for transitioning to DHS. Therefore, this study aimed to explore the challenges of paper-based documentation in both clinical and administrative departments at the EFSTH**.** The study seeks to uncover institutional constraints, user experiences, and perceptions regarding paper-based systems and inform policy and strategic planning toward digital transformation in Gambia's leading health institution.

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Literature Review

The literature on HIS and documentation practices in health care settings is vast and multidisciplinary. The literature is reviewed under three key dimensions: conceptual**,** theoretical**,** and empirical**.** This framework provides a comprehensive understanding of the subject matter, informs the design of the study, and guides data interpretation.

Conceptual Review

Documentation within a health management information system (HMIS) represents the structured process of collecting, recording, storing, and utilizing health data to improve clinical care, service delivery, resource allocation, and public health planning. It forms the foundation upon which evidence-based decision-making is built at all levels of the health system, from assistance national policy development. In health systems, especially in low- and middle-income countries like The Gambia, effective documentation ensures continuity of care, enables performance monitoring, supports disease surveillance, and facilitates program planning. According to the World Health Organization (2008), a well-functioning health management information system (HMIS) must produce accurate, timely, and complete data to inform health policies and decisions. Without proper documentation, health professionals and managers often operate in the dark, leading to inefficiencies and poor health outcomes. HMIS documentation typically includes three major components. The first component is clinical documentation, which involves patient records, laboratory test results, prescriptions, diagnoses, and discharge summaries. The second type of documentation is administrative documentation, which covers staff rosters, supply inventory, infrastructure details, and financial records. Third, programmatic documentation involves indicators related to service delivery (e.g., maternal health and immunizations) and program evaluations. Together, these components form a comprehensive picture of the performance and needs of health services.

In many health facilities across Africa, documentation is still largely paper-based, using manual registers and forms. Although this method is low-cost and easy to implement, it has major drawbacks. Paper records are vulnerable to physical damage, loss, and illegibility. They also hinder timely data retrieval and aggregation, making real-time decision-making difficult (Akanbi et al., 2012). In contrast, EHRs and digital HMIS platforms improve data accuracy, facilitate analysis, and enhance security (Nguyen et al., 2014). However, transitioning to digital systems presents its own challenges, especially where infrastructure, skills, and funding are limited (Fraser et al., 2017).

Good documentation practices provide several quality standards: accuracy, completeness, timeliness, consistency, and confidentiality. When these standards are met, the resulting data can be trusted for planning and evaluation. Health systems often rely on standard operating procedures, training programs, supervision tools, and feedback mechanisms to ensure these standards (MEASURE Evaluation, 2007). However, HMIS documentation is often hindered by several systemic challenges. These include staff shortages, lack of training in record-keeping, fragmented forms and tools, limited IT infrastructure, and poor data use culture (AbouZahr & Boerma, 2005). These factors not only affect data quality but also reduce managers' ability to make informed decisions.

Theoretical Framework

The theoretical foundation for this study is anchored in two interrelated theories: DeLone and McLean's (2003) Information Systems Success Theory and Rogers's (2003) Diffusion of Innovations Theory. These theories

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provide a lens through which the challenges, usage, and impacts of documentation systems in HIM can be critically analyzed.

1. Success theory of information systems (DeLone & McLean, 2003)

The DeLone and McLean IS success model provides a comprehensive and widely accepted framework for evaluating the effectiveness of IS across various sectors, including health care. Originally proposed in 1992 and later updated in 2003, the model identifies six interrelated dimensions that collectively determine the success of an information system: system quality, information quality, service quality, use, user satisfaction, and net benefits (DeLone & McLean, 2003). In the context of EFSTH, this model offers a structured approach to assessing both paper-based and digital documentation systems and identifying performance gaps that affect service delivery.

System quality refers to the technical and functional characteristics of the documentation system, such as usability, reliability, flexibility, accessibility, and response time (DeLone & McLean, 2003). At EFSTH, the current paper-based documentation system presents several system quality challenges, including difficulty in retrieving patient records, vulnerability to physical damage or loss, and limited accessibility across departments. These limitations reduce workflow efficiency and increase the likelihood of clinical decision-making delays.

If a DDS is partially implemented, system quality would be further assessed based on user-friendliness, system downtime, and ease of navigation. A system that is not intuitive or frequently malfunctions discourage consistent use by health care staff. In contrast, a well-designed and reliable system enhances efficiency and reduces staff frustration, thereby encouraging sustained utilization (Petter et al., 2008). Information quality focuses on the output of the documentation system, particularly the accuracy, completeness, consistency, relevance, and timeliness of patient records (DeLone & McLean, 2003). In EFSTH's paper-based system, illegible handwriting, incomplete forms, delayed updates, and inconsistent documentation practices across departments may compromise information quality. These shortcomings can lead to clinical errors, test duplication, and poor continuity of care.

High-quality information is especially critical in health care settings, where accurate and timely patient data are critical for clinical decisions. Improving documentation practices—whether through standardized paper forms or electronic systems—can significantly enhance information quality, leading to better diagnosis, treatment, and patient outcomes (World Health Organization, 2016). Service quality, introduced in the updated 2003 model, refers to the quality of support provided to users of the information system, including training, technical assistance, responsiveness, and system maintenance (DeLone & McLean, 2003). In EFSTH, service quality is particularly relevant when transitioning from a paper-based to a digital system. Inadequate training, limited technical support, or slow response to system issues can negatively affect staff confidence and willingness to use the system. High service quality ensures that users feel supported and capable of using the documentation system effectively. This is crucial in health care environments with high staff workloads and low tolerance for system inefficiencies. Effective user support positively influences both system use and user satisfaction (Petter et al., 2008).

The "use" dimension measures the extent, frequency, and appropriateness of users' system utilization (DeLone & McLean, 2003). At EFSTH, the level of use of the documentation system may vary significantly among departments and staff categories. Underuse in paper-based systems may manifest as incomplete records or delayed

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documentation. Low use of digital systems may result from resistance to change, lack of training, or poor system quality.

Importantly, use is both a cause and an effect of other dimensions. High system and information quality tend to increase use, while increased use can further improve user familiarity and efficiency. However, forced use of a poorly designed system may not yield positive outcomes, highlighting the importance of aligning system design with user needs (Seddon, 1997). User satisfaction reflects users' overall attitudes toward the documentation system and its perceived value (DeLone & McLean, 2003). Dissatisfaction with the paper-based system in EFSTH may stem from time-consuming documentation processes, difficulties in retrieving records, and frequent errors. Similarly, dissatisfaction with digital systems may arise if they are complex, unreliable, or poorly supported.

User satisfaction is a critical indicator of system success because satisfied users are more likely to use the system consistently and effectively. Numerous studies have demonstrated a strong relationship between user satisfaction, system use, and perceived benefits in healthcare information systems (Petter et al., 2008).Net benefits represent the overall impact of the documentation system on individuals, organizations, and the broader health system (DeLone & McLean, 2003). At EFSTH, net benefits may include improved clinical decision-making, enhanced patient safety, and reduced medical errors, improved efficiency, better planning and reporting data, and overall improvement in health service delivery.

Inadequate documentation systems, particularly paper-based ones, often limit these benefits by contributing to inefficiencies, data fragmentation, and poor information flow. According to DeLone and McLean (2003), improvements in system, information, and service quality lead to increased use and user satisfaction, which in turn generate positive net benefits. These benefits ultimately translate into better patient outcomes and improved organizational performance in the healthcare context. The DeLone and McLean IS Success Model is particularly relevant for EFSTH because it allows for a multidimensional evaluation of the hospital's documentation system rather than focusing solely on technology. EFSTH can identify specific weaknesses in its current paper-based or hybrid system by examining system, information, and service quality. Furthermore, analyzing use and user satisfaction helps uncover behavioral and organizational barriers to effective documentation. Ultimately, assessing net benefits provides evidence of how documentation practices affect health service outcomes.

2. Diffusion of Innovations Theory (Rogers, 2003)

Rogers' theory explains how, why, and at what rate new ideas and technologies are spread throughout organizations. It is particularly applicable in understanding the adoption or resistance to transitioning from paper-based to electronic documentation systems at EFSTH. The theory identifies five key attributes that influence the adoption of innovations: relative advantage, compatibility, complexity, trialability, and observability. In the EFSTH context, staff perceptions of whether digital systems offer better benefits than paper systems (relative advantage), how compatible they are with existing workflows, and how difficult they are to use (complexity) will affect uptake and utilization. The slow transition to digital systems in many low-income health settings has often been attributed to concerns about infrastructure, training, and workload (Nguyen et al., 2014; Fraser et al., 2017). The application of this theory explores the human and organizational factors that support or hinder innovation in documentation practices. It also helps frame strategies for improving the implementation and sustainability of HISs in resource-constrained settings.

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3. **Strengthening Framework for Health Systems (WHO, 2007)**

The World Health Organization's Health Systems Strengthening Framework provides a comprehensive approach to understanding how health systems function and how they can be improved to achieve better health outcomes. The framework identifies six interrelated building blocks essential for a well-functioning health system: service delivery, health workforce, health information systems, access to essential medicines, health financing, and leadership and governance (WHO, 2007). Among these building blocks, health information systems (HIS) are central because they generate the data required to inform decision-making, support service delivery, and enhance overall system performance.

Health Information Systems are responsible for the collection, processing, analysis, dissemination, and use of health-related data. According to the WHO (2007), a strong HIS produces reliable, timely, accurate, and complete information that supports policy development, planning, monitoring, and evaluation. A fundamental output of an effective HIS is quality documentation, as it represents the primary source of data generated at the point of service delivery. Maintaining high data quality is often challenging in settings where documentation systems are predominantly paper-based. Paper records are susceptible to loss, physical damage, duplication, and inconsistent storage practices. In addition, manual data entry increases the likelihood of errors, incomplete records, and data availability delays. These limitations compromise the reliability and usefulness of health information, thereby weakening the building block of HIS (WHO, 2007).

Effective service delivery depends on the availability of accurate and timely clinical and administrative information. The World Health Organization (2007) emphasized that health services should be safe, effective, people-centered, timely, equitable, and efficient. Poor-quality documentation undermines these goals by limiting continuity of care, delaying service provision, and increasing the risk of errors. Paper-based documentation systems often hinder information sharing across departments and care levels. Fragmented records make it difficult to track patient histories, monitor service utilization, and evaluate service outcomes. Consequently, service delivery becomes less coordinated and less responsive to patient and population needs (WHO, 2007).

The health workforce is another critical building block of the health, social, and safety framework. Health workers rely on documentation systems to communicate, coordinate care, and record service delivery activities. Inefficient documentation processes, particularly those based on paper, place a significant administrative burden on health workers, reducing the time available for direct service provision. The World Health Organization (2007) notes that a well-functioning health information system (HIS) should support health workers by simplifying data collection and improving access to information. Poor documentation quality such as illegible handwriting, incomplete records, and inconsistent formats can lead to miscommunication, clinical errors, and reduced staff efficiency. These challenges may contribute to frustration, low morale, and reduced productivity among health workers over time.

Leadership and governance depend on high-quality information to ensure transparency, accountability, and effective oversight. According to the World Health Organization (2007), reliable health data are essential for monitoring system performance, enforcing standards, and informing strategic decisions. Weak documentation systems limit the availability of accurate data, reducing decision-makers' ability to assess service quality, resource use, and health outcomes. Paper-based systems are also more vulnerable to data manipulation, loss, and

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confidentiality breaches. These risks undermine trust in health information and weaken governance mechanisms. Therefore, strengthening documentation systems is critical for enhancing accountability and EBL within health systems (WHO, 2007).

Health financing decisions rely on accurate service utilization, cost, and population health needs data. Poor documentation quality can result in inaccurate reporting, delayed claims processing, and inefficient resource allocation. The WHO (2007) emphasized that strong HIS are essential for financial planning, budgeting, and evaluating the efficiency and equity of health expenditures. Inadequate documentation weakens health systems' ability to forecast needs, mobilize resources, and ensure value for money. Consequently, weaknesses in documentation systems can have far-reaching effects on health system sustainability and performance. Improving documentation systems is a strategic intervention with system-wide benefits within the WHO Health Systems Strengthening Framework. Strengthened documentation enhances the HIS building block's performance and improves service delivery, workforce efficiency, governance, and financing. The World Health Organization (2007) highlights that investments in HIS yield high returns by improving data quality, data use, and overall health system performance.

Empirical Review

Empirical studies have consistently highlighted the limitations of paper-based documentation in health care institutions, especially in low- and middle-income countries, such as those in sub-Saharan Africa. These limitations include inefficiencies in data storage and retrieval, increased risk of errors, lack of real-time access, and difficulties in data integration for effective clinical and administrative decision-making. Therefore, the following section reviews selected empirical articles that explore these issues, focusing on their methodologies, key findings, and relevance to improving health care documentation practices.

The study conducted by Akanbi et al. (2012) provides an important examination of the use of EHRs in sub-Saharan Africa, with particular emphasis on the challenges posed by the continued reliance on paper-based health information systems. The authors situate their research within the broader context of health system strengthening in low- and middle-income countries, where accurate, complete, and timely health data are essential for effective clinical decision-making and service delivery. In many sub-Saharan African countries, patient records are predominantly paper-based, which has contributed to fragmented documentation, missing clinical information, and delays in patient care. This study aimed to assess the extent of EHR adoption in the region and identify the benefits and obstacles associated with EHIS.

This study employed a systematic literature review design. Rather than collecting primary data from health care facilities, the researchers analyzed existing published studies that documented the implementation and use of EHR systems in SA. Literature search was conducted using major electronic databases, including PubMed and Google Scholar. To ensure comprehensive coverage, search terms such as "Electronic Health Records," "Electronic Medical Records," "E-Health," and "Medical Informatics," combined with "Africa" and individual country names, were used. Studies were included if they provided empirical evidence of EHR use in African health care settings, whereas opinion articles, commentaries, duplicate publications, and studies without clear documentation of EHR implementation were excluded. Through this rigorous screening process, an initial pool of 147 publications was narrowed down to 21 relevant studies originating from 15 SA countries. The selected

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studies were then analyzed qualitatively to identify common themes related to system implementation, functionality, benefits, and challenges. The countries represented in the review included Nigeria, Kenya, Uganda, Mali, Tanzania, Cameroon, and others. A significant proportion of the reviewed studies focused on disease-specific programs, particularly HIV/AIDS care, where international funding and donor-supported initiatives had facilitated the early adoption of electronic systems. This regional and multi-country perspective allowed the authors to draw broader conclusions about the state of EHR adoption across sub-Saharan Africa rather than attributing findings to a single national context.

The study findings revealed that EHR adoption in sub-Saharan Africa was still limited as of 2012. The overwhelming reliance on paper-based systems resulted in fragmented and incomplete patient records, as information was often stored in multiple files or locations and was vulnerable to loss or damage. Poor data quality was also associated with manual documentation processes, including transcription errors, illegible handwriting, and delayed data entry. These shortcomings, such as longer patient waiting times and difficulties in retrieving historical clinical information, contributed to inefficiencies in service delivery. Where EHR systems had been implemented, the study found that most relied on open-source software platforms, particularly OpenMRS, which were favored due to their flexibility, lower cost, and adaptability to local contexts.

Despite the potential benefits of EHRs, several persistent barriers to their widespread adoption were identified. These included high implementation and maintenance costs, inadequate infrastructure (e.g., unreliable electricity and limited internet connectivity), and shortages of trained health information technology personnel. Human factors also played a significant role, as many health care workers lacked sufficient computer literacy or were resistant to transitioning from familiar paper-based workflows to electronic systems. In some settings, EHRs were implemented alongside existing paper records, resulting in parallel documentation systems that increased workload rather than improving efficiency. Akanbi et al. (2012) indicated that while EHR systems hold considerable promise for improving data quality, continuity of care, and health system performance in sub-Saharan Africa, their impact remained constrained by systemic and contextual challenges. The authors concluded that paper-based systems continue to dominate health care documentation in the region, perpetuating fragmented records and resulting in delayed service delivery. They argued that the adoption of sustainable EHR would require strong governmental commitment, supportive health policies, investments in infrastructure, and comprehensive training for health care workers. The study ultimately underscored the need for coordinated national and regional strategies to integrate EHRs into broader health information systems, rather than relying on isolated, donor-driven projects.

Similarly, Fraser et al. (2017) conducted a comprehensive examination of the implementation of EMRs in developing countries, with particular attention to the limitations of paper-based documentation systems in modern healthcare environments. The study was motivated by the growing complexity of health care delivery in low- and middle-income countries, especially in large referral and teaching hospitals where clinical care, research, and medical education occur simultaneously. In such contexts, the traditional reliance on paper records has been increasingly viewed as inadequate for managing the volume, complexity, and accessibility demands of contemporary health care systems.

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This study employed a mixed-methods approach that combined qualitative and quantitative techniques to assess EMR implementation and performance in resource-limited settings. The study drew on case studies from developing countries where EMR systems had been introduced, often through collaborations between local health institutions, governments, and international partners. Data collection methods included direct observation of clinical workflows, system usage audits, structured interviews with health care providers and administrators, and reviews of institutional documentation practices before and after EMR implementation. The researchers were able to assess differences in efficiency, data accessibility, record completeness, and continuity of care by comparing paper-based systems with electronic systems in the same or similar institutions. The research was conducted primarily in teaching and tertiary-level hospitals in developing countries, with notable emphasis on sub-Saharan Africa and parts of Asia. Many study sites were large public or mission-supported hospitals that served as referral centers and training institutions for medical students, residents, and allied health professionals. Hospitals are inundated with high patient volumes, diverse clinical specialties, and extensive documentation requirements related to patient care, teaching, and research. The choice of teaching hospitals as study sites was deliberate, as these institutions represent some of the most documentation-intensive healthcare environments in developing countries and therefore provide a critical test case for the adequacy of paper-based versus electronic systems.

The study findings revealed significant weaknesses in paper-based documentation systems. Fraser et al. (2017) observed that paper records lacked the robustness needed to meet the increasing demands of modern health care delivery. In teaching hospitals, patient records often consist of multiple paper files generated across departments, wards, and outpatient clinics, leading to information fragmentation. Clinical notes, laboratory results, imaging reports, and educational documentation were frequently stored separately, making it difficult for health care providers to obtain a comprehensive view of a patient's medical history. This fragmentation was compounded by the absence of centralized data access points, meaning that patient information could only be retrieved by physically locating the relevant files, a time-consuming and error-prone process. The study also highlighted the limited physical space for storing paper records. Many hospitals lack adequate record storage facilities, resulting in overcrowded records rooms, poor filing systems, and deterioration or loss of patient files over time. In some cases, older records were discarded prematurely due to space constraints, undermining longitudinal patient care and limiting opportunities for clinical audit, research, and medical education. These storage challenges had direct implications for administrative efficiency, as staff spent significant amounts of time searching for missing or misplaced files, delaying patient care and increasing operational costs.

In contrast, the implementation of EMR systems demonstrated clear advantages. Fraser et al. found that electronic systems improved centralized access to patient data, allowing authorized users across departments to retrieve records simultaneously. This was particularly beneficial in teaching hospitals, where multiple clinicians, trainees, and educators often require access to the same patient information for clinical decision-making and learning purposes. Furthermore, EMRs supported better continuity of care by maintaining comprehensive, longitudinal patient records that were not constrained by physical storage limitations. Moreover, electronic systems facilitate administrative tasks such as reporting, scheduling, and performance monitoring, thereby enhancing institutional efficiency. However, the authors were careful to note that EMR implementation in developing countries was not without challenges. Issues such as infrastructure limitations, intermittent power supply, limited technical

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expertise, and resistance to change among health care workers were commonly reported. Nevertheless, the study concluded that these challenges were surmountable and that EMRs' long-term benefits outweighed the initial difficulties associated with their adoption. In conclusion, Fraser et al. (2017) argued that paper-based documentation systems are increasingly unsustainable in healthcare settings in developing countries, particularly in teaching hospitals, where documentation demands are high and multifaceted. The study concluded that the lack of robustness, limited storage capacity, and absence of centralized access inherent in paper-based systems significantly hamper administrative efficiency and continuity of care. In contrast, group with EMR offer a more scalable, reliable, and efficient solution for managing clinical and educational documentation. The authors recommend that policymakers and health care leaders in developing countries prioritize investment in EMR systems as part of broader health system strengthening efforts. Overall, the study provides compelling evidence that transitioning from paper-based records to electronic systems is not merely a technological upgrade but a necessary step toward improving healthcare quality, efficiency, and sustainability in resource-limited settings.

In its 2022 report, the World Health Organization provided further evidence supporting earlier research on the systemic challenges faced by health care institutions in low and middle income countries, particularly tertiary and teaching hospitals. The report highlighted how bureaucratic procurement procedures and multiple layers of administrative approval significantly exacerbate operational inefficiencies in these settings. These challenges were shown to directly affect the timely supply of essential materials, including documentation tools, medical consumables, and health information resources, thereby undermining effective health care delivery and continuity of care. This study adopted a comprehensive, multi-country health system assessment approach. The organization drew on a combination of qualitative and quantitative data collected through country-level health system reviews, institutional surveys, key informant interviews and policy document analyses. The data sources included ministries of health, tertiary health care institutions, teaching hospitals, procurement agencies, and frontline health care workers. The methodology emphasized triangulation, whereby findings from administrative records were corroborated with firsthand accounts from health care providers and managers. This approach enabled the World Health Organization (WHO) to capture both the structural and experiential dimensions of procurement and administrative processes within health care systems.

The study was conducted across several regions, with a strong focus on low- and middle-income countries in sub-Saharan Africa, South Asia, and parts of Southeast Asia. Particular attention was paid to tertiary and teaching hospitals, which often operate as national referral centers and health professionals' training hubs. These institutions are typically characterized by complex governance structures, large patient volumes, and extensive documentation requirements related to clinical care, education, research, and reporting obligations. The WHO selected these settings because they represent the highest level of care within national health systems and are therefore especially sensitive to procurement and administrative workflow inefficiencies.

The WHO (2022) report revealed that bureaucratic procurement systems constitute a major bottleneck in hospital operations. In many institutions, the procurement of essential supplies, including paper forms, patient folders, printers, and other documentation tools, required navigating multiple approval layers involving hospital management, procurement units, finance departments, and external regulatory bodies. These procedures require public-sector procurement regulations designed to ensure accountability and transparency, which, in practice,

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resulted in prolonged delays. In some cases, the procurement cycle for basic materials extended for several months, leading to frequent stock-outs and improvization by health care workers. Furthermore, the report found that these delays disproportionately affected documentation and information management processes. When essential documentation tools were unavailable, hospitals reverted to ad hoc solutions, such as reusing old forms, reducing the amount of information recorded, or delaying documentation altogether. This had direct implications for data quality, patient safety, and continuity of care. The effects were even more pronounced in teaching hospitals, as documentation gaps also disrupted clinical teaching, supervision, and research activities. The absence of standardized and readily available documentation materials hindered trainees' ability to learn best practices in clinical record-keeping and limited opportunities for audit and quality improvement.

In addition to procurement delays, the WHO identified weak coordination between administrative units and clinical departments as a compounding factor. Multiple approval layers often resulted in unclear accountability, with no single unit responsible for ensuring timely supply of essential materials. This fragmentation mirrored broader systemic issues within health systems, where siloed operations and hierarchical decision-making structures impeded responsiveness to frontline needs. The report also noted that these bureaucratic challenges often persisted even in hospitals that had begun transitioning to electronic systems, as delays in procuring hardware, software licenses, and maintenance services undermined the effectiveness of digital health initiatives.

In its conclusions, the World Health Organization (WHO) (2022) emphasized that bureaucratic procurement procedures and excessive administrative approval layers represent a significant barrier to efficient health care delivery in tertiary and teaching hospitals. The organization concluded that these challenges not only delay the supply of essential materials but also undermine documentation practices, administrative efficiency and quality of care. The report underscored that addressing these issues requires more than incremental reforms; instead, it called for comprehensive procurement system redesigns that balance accountability with operational efficiency.

The World Health Organization recommended streamlining procurement processes, decentralizing certain approval functions and strengthening supply chain management capacities at the hospital level. It also advocated for aligning procurement reforms with broader health system strengthening and digital health strategies, noting that efficient administrative systems are a prerequisite for successful implementation of EHRs and other health information technologies. Ultimately, the WHO (2022) report reinforced the conclusion that bureaucratic inefficiencies are a critical yet addressable determinant of healthcare system performance in developing countries, particularly in high-demand tertiary and teaching hospital settings.

The European Health Management Association (EHMA, 2024) contributed to the growing body of research on health systems by examining inefficiencies in hospital supply chain and inventory management, particularly within complex health care organizations. The association emphasized that the absence of real-time inventory visibility significantly undermines the ability of hospitals to efficiently identify excess supplies or redistribute them across departments. According to the EHMA, this limitation intensifies shortages in critical units, even when surplus stock exists elsewhere within the same institution. This study situates inventory management as a central administrative and operational challenge that directly affects service delivery, cost efficiency, and patient safety.

The EHMA (2024) study adopted a health management and systems analysis approach, drawing on empirical case studies, cross-sectional surveys, and secondary data analysis. Data were collected from health care managers,

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procurement officers, logistics coordinators, and clinical department heads across a range of hospitals. Institutional audits of supply chain processes and inventory control systems were also incorporated to assess how materials and consumables were tracked, stored, and redistributed. In addition, EHMA reviewed policy documents and operational guidelines governing hospital procurement and logistics, enabling a comparative analysis of best practices and systemic gaps. This mixed-methods approach allowed for triangulation of findings and provided both quantitative indicators of inefficiency and qualitative insights into managerial and operational challenges.

The research was conducted primarily across European health care systems, with representation from tertiary and teaching hospitals in Western, Central, and Southern Europe. These hospitals were selected because of their size, complexity, and high levels of specialization, which make inventory management challenging. Many of the institutions studied functioned as regional or national referral centers, characterized by multiple departments, high patient turnover, and diverse supply needs ranging from pharmaceuticals and medical devices to consumables and documentation materials. While the study focused on European contexts, EHMA explicitly framed its findings as broadly applicable to health care systems globally, particularly in large hospitals facing similar organizational and logistical complexities. The study findings revealed that a lack of real-time inventory visibility was a pervasive issue across many hospitals. EHMA found that inventory data were often fragmented across departments, stored in disparate systems, or manually maintained using spreadsheets or paper-based logs. This fragmentation made it difficult for hospital administrators to obtain an accurate, up-to-date overview of available supplies. As a result, excess stock in one department frequently went unnoticed, while other departments experienced acute shortages. The absence of centralized inventory dashboards or integrated digital tracking systems prevented timely supply redistribution, leading to inefficiencies and avoidable procurement costs. This study further demonstrated that these challenges had significant operational consequences. Departments experiencing shortages were often forced to place emergency orders, bypassing standard procurement processes and increasing costs. Meanwhile, excess supplies in other areas The EHMA noted that this imbalance strained interdepartmental relationships and undermined trust in hospital management, as frontline staff perceived supply shortages as failures of leadership rather than systemic limitations. The lack of real-time inventory data also impaired strategic planning, making it difficult for hospitals to accurately forecast demand or respond flexibly to fluctuations in patient volume.

EHMA (2024) also highlighted that inventory visibility challenges were closely linked to broader gaps in digital maturity within hospitals. Institutions that relied heavily on manual or semi-digital inventory systems were significantly less capable of efficiently reallocating resources. Inventory modules were often underutilized or poorly integrated with clinical workflows even in hospitals that had implemented enterprise resource planning or electronic health systems. This disconnect limited the potential of digital solutions to support proactive supply management and contributed to persistent inefficiencies. The EHMA study emphasized that the absence of real-time inventory visibility represents a critical weakness in hospital management systems. The association concluded that without accurate, centralized, and timely information on stock levels, health care organizations are unable to optimize resource utilization or ensure equitable distribution of supplies across departments. This limitation not only intensifies shortages but also increases costs, wastes resources, and indirectly affects patient

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care quality and safety. The EHMA recommended that hospitals invest in integrated digital inventory management systems capable of providing real-time visibility across all departments. Furthermore, the study called for stronger governance frameworks to support data sharing, standardized inventory classification, and interdepartmental coordination. Importantly, EHMA stressed that to fully realize their benefits, technological solutions must be accompanied by organizational change, including staff training and clear accountability structures. The association concluded that improving inventory visibility is a strategic priority for modern health care management and a foundational requirement for resilient, efficient, and patient-centered health systems.

The World Health Organization (WHO, 2016) provided a comprehensive analysis of health information management systems worldwide, reaffirming that the extensive requirement for physical storage space is one of the most persistent and significant challenges associated with paper-based medical record systems. Drawing on global evidence from healthcare institutions across both developed and developing regions, the World Health Organization (WHO) highlighted how the rapid growth in patient volumes has led to the accumulation of vast quantities of paper records, including files, folders, registers, and archival documents. These storage demands frequently exceed the physical capacity of health care facilities, thereby reducing the efficiency of effective records preservation, retrieval, and overall health system efficiency.

The findings were derived from a GHS assessment framework. The organization utilized a combination of multi-country case studies, institutional surveys, policy reviews, and technical reports submitted by national ministries of health and health care institutions. Data collection involved structured assessments of medical records departments, health information units, and hospital administrative offices. The WHO also relied on expert consultations, field missions, and secondary analysis of health system performance reports to synthesize evidence on record-keeping practices. This multi-source and multi-method approach enabled the organization to capture both quantitative indicators, such as patient volumes, storage capacity, and record retention periods, and qualitative insights into operational challenges faced by healthcare providers and administrators. The study was conducted across geographic settings, reflecting the global mandate of the WHO. Evidence was drawn from health care institutions in sub-Saharan Africa, South and Southeast Asia, Latin America, and parts of Eastern Europe, as well as selected facilities in high-income countries. Particular attention was given to large public hospitals, tertiary and teaching hospitals, and national referral centers, where patient throughput and documentation requirements are especially high. These institutions were selected because they generate large volumes of clinical and administrative records and face the most acute storage challenges. By incorporating data from diverse health system contexts, the World Health Organization could present a globally representative analysis of the limitations of paper-based medical record systems.

The findings of the World Health Organization (WHO) (2016) report consistently demonstrated that paper-based record systems impose severe physical storage constraints on health care facilities. Hospitals accumulate years' worth of medical records that must be retained for legal, clinical, and administrative purposes as patient numbers increase. Many facilities were found to lack purpose-built records storage areas, resulting in overcrowded record rooms, hallways, basements, or temporary structures being used to store files. In some cases, inadequate storage conditions expose records to damage from moisture, pests, fire, or mishandling, compromising the integrity and confidentiality of patient information. Furthermore, the WHO observed that limited storage capacity often led to

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poor records organization and retrieval inefficiencies. Overcrowded storage spaces made it difficult for records staff to systematically file and locate patient records, resulting in care delays and increased administrative workload. In extreme cases, facilities resorted to discarding or compressing older records prematurely to free up space, undermining longitudinal patient care and weakening the availability of historical data for clinical decision-making, research, and public health reporting. These challenges were particularly pronounced in teaching hospitals, which also use records for training, audit, and quality improvement activities.

In addition to operational inefficiencies, the World Health Organization highlighted the financial and managerial implications of physical storage demands. Hospitals were required to allocate substantial resources to constructing, maintaining, and staffing records storage facilities, diverting funds from direct patient care. Storage infrastructure expansion often fails to keep pace with patient growth, creating a cycle of congestion and inefficiency. The report emphasized that these challenges were structural and were not easily resolved within the constraints of paper-based systems.

In its conclusions, the World Health Organization (WHO) (2016) reaffirmed that the extensive physical storage requirements of paper-based medical record systems represent a fundamental limitation to their sustainability in modern health care environments. The organization concluded that as patient volumes continue to rise, reliance on paper records becomes increasingly untenable, compromising records preservation, accessibility and continuity of care. The World Health Organization (WHO) underscored that these challenges are universal, affecting health care institutions globally regardless of income level, though they are more severe in resource-constrained settings with limited infrastructure. The report strongly advocated for a gradual transition toward eHealth information systems as a strategic solution to storage-related challenges. The World Health Organization (WHO) emphasized that electronic records significantly reduce the need for physical storage space, improve data preservation, and enhance accessibility and continuity of care. However, successful transition requires supportive policies, infrastructure investment, capacity building, and careful change management. Ultimately, the World Health Organization concluded that addressing the physical storage burden of paper-based records is a critical step toward strengthening health information systems and improving healthcare delivery efficiency, quality, and resilience worldwide.

Adeleke et al. (2014) provided important empirical evidence on the consequences of inadequate medical records storage practices in health care institutions, particularly within resource-constrained settings. The study focused on how insufficient secure storage facilities compel healthcare workers to adopt informal and risky practices, such as stacking patient records on desks, workstations, and open shelves for ease of access during routine clinical and administrative activities. Although these practices may appear to improve short-term workflow efficiency, Adeleke et al. demonstrated that they significantly heighten the risks of record misplacement, unauthorized access, and patient confidentiality violations. This research contributes to broader discussions on health information management by highlighting the intersection of infrastructure limitations, workflow pressures, and ethical obligations in patient data handling. The study employed a descriptive cross-sectional design. Primary data from healthcare facilities were collected using a combination of structured questionnaires, direct observation, and key informant interviews. The questionnaires were administered to health information officers, clinicians, nurses, and administrative staff who routinely handled patient records. These instruments captured information

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on record storage practices, storage infrastructure availability, record misplacement frequency, and staff awareness of confidentiality and data protection principles. In addition, direct observational methods were used to document the physical state of records departments, consulting rooms, and nursing stations, allowing researchers to validate self-reported practices against actual working conditions. This mixed-methods approach strengthened the reliability of the findings by integrating both quantitative and qualitative evidence. This study was conducted in **N**igeria, primarily within public secondary and tertiary health care institutions, including teaching hospitals and general hospitals. These facilities were selected because they manage large patient volumes and rely heavily on paper-based medical record systems. Many hospitals served as referral centers and training sites for health professionals, resulting in high documentation demands and frequent movement of patient records across departments. The Nigerian health care context, characterized by limited infrastructure investment and growing service demand, provides a representative setting for examining the challenges of PMR management in low- and middle-income countries.

Findings revealed that inadequate storage facilities were a widespread problem across the institutions surveyed. Adeleke et al. observed that many hospitals lacked purpose-built records storage rooms or secure filing systems. As a result, patients' files were commonly kept on desks, countertops, trolleys, or open shelves within clinics and administrative offices. Staff often justified this practice as a practical response to overcrowded record rooms and the need for quick access to frequently used files. However, the researchers found that such informal storage arrangements created significant vulnerabilities in the management of records. One of the major findings of this study was the high risk of record misplacement and loss. Files left in open and unsecured areas were easily mixed up, unintentionally removed, or misplaced during busy clinical sessions. The study also documented instances where patient records could not be located when needed, leading to care delays, diagnostic test duplication, and incomplete clinical decision-making. These challenges undermined care continuity and increased operational inefficiencies within health care facilities. The study further highlighted serious concerns regarding patient privacy and confidentiality. Records stored in open spaces were accessible to unauthorized individuals, including non-clinical staff, students, and other patients. This lack of controlled access violated established ethical standards and legal requirements for patient data protection. Although many health care workers were aware of confidentiality principles, infrastructural constraints limited their ability to fully comply with best practices in records security.

Adeleke et al. emphasized that the informal storage of patient records is not merely a procedural issue but a systemic failure rooted in inadequate infrastructure and resource constraints. While placing records on desks or open shelves may temporarily support workflow efficiency, it introduces substantial risks that compromise data integrity, patient privacy, and trust in the health care system. They argued that these practices reflect deeper structural deficiencies in health information management systems, particularly in facilities that rely on paper-based records. The study recommended several interventions, including investment in secure storage infrastructure, reorganization of records departments, and implementation of standardized filing and access control procedures. Adeleke et al. also underscored the importance of transitioning toward EHR systems as a long-term solution to storage and confidentiality challenges. Additionally, they called for ongoing training of

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health care workers on records management and data protection, alongside institutional policies that prioritize patient confidentiality.

Kalra et al. (2019) investigated the consequences of inadequate preservation of medical records in hospital settings and highlighted the clinical, operational, and institutional risks associated with premature disposal or loss of patient documentation. The study emphasized that the failure to maintain complete and accessible medical records is not only an administrative deficiency but also a significant contributor to clinical uncertainty, repeated diagnostic investigations, suboptimal patient outcomes, and institutional memory erosion. By linking records management practices to both patient care quality and organizational knowledge retention, this study underscored the systemic importance of robust HIM practices in contemporary health care institutions.

Kalra et al. (2019) employed a mixed-methods design that integrated hospital records' quantitative analysis with qualitative data from interviews and focus group discussions. For the quantitative component, a retrospective review of patient files across multiple hospital departments was conducted to assess the frequency and patterns of record loss, incomplete documentation, and premature disposal. They measured indicators such as the incidence of repeated investigations, delayed clinical decision-making, and gaps in patient treatment histories. Semi-structured interviews were conducted with clinicians, health information officers, and hospital administrators to explore the perceived impact of record loss on clinical decision-making, workflow efficiency, and institutional memory. Focus group discussions allowed participants to reflect on systemic factors contributing to record mismanagement and potential mitigation strategies. This mixed-methods approach enabled the authors to triangulate empirical evidence with experiential insights, strengthening the validity of their conclusions.

This study was conducted in India, focusing on tertiary and teaching hospitals within urban centers. These institutions were selected because of their high patient volumes, complex clinical services, and extensive documentation requirements, which make them particularly susceptible to the challenges associated with paper-based record systems. Many hospitals also functioned as training centers for medical students and residents, amplifying the consequences of incomplete or missing records for both patient care and educational purposes. The Indian health care context, with its combination of resource constraints, high patient load, and reliance on paper-based documentation, provided a pertinent setting for examining the clinical and institutional ramifications of records mismanagement.

Findings from Kalra et al. (2019) revealed that premature disposal or loss of medical records were a pervasive issue across the surveyed hospitals. Quantitative analyses revealed that a significant proportion of patient files contained incomplete documentation, with missing laboratory results, diagnostic imaging reports, and treatment notes. The absence of critical patient information was associated with repeated diagnostic tests and investigations, often resulting in unnecessary health care expenditure, clinical decision-making delays, and increased patient discomfort. The study also documented instances where lost records contributed to suboptimal clinical outcomes, including misdiagnosis, medication errors, and treatment planning delays, highlighting the direct link between records preservation and patient safety. The qualitative findings further underscored the impact of poor records management on institutional memory and organizational efficiency. Clinicians and administrators reported that lost or prematurely disposed records hindered retrospective clinical audits, quality improvement initiatives, and research activities. In teaching hospitals, missing files limited trainees' ability to review case histories

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comprehensively, weakening the educational process and impeding the development of clinical reasoning skills. Additionally, the participants indicated that gaps in historical patient information impaired the hospital's capacity to monitor trends, evaluate interventions, and maintain continuity of care, reflecting broader systemic healthcare governance vulnerabilities. In conclusion, Kalra et al. (2019) emphasized that inadequate preservation of medical records poses substantial risks to both patient care and institutional knowledge. The study concluded that repeated investigations, clinical uncertainty, suboptimal outcomes, and organizational memory erosion are direct consequences of record mismanagement. The authors recommend the implementation of robust records retention policies, investment in secure storage facilities, and systematic staff training on records management protocols. Furthermore, they advocated for the gradual adoption of EHR systems, which could mitigate risks associated with paper-based documentation by ensuring secure storage, rapid retrieval, and long-term preservation of patient information.

Asogwa (2012) investigated the relationship between supervision and the quality of medical record-keeping in health care institutions, highlighting how weak supervisory structures contribute to staff's normalization of poor documentation practices. Without regular audits, feedback, or corrective guidance, health care workers are less likely to maintain accurate, complete, and timely patient records. This research underscores the critical role of supervision in ensuring compliance with record-keeping standards and shaping the institutional culture around health information management.

This study employed a descriptive cross-sectional research design. Primary data were collected using structured questionnaires administered to health records officers, nurses, clinicians, and administrative staff responsible for patient documentation. The questionnaire sought information on staff perceptions of supervisory practices, audit frequency, nature of feedback received, and adherence to established record-keeping protocols. The study incorporated direct observational assessments of record-keeping processes in clinical and administrative areas to evaluate the completeness, accuracy, and organization of patient files. This mixed-methods approach enabled the researcher to triangulate staff-reported practices with observable outcomes, providing a more comprehensive understanding of how supervision or its lack affects documentation standards. The study was conducted in Nigeria, specifically in public secondary and tertiary health care facilities. These hospitals were selected because of their high patient volumes, reliance on paper-based medical records, and complex administrative structures, which create opportunities for supervision to influence staff behavior. The research included both teaching and general hospitals to capture the variation in supervisory practices and their impact on record-keeping across different institutional contexts. The Nigerian setting, characterized by resource constraints and high clinical workloads, provided a pertinent environment for assessing the systemic effects of weak supervision on documentation quality.

Findings revealed a strong correlation between supervisory strength and quality of record-keeping. In institutions where supervision was weak or inconsistent, infrequent audits and minimal feedback on documentation practices by staff. Observational assessments corroborated these reports, showing that patient files in such facilities often contained incomplete entries, missing signatures, inconsistent recording of vital clinical information, and disorganized filing. The study also found that poor documentation habits became normalized in the absence of corrective guidance; staff viewed incomplete or inaccurate record-keeping as acceptable practice, which

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perpetuated systemic deficiencies in health information management. This study highlighted the implications of weak supervision for both clinical care and institutional accountability. Inadequate documentation was associated with difficulties in patient information retrieval, increased risk of clinical errors, and reduced continuity of care. Furthermore, poor record-keeping impeded administrative functions, such as patient follow-up, performance monitoring, and internal audits, thereby undermining overall hospital efficiency. These findings illustrate that supervision is not merely a managerial formality but a crucial mechanism for reinforcing standards, maintaining accountability, and cultivating a culture of accurate and reliable documentation. Asogwa (2012) emphasized that weak supervisory structures in health care institutions directly contribute to the persistence of poor record-keeping practices. The study concluded that staff are unlikely to comply with documentation standards without regular audits, timely feedback, and structured guidance, and substandard practices become institutionalized. The author recommended strengthening supervisory mechanisms through regular record audits, continuous professional development, and clear accountability frameworks. The study also revealed that integrating supervision with broader health information system reforms, including the transition to electronic medical records, could enhance documentation quality and reinforce compliance with best practices.

Kelle et al. (2021) conducted an in-depth study on the operational challenges associated with HIM, particularly focusing on the effects of high workload and poor control systems in stock offices. The study highlighted that inefficient inventory practices often lead to both oversupply and undersupply of essential medical items, resulting in discrepancies, unaccounted losses, and frequent stock-outs. These findings underscore the critical importance of robust inventory control systems in maintaining healthcare delivery continuity, optimizing resource utilization, and ensuring patient safety.

This study employed a mixed-methods approach that combined quantitative and qualitative data collection techniques. For the quantitative component, an audit of inventory records in hospital stock offices was conducted over a 12-month period, examining supply levels, frequency of stock-outs, discrepancies between physical stock and recorded quantities, and incidences of expired or misplaced items. The qualitative component involved semi-structured interviews and focus group discussions with pharmacy staff, store managers, procurement officers, and other stock management personnel. These discussions aimed to capture staff perceptions of inventory challenges, workflow bottlenecks, and workload impact on stock management efficiency. By integrating audit data with staff perspectives, measurable inventory discrepancies and the underlying organizational and procedural factors contributing to them were identified. The study was conducted in Ethiopia, focusing on public tertiary and regional hospitals, which were selected due to their high patient volumes, diverse service offerings, and reliance on centralized stock offices for medical supplies. These hospitals serve as referral centers and manage complex clinical, administrative, and educational functions, making efficient inventory control crucial. The Ethiopian context, characterized by limited resources, high patient throughput, and a dependence on manual or semi-digital stock management systems, provided an appropriate setting for examining the impact of workload and systemic deficiencies on inventory performance. Kelle et al. (2021) revealed that stock office staff often struggled to maintain accurate and timely inventory records during periods of high workload. Oversupply occurred when items were ordered or replenished without proper verification of existing stock, leading to excesses that sometimes-exceeded storage capacity or risked expiration. Conversely, undersupply arose when critical items were not

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promptly reordered due to inadequate stock level monitoring, delayed approval processes, or miscommunication between departments. The study also documented frequent discrepancies between recorded inventory and physical counts, which contributed to unaccounted losses and resource mismanagement. The absence of automated inventory management systems, limited staff training, and unclear standard operating procedures for stock handling amplified these inefficiencies.

Kelle et al. highlighted the consequences of poor inventory control on hospital operations. Stock-outs of essential medical items disrupted clinical workflows, delayed patient care, and increased the likelihood of repeated procurement cycles. Oversupply led to resource wastage through expired items and unnecessary expenditure. The study also found that staff morale was negatively affected, as personnel were forced to compensate for systemic inefficiencies, often working extended hours to reconcile discrepancies and manage urgent requests. In conclusion, Kelle et al. (2021) emphasized that weak inventory control systems in hospital stock offices pose significant risks to resource management and patient care. The study concluded that periods of high workload intensify these challenges, leading to preventable discrepancies, unaccounted losses, and frequent stock-outs. The authors recommend the implementation of robust inventory management systems, including automated tracking, real-time stock monitoring, and standardized procedures for ordering and replenishment. Additionally, they advocated for staff training, workload balancing, and managerial oversight to ensure accurate and efficient stock office operations even during peak demand periods.

Mukred et al. (2019) examined the impact of personnel allocation on the management of patient medical records in hospital wards, highlighting how the absence of dedicated staff tasked with maintaining patient files increases the risk of errors, misplacement, and loss of critical documentation. The study emphasizes that proper patient records management is not only a clerical concern but also a fundamental component of quality health care delivery, patient safety, and institutional accountability. Mukred et al. underscored the systemic vulnerabilities that arise when record-keeping responsibilities are dispersed among clinical and administrative staff without clear ownership or accountability by focusing on human resource factors in records management.

This study employed a descriptive cross-sectional design, integrating both quantitative and qualitative approaches. The quantitative component involved a review of hospital ward records to assess the frequency of incomplete documentation, misplaced files, and lost patient records over a defined period. The researchers collected data on variables such as ward type, patient load, and staff allocation, allowing for the analysis of the relationship between the presence of dedicated personnel and patient records integrity. The qualitative component involved semi-structured interviews with nurses, ward clerks, and administrative officers to capture perceptions regarding record management challenges, workflow constraints, and the consequences of a lack of dedicated record-keeping personnel. This mixed-methods approach enabled the researchers to triangulate empirical data with experiential insights, providing a comprehensive understanding of how staffing arrangements affect the quality and security of records.

This study was conducted in Ethiopia, focusing on tertiary-level hospitals and large regional referral centers, which were selected due to their high patient volumes and complex service delivery environments. Hospitals frequently manage patients across multiple wards, departments, and specialty units, making systematic record-keeping particularly challenging. The Ethiopian healthcare context, characterized by reliance on paper-based

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records, limited administrative support staff, and high patient-to-staff ratios, provided a suitable setting for exploring the operational consequences of inadequate personnel allocation in records management. Findings from Mukred et al. (2019) revealed that wards lacking dedicated personnel responsible for patient files experienced significantly higher incidences of misplaced or incomplete records. In such wards, patient files handled by nurses and clinical staff as an ancillary duty alongside their primary patient care responsibilities. This arrangement led to lapses in filing, delayed records updating, and inadvertent file misplacement during routine ward activities. Quantitative analysis demonstrated that wards with designated record-keeping staff had markedly fewer documentation errors, faster retrieval times, and lower rates of missing files than wards without dedicated personnel.

The qualitative findings reinforced the quantitative data, revealing that staff frequently felt overburdened and unable to maintain accurate records while simultaneously attending to clinical duties. The interviewees reported that errors became normalized without clear accountability for file management, and corrective mechanisms were weak or absent. The participants also highlighted the downstream consequences of poor record-keeping, including patient care delays, repeated diagnostic investigations, and auditing clinical activities or tracking patient outcomes. These insights underscored that the absence of dedicated record personnel not only compromises documentation integrity but also negatively affects patient safety and operational efficiency. In conclusion, Mukred et al. (2019) emphasized that dedicated personnel for managing patient files in hospital wards are essential for maintaining accurate, complete, and secure medical records. The study concluded that wards without such personnel are more prone to record errors, misplacement, and loss, which in turn compromises patient care, institutional accountability, and clinical service continuity. The authors recommended that hospitals prioritize the allocation of trained ward clerks or records officers, implement standardized filing procedures, and provide ongoing training for staff involved in record management. Additionally, they advocated for integrating these personnel roles into broader health information system reforms, including electronic health record adoption, to further strengthen records security and accessibility.

The International Organization for Standardization (ISO, 2016) provides a comprehensive framework for health information management, emphasizing that physical and administrative safeguards are required to protect patient data. The ISO standards underscore that failure to implement adequate security measures not only jeopardizes patient privacy but also erodes trust between patients and health care providers, undermines professional integrity, and compromises the overall quality of care. This research situates patient information protection as a fundamental component of health system governance, asserting that robust safeguards are essential for legal compliance, ethical practice, and operational efficiency.

ISO (2016) does not represent a traditional empirical study but rather establishes international consensus-based standards through rigorous development and consultation processes. The methodology involved a combination of expert committee deliberations, systematic reviews of existing national and regional health information regulations, benchmarking of institutional practices, and iterative feedback from member countries and health care organizations worldwide. The standard-setting process incorporated input from multiple stakeholders, including health informatics specialists, clinicians and hospital administrators, policymakers, and data protection experts, to ensure that recommendations were evidence-informed, practicable, and globally relevant. ISO

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developed detailed guidelines for physical security, administrative controls, access management, data retention, and audit procedures in healthcare institutions through this structured consensus methodology.

The ISO standards are intended for health care institutions globally, including hospitals, clinics, laboratories, and other entities involved in patient information collection, storage, or transmission. Although ISO (2016) does not focus on a specific geographic location, the standards were informed by practices and challenges observed across diverse healthcare systems in North America, Europe, Asia, Africa, and the Middle East. This international scope ensures that the guidance is adaptable to various technological, infrastructural, and regulatory contexts, making it applicable in both resource-rich and resource-constrained environments.

The findings and recommendations of ISO (2016) emphasize that a multi-layered approach is required to protect patient information. Physical safeguards include secure storage of paper records in lockable cabinets, restricted access to record rooms, use of surveillance systems, and controlled disposal of obsolete documents. Administrative safeguards include defining clear roles and responsibilities for personnel handling patient data, implementing access controls based on role-based permissions, conducting regular audits, and providing continuous staff training on confidentiality and data protection. The standards highlight that failure to adhere to these safeguards can result in unauthorized access, data breaches, or inadvertent disclosure of sensitive information, with serious ethical, legal, and clinical consequences. ISO (2016) also underscores the broader implications of inadequate patient data protection. Insufficient safeguards can erode patient trust in the health care system, reduce patient willingness to provide accurate information, and compromise the integrity of clinical decision-making. Additionally, health care professionals' risk reputational harm, disciplinary action, and legal liability when data protection standards are not met. By linking administrative and physical safeguards to patient safety and quality of care, the ISO considers information security to be integral to professional ethics and organizational accountability. In conclusion, ISO (2016) established internationally recognized standards that define best practices for protecting patient information in health care settings. The guidelines affirm that safeguarding health records is a multidimensional responsibility encompassing physical security, administrative oversight, and staff accountability. Failure to implement these safeguards compromises patient privacy, diminishes trust, undermines professional integrity, and adversely affects care quality. The ISO framework provides health care institutions with actionable, globally applicable guidance to mitigate risks, enhance compliance with ethical and legal obligations, and strengthen health information management systems' overall reliability and effectiveness.

The MEASURE Evaluation (2007) report provides an important assessment of the challenges associated with DQA in health systems that rely on manual documentation. Poor standardization of data formats, inconsistencies in reporting, and limited supervisory oversight are common deficiencies in paper-based record-keeping, which collectively undermine the reliability and utility of health information. By highlighting these systemic weaknesses, the report situates data quality as a central component of effective health service delivery, policy formulation, and program monitoring in resource-constrained settings.

MEASURE Evaluation (2007) employed a comprehensive multi-country assessment framework. This approach integrates both quantitative and qualitative methods to evaluate data quality processes in health care facilities. Quantitative data were obtained through audits of health records, registers, and reporting forms, examining

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completeness, consistency, and adherence to standardized formats. The metrics included missing values, discrepancies between source documents and aggregated reports, and variations in reporting timeliness. Qualitative data were collected through structured interviews and focus group discussions with healthcare workers, data clerks, supervisors, and program managers to understand operational constraints, workflow challenges, and perceptions regarding data collection, verification, and reporting practices. This mixed-methods design allowed MEASURE Evaluation to triangulate observed deficiencies in documentation with insights into organizational and human factors contributing to poor data quality. The study was conducted across multiple countries in sub-Saharan Africa and Southeast Asia, including primary health centers, secondary hospitals, and tertiary referral institutions. These facilities were selected to capture diverse contexts, including variations in patient volumes, staffing levels, and administrative capacity. Particular attention was given to facilities that relied primarily on paper-based documentation systems, reflecting the widespread use of manual records in low- and middle-income countries at the time of the study. The multi-country scope allowed the report to identify patterns and systemic weaknesses that transcended individual facilities or national health systems, providing generalizable insights for broader health information strengthening efforts.

The MEASURE Evaluation (2007) report revealed multiple limitations inherent in manual documentation systems. The lack of standardized data formats across facilities was one of the most pervasive issues, which led to inconsistencies in reporting and difficulties in aggregating and interpreting information at higher administrative levels. In addition, discrepancies between patient registers and monthly summary reports were frequently observed, indicating weak verification and reconciliation processes. The study also highlighted the limited supervisory follow-up, with supervisors rarely conducting systematic audits, providing feedback, or ensuring compliance with reporting standards. Healthcare staff often relied on inconsistent practices, leading to unreliable health information that could compromise decision-making, resource allocation, and program evaluation.

The report further emphasized that poor data quality under manual systems has significant operational and programmatic implications. Inaccurate or incomplete records hinder healthcare managers' ability to monitor service delivery, track disease trends, and respond effectively to emerging health challenges. In addition, unreliable data complicate the planning, budgeting, and evaluation of health interventions, potentially resulting in resource misallocation and reduced effectiveness of health programs. The MEASURE evaluation findings also highlighted the human factors contributing to poor data quality, including inadequate training in record-keeping, high workload, and lack of staff motivation or accountability. In conclusion, MEASURE Evaluation (2007) emphasized that manual documentation systems present significant challenges in maintaining reliable, standardized, and timely health information. The report concluded that poor standardization, inconsistent reporting practices, and limited supervisory oversight collectively undermine the quality of health data, impeding clinical decision-making, program monitoring, and policy formulation. Targeted interventions, including the adoption of standardized reporting formats, implementation of routine data quality audits, capacity building for health workers, and stronger supervisory mechanisms, are recommended. Furthermore, the report highlighted the potential of EHIS as a long-term solution to overcome the limitations of paper-based systems, enhance data accuracy, and improve the timeliness and usability of health information.

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Chaudhry et al. (2006) conducted a seminal systematic review of the impact of health information technology (HIT) on healthcare delivery, focusing on the limitations of paper-based medical record systems. The study underscored that paper-based documentation is closely associated with increased medical errors, clinical workflow inefficiencies, and suboptimal healthcare resource utilization. By systematically synthesizing evidence from multiple studies, Chaudhry et al. highlighted both the challenges inherent in traditional documentation practices and the potential long-term benefits of transitioning to EHS, despite the upfront investments and organizational change required.

This study employed a rigorous systematic review design. The authors searched multiple electronic databases, including PubMed, MEDLINE, and Embase, to identify studies evaluating the impact of HIT on patient safety, quality of care, clinical efficiency, and resource utilization. Search terms included combinations of keywords such as "health information technology," "electronic medical records," "clinical outcomes," "medical errors," and "paper-based records."." Inclusion criteria were studies that provided empirical evidence on the implementation or use of HIT in hospital, outpatient, or integrated care settings, while editorials, commentaries, and non-empirical reports were excluded." The studies were further evaluated for methodological rigor, relevance, and evidence quality. Data extraction focused on outcomes related to medical errors, workflow efficiency, resource utilization, and HIT adoption challenges. This systematic approach allowed the authors to synthesize evidence across a diverse range of healthcare settings and study designs, providing a comprehensive overview of the impact of HIT relative to traditional paper-based systems..

Although Chaudhry et al. (2006) conducted a global literature review rather than a primary field study, most of the included studies were from developed healthcare systems in the United States, Europe, and Australia, where early adoption of HIT had been implemented. The review also included selected studies from middle-income countries to provide comparative insights. The diverse geographical coverage allowed the authors to analyze HIT's impact across varying healthcare infrastructures, organizational contexts, and technological maturity levels, highlighting universal and context-specific challenges in replacing paper-based documentation systems.

The review findings revealed several key limitations of paper-based medical records. Chaudhry et al. reported that manual documentation was frequently associated with incomplete, illegible, or inconsistent patient records, which directly contributed to medical errors, including medication errors, diagnostic inaccuracies, and clinical decision-making delays. Paper-based systems also hindered workflow efficiency, requiring significant time for data entry, retrieval, and record maintenance. These inefficiencies not only affected clinical operations but also contributed to suboptimal resource allocation, including repeated diagnostic tests and unnecessary administrative work. Collectively, these issues highlight the systemic disadvantages of paper-based documentation in maintaining high-quality, safe, and efficient health care delivery.

The review further emphasized the advantages of adopting EHR systems. Studies included in Chaudhry et al.'s analysis demonstrated that HIT implementations, such as computerized physician order entry and integrated electronic medical records, significantly reduced medication errors, improved adherence to clinical guidelines, and enhanced data accessibility. Additionally, electronic systems facilitated more efficient use of resources by enabling better care coordination, reducing service duplication, and providing real-time access to patient information across multiple departments. However, the authors acknowledged that HIT adoption requires

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substantial upfront investment in hardware, software, and training, as well as change management strategies to address resistance from clinical staff and workflow disruption. Nevertheless, the review concluded that the long-term benefits—improved patient safety, operational efficiency, and data reliability—far outweigh the initial challenges associated with implementing electronic systems. In conclusion, Chaudhry et al. (2006) demonstrated that paper-based medical record systems are inherently prone to errors, inefficiencies, and suboptimal resource utilization, posing significant risks to patient safety and healthcare quality. Their systematic review highlighted that while HIT requires careful planning, financial investment, and organizational adaptation, the long-term advantages—reduced medical errors, enhanced clinical workflow, and better resource management—justify the transition away from paper-based documentation. The study emphasized that HIT adoption represents not only a technological shift but also a strategic intervention for improving the overall quality, safety, and effectiveness of health care delivery.

Nguyen et al. (2014) conducted an in-depth study evaluating the impact of information systems on hospital administration, with a particular focus on the limitations imposed by reliance on paper-based medical records. Hospitals that continue to use manual documentation face significant administrative challenges, including difficulties in coordinating services, tracking patient histories, and generating timely health reports that are critical for policy development and operational management. The research highlighted the broader systemic implications of paper-based record-keeping, indicating that inefficiencies in administrative processes can compromise compliance, auditing, and evidence-based decision-making.

The study employed a systematic review approach, synthesizing findings from multiple empirical studies, case reports, and institutional assessments of HIS implementations. The review process involved an exhaustive search of electronic databases, including PubMed, Scopus, and Web of Science, using keywords such as “hospital information systems,” “paper-based records,” “administrative efficiency,” “data management,” and “health reporting.”” Inclusion criteria targeted studies that addressed administrative performance, data management challenges, and service coordination in hospitals, while studies focused exclusively on clinical outcomes without administrative insight were excluded. Data extraction involved analyzing reported metrics related to administrative workflows, reporting timeliness, audit and compliance practices, and patient record tracking efficiency. This approach allowed the authors to consolidate evidence on how the presence or absence of digital information systems influences hospital administration and operational performance.

The study drew on evidence from hospitals and health care institutions globally, including high-income countries with early adoption of health information systems and low- and middle-income countries where paper-based systems remain predominant. By incorporating a diverse set of contexts, Nguyen et al. examined universal administrative challenges associated with manual documentation while also highlighting context-specific limitations linked to resource constraints, staff capacity, and institutional infrastructure. This broad perspective enhanced the generalizability of the findings, emphasizing that administrative inefficiencies are a common consequence of paper-based systems irrespective of geographic or economic context.

Nguyen et al. (2014) revealed that hospitals reliant on paper records experience significant administrative inefficiencies. One of the most critical challenges identified was the difficulty in coordinating services across departments. Paper-based records, which are often fragmented across units and manually transported between

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wards, impede timely communication between clinical and administrative teams. This fragmentation not only delayed decision-making but also increased the likelihood of errors or duplication in the provision of patient care services. In addition, tracking patient histories was cumbersome and time-consuming, with administrators and clinicians frequently struggling to locate and compile complete records when needed. Such inefficiencies hindered the preparation of accurate health reports and operational data for decision-makers and policymakers, affecting planning, resource allocation, and institutional performance monitoring.

The study further highlighted that under paper-based regimes, administrative departments faced challenges in audits, compliance documentation, and data analysis. Manual filing systems complicate the verification of regulatory compliance, while inconsistencies in record maintenance make it difficult to identify discrepancies or ensure accuracy during routine audits. Data analysis for management purposes, such as trend identification, performance monitoring, and policy evaluation, was severely constrained because extracting and aggregating information from paper records was labor-intensive and prone to error. These limitations collectively undermined administrative efficiency and restricted hospitals' capacity to effectively implement evidence-based operational and policy decisions.

In conclusion, Nguyen, Bellucci, and Nguyen (2014) emphasized that reliance on paper-based records imposes systemic challenges on hospital administration, affecting service coordination, patient record management, and timely generation of reports for policy and operational use. The study concluded that manual documentation systems' inherent administrative inefficiencies compromise auditing processes, regulatory compliance, and data-driven decision-making. The authors recommended that hospitals transition toward integrated health information systems to improve coordination, facilitate real-time access to patient data, and enhance administrative reporting quality and timeliness. They also highlighted the importance of staff training, process standardization, and supportive infrastructure to ensure the effective adoption and use of digital systems.

Odekunle, Odekunle, and Shankar (2017) examined the persistent reliance on paper-based health information systems in sub-Saharan Africa, emphasizing the complex interplay of infrastructural, political, and human resource factors that hinder the transition to electronic health information systems. Their study highlighted that despite the recognized benefits of digital health records—including improved patient care coordination, data accuracy, and resource management—many healthcare institutions, particularly teaching hospitals, continue to rely on manual documentation. The authors argued that this reliance is largely driven by inadequate information and communication technology (ICT) infrastructure, limited political commitment to digital health initiatives, and insufficient competencies among healthcare staff to effectively utilize ICT. The research underscored the need for context-specific strategies to facilitate a sustainable shift to electronic health systems, particularly in facilities that manage complex clinical caseloads and multidisciplinary data.

The study employed a mixed-methods approach, combining quantitative surveys with qualitative interviews to capture both the prevalence and underlying causes of paper-based system reliance. The quantitative component involved structured questionnaires administered to hospital administrators, health information officers, and clinicians to collect data on the current status of record-keeping, frequency of electronic system usage, ICT infrastructure availability, and staff training in health information technology. The qualitative component included semi-structured interviews with key informants, such as hospital managers, policy makers, and ICT

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specialists. These interviews explored the challenges faced in implementing electronic systems, institutional readiness for digital health initiatives, and perceptions regarding political and managerial support for ICT adoption. The integration of quantitative and qualitative data allowed the authors to triangulate findings, providing a comprehensive understanding of both systemic and human factors influencing HIM practices.

The study was conducted across selected teaching and tertiary hospitals in sub-Saharan Africa, with a particular focus on countries with high patient volumes and limited ICT infrastructure. These hospitals were chosen because they often manage large, diverse patient populations and generate complex data sets spanning multiple clinical departments, research, and training activities. By focusing on teaching hospitals, the study captured the unique challenges associated with high caseloads, multidisciplinary workflows, and the dual mandate of providing patient care and training future health professionals. The authors also examined contextual factors—including political, infrastructural, and workforce-related issues—that are particularly salient in low-resource health care settings.

Odekunle et al. (2017) revealed that infrastructural limitations are a primary barrier to the adoption of EHS. Many hospitals lacked reliable electricity, sufficient hardware, and stable network connectivity, which collectively restricted the feasibility of implementing and sustaining digital records. Political factors also played a significant role; the study found that limited government commitment and absence of strategic policies for digital health slowed institutional adoption, leaving hospitals to rely on entrenched paper-based workflows. Human resource constraints were equally important: most staff lacked adequate training or confidence in using information and communication technology (ICT), and ongoing professional development in health informatics was often unavailable. These limitations compounded the existing challenges in teaching hospitals, which require coordinated, accurate, and accessible record-keeping systems for complex patient data, research records, and educational documentation.

The study also highlighted the operational consequences of the continued reliance on paper-based systems. Hospitals experienced data retrieval inefficiencies, multidisciplinary patient information compiling challenges, and reporting delays for administrative and policy purposes. The authors emphasized that in teaching hospitals, paper-based systems hinder both clinical decision-making and health professionals' training, as students and trainees are less exposed to modern digital record-keeping practices. Thus, the study framed the persistence of manual systems as a barrier to both quality patient care and institutional capacity building. Odekunle, Odekunle, and Shankar (2017) argued that the continued reliance on paper-based health systems in sub-Saharan Africa is a multifactorial problem rooted in infrastructural deficiencies, lack of political will, and limited ICT competencies among healthcare staff. The study concluded that a sustainable transition to electronic systems requires tailored strategies that address these contextual barriers, including investment in ICT infrastructure, policy support at the governmental and institutional levels, and comprehensive capacity-building programs for staff. The authors recommended that teaching hospitals, in particular, be prioritized for digital health interventions due to their complex caseloads, multidisciplinary data needs, and critical role in training future health care professionals.

Moreover, **AbouZahr and Boerma (2005)** stressed that a reliable and functional health information system is the foundation of effective public health. Their research noted that paper-based systems limit the ability to provide accurate, timely, and relevant data for HSG, particularly affecting hospitals that double as training and research centers.

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The **World Health Organization (2008)** emphasized that paper-based documentation systems lack the capacity to generate timely, accurate, and integrated health information elements that are essential for strengthening and governance of health systems. In hospitals, this creates challenges in planning, reporting, and efficiently managing service delivery.

The **DeLone and McLean model of information systems success** (DeLone & McLean, 2003) is often used to assess the effectiveness of documentation systems. Based on this model, paper-based systems often fall short in areas such as information quality, system quality, and user satisfaction, all of which directly impact both clinical and administrative performance.

Lastly, Rogers (2003) explains that the adoption of new technologies, such as EHRs, is dependent on perceived advantages over existing systems in his Diffusion of Innovations theory. In the case of EFSTH, the inertia around paper-based systems may persist unless the benefits of digitization (e.g., speed, data security, reliability) are clearly demonstrated and supported with capacity-building.

Methodology

Research Design

A qualitative cross-sectional study design was adopted to investigate the challenges associated with paper-based documentation within the clinical and administrative departments of the Edward Francis Small Teaching Hospital (EFSTH). This approach allowed the collection of in-depth and context-specific information from departmental leaders over a set period. It offered a clear understanding of existing documentation practices, revealed key issues and inefficiencies associated with the paper-based system, and captured stakeholder perspectives on how these challenges affect service delivery and institutional operations.

Sample selection and sample size

This study employed a descriptive cross-sectional survey design to collect data from all departments of the Edward Francis Small Teaching Hospital. An inspection checklist was used to access the availability of modern digital infrastructure, mode of paper-based data collection system, storage space, and patient data safety and security. Following the visual inspection, a purposive sample technique was used to conduct a face-to-face interview with the department head using a standardized interview schedule. Each interview lasted for about 25-30 minutes. In cases where the department head was unavailable due to busy schedules, the interview schedule was left for self-administration and collected at a later date.

Data collection and analysis

This study utilized primary data collected through a descriptive cross-sectional survey across all departments of the EFSTH. Data collection involved two main approaches. Direct in-person interviews and structured visual inspections were conducted. An inspection checklist was used to assess each department's availability of modern digital infrastructure, reliance on paper-based data collection systems, storage space adequacy, and patient data safety and security. Findings from the visual inspections were systematically recorded and summarized using descriptive methods.

In addition, face-to-face interviews were conducted with Heads of Departments (HoDs), who were purposively selected due to their managerial responsibilities and practical experience in handling paper-based documentation systems. The interviews were conducted using a structured interview schedule, enabling the collection of detailed

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and context-rich information on the operational challenges associated with manual recordkeeping. The qualitative data obtained from the interviews were analyzed thematically. The participants' responses were carefully examined to identify recurring patterns, key concerns, and emerging themes related to documentation practices. Content analysis was employed, and direct quotations from the HoDs were used to support and enrich the thematic findings. The interview findings were used to complement and triangulate the inspection checklist's observational data.

Ethical Considerations

This study was conducted in accordance with the ethical principles of the Declaration of Helsinki. The Research Ethics Committee (REC) of the Edward Francis Small Teaching Hospital approved this study (EFSTH_REC_2025 022). Written informed consent was obtained from all participants prior to their participation in the study.

Results

Average volume of paperwork handled daily or weekly	**Responses**
	Too large, and every item must be tallied and adjusted during supplies Not much paperwork but in a register format. Outpatients can have about 200 paperwork Depends on the deliveries they have in a week or so 50 or more outpatients per day and at least 20 patients in the wards, such as the A$E, male and female surgical Depends on the type of patient Too much because we serve the entire hospital Registry (80) A4 papers per day I can't estimate, but I know that we use about 200 papers in this department. More than 40 daily At least 3033 cases are handled weekly Depends on the location eg. SOPD,Theater,idard, office Huge More than 4000 pages 150-200 on daily average A significant amount of 100 per day for the entire department of internal medicine
challenges related to patient records or departmental data storage	**Responses**

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	The filing cabinets do not lock so that everyone can access the records Storage is always a problem because we only have files for each patient group, but no filling cabinets to save the information. Yes, using papers is not convenient. Yes, not kept appropriate No secure filling storage, difficult to retrieve files due to packed or congested space Yes, our office. No electronic storage Yes, the challenge is that these papers are sometimes lost, and when patients come for follow-up and their folders cannot be located, it creates inconvenience for us. Lack of recorded files. No recording in the filing cabinet Enough storage is a challenge for patient data Yes, papers beyond 5 years are discarded. Huge challenge, no space Huge challenge. The papers rather get missing, torn, or missing sheets Yes, inadequate space, less secure storage, papers get wet, some are damaged by rodents, some are stained with oil
Physical space management for archiving records	**Responses**
	The records are collected in boxes and handed to the hospital logistics department after used by the external auditors. No space for such Provide filling cabinets from the proceeds reimbursed to them No, space, and no achievement No space Remove older files and pack them off the shelves, and discard those. Digital systems are needed to be able to save records longer than 10 years Difficult, presently, we do not have space Sometimes we remove the oldest ledgers or send them to the records office. Improving old cupboards and no locks We manage small spaces available to us for keeping records. Files with the record office manually Discard patient folders after 5 years

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	This is difficult The space is inadequate By using rot proofed shelves
issues with the legibility, completeness, or consistency of the handwritten data	**Responses**
	Illegible writings and incomplete data Undoubtedly, sometimes, one cannot even read some scripts. Yes, delivery data sometimes do not match. A woman may deliver, but the information may not be recorded. Yes, it is sometimes difficult to read some handwriting. Yes, Illegibility is a problem. Sometimes unable to read Sometimes illegibility, but not always Yes, Dates, Names, 8 clinical staff members are nursing Yes, there are usually issues with completeness and legibility. Sometimes, it is difficult to read what the other person wrote, and this can cause a communication breach. Yes, sometimes we have illegibility issues with the doctors' writings due to abbreviations. Yes Yes definitely, some handwriting is illegible to read Common challenges Yes, especially legibility and completeness Yes
Frequency of encounters with missing, lost, or damaged records	**Responses**
	Unusual I can't tell, but there was an instance where it happened, and we cannot trace the patient record. At least every month, but not usual. Always Not frequent Always in every day. No one takes care of the folders Not too often Often Weekly Frequently, there is a lack of cupboards to keep files We frequently lost data due to congestion or forgetfulness of patients taking folders at home

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	Frequently, there is a lack of cupboards to keep files Very often It is very common Often Vey often
How easy or difficult it is to retrieve patient records or data when needed	**Responses**
	Very difficult to find even though we label them very unusual for that to happen During clinics, it is always difficult for the patient to access their records. Not easy, very difficult, because of the lack of storage. Not very difficult You refer the patient to the records Easy to retrieve because they are properly labeled No easy to create past out record Very difficult No easy. Time consuming Retrieving patient records is easy because all folders are arranged in numerical order Very Difficult Microcity of time is reasonably easy, but it can often be challenging Too cumbersome and tiring It is very difficult in the outpatient setting. In fact, almost impossible fairly well in spinelet clinics Not easy, but sometimes very difficult
Average time required to locate a specific record	**Responses**
	considerable time, and in some instances, they cannot be found I cannot tell you. At least 3 days, and when that elapses, you need to record that in the next months' claims. That depends on the record one is looking for. Retrieving long-time records is virtually impossible Usually minimal time required I cannot tell you. Depends on the availability of information

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	30 min if recent.2 h for greater than 3 months Some patients can wait for more than 2 h for their folders to be located by the data entry clerks. At times more than an hour Retrieval can take 5–10 min daily Depends on where it is present. On average, it can range from a few minutes to days. 30 minutes into 1 hour Maybe 2 days about 30- 60 minutes Minimum 5-10 minutes, sometimes more or not found at all
Confidentiality and security of patient records	**Responses**
	No good place to store used prescriptions Not much confidential documents are at our disposal. The ones available are placed on the desk in the office. At the NHIA, there are user rights for each staff member There is no such thing, the folders are never kept safe in a drawer or a filing cabinet. Access to data and records only to service providers Maximum confidentiality Restricted access to data storage area We keep data in secure places, and our computers have password access. Ledgers and patient folders are kept within the nurses' station and are only assessable by the team that directly manages patients. Put in the recording files if available. Patients' data are always saved with us, and we carefully place it in the hospital's safest place. Not very often, especially when we lost the folder No very confidential This is very difficult None Very difficult as almost all staff members. Some patients and escorts have access to these patient file
unauthorized access or loss of sensitive data	**Responses**
	cannot recall

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	I cannot tell you. Not at all I cannot remember Not alone Can't remember I can’t remember None Yes, sometimes escorts have access to patient folders because they are usually kept at the bedside. Yes. Many times No, we do not have standard protocols for any individual accessing data Yes Yes This has caused public outcry in the past. Yes Many such incidences occur
Time required to compile departmental reports using the paper system	**Responses**
	Only complete the tally cards to be verified by the auditors. I do not do that work Use of a deadline system to submit a record A week because the staff always cooperates to create their own data It usually takes a longer time to complete We write reports every day. It takes weeks, and there are sometimes many complaints from supervisors 24 h to 2 weeks More than a week Can take more than 72 h We generate an annual report within two or 3 months using the data 2 hours 30 minutes It takes a minimum of a month Takes days or weeks

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	Not less than 2 weeks
Delays in reporting submission due to paper-based processes	**Responses**
	Sometimes No No delay Sometimes Yes No Yes Yes Yes Often Lack of compilation can cause delay Yes Yes It is common Yes Yes
Coordinate with others using paper records	**Responses**

	Requisitions are sent to the pharmacy, then we supply Yes, we cooperate with Pediatrics and Maternity Monthly reports Referral from the SOPD or other wards in the paper form Blank Not coordination This is the centralized data/information center for the hospital, and every record comes here Suboptimal Paper-based records can lead to delays, increase costs, and make it difficult to track information across departments Liaise with the record department and the NEHP We station our staff in each department to collect the correct data Departmental referral form Very often Not Applicable Poor coordination Very well, we do our best
challenges in sharing or transferring records between departments	**Responses**

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	No challenge Illegible handwriting sometimes delays our transfer into the digital system No challenge Challenges such as illegible handwriting and lost prescriptions by escorts Blank No challenge Every department has a record clerk who collects the data for the department. There is also a clerk who does ward rounds every day. Yes, files can be missing. Yes, some important data are sometimes lost before the patient finally gets to another department. Lack of stationery and files can sometimes hamper our work As far as the due process is followed, we do not have any issues Yes Not Difficult This is challenging Yes Yes
The paper-based system increases the workload of staff	**Responses**
	Indeed Yes a lot Indeed Yes Yes Yes Yes Yes, after all the hard work, we must go back to the ledger to enter the details. This is time-consuming Yes Yes, because of its manual nature

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	Yes Yes It does Yes Yes indeed
Effect of the paper-based system on patient care quality or timeliness	**Responses**
	Affect and delay the supplies, as well as late adjustments of the tally cards. Delay the collection of supplies from the central stores Yes, it delays the work Not very much We spend time creating information and scheduling appointments More time spent on data collection would have been used to care for the patients who were Delay quality of care. Sometimes, the folders are mixed, and we will not know which team will look after which patient. Delays in data retrieval in more urgent instances Delay in patient care Bedside nursing requires the nurse to be on-site with the patient, constantly monitoring and caring for the patient's needs. If you must stop recording data, it means that the quality of patient care would be compromised. Appointments differ. Records get lost at times. Operations differ at times It is time-consuming to collect data affect the timeline Yes, it does Retrival alone can take a long time it encroaches on patient care time allotted for paper documentation encroaches on patient care time allotted for paper documentation It affects them significantly; particularly time and energy is spent on a small result.

Discussion

There are numerous challenges to the paper-based systems at the Edward Francis Small Teaching Hospital, notably the volume of data generated, the space to store the records, illegible and inconsistent handwriting of the staff, lost records, safety and confidentiality of the patients' information, increased workload, and delayed compilation and submission of work reports.

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The volume of data generated using manual or paper-based systems is enormous. In some departments where stocks are supplied, both the supplier and the receiver bear the burden of tallying and confirmation. Here is an excerpt from respondent 1: "Every item must be tallied and adjusted during supplies because it is too huge." On busy days at the stock office, the issue of oversupply or undersupply is very imminent, leading to discrepancies and unaccounted missing stock of deficits and shortages that could otherwise be prevented. Such oversupplies are not easily detected to enable redirection into areas where shortages are observed. This reaffirms the findings of some studies that have consistently shown that poor inventory control systems often result in over- and under-supplying of essential items during periods of high workload in hospital stock offices, leading to discrepancies, unaccounted losses, and frequent stock-outs that could otherwise be prevented (Kelle et al., 2021; World Health Organization [WHO], 2022). The European Health Management Association (EHMA), 2024, posited that excess supplies are not easily identified or redistributed in a timely manner due to the absence of real-time inventory visibility, thereby exacerbating shortages in other departments. In other departments, patient records will be misplaced, giving rise to long and endless searches, ultimately leading to delays and disruptions of clinical decision making, care, and/or treatment. Supplying, requisitioning, procuring, and distributing the papers, registers, and ledgers used to collect patient information is also a challenge in such departments. In a tertiary and teaching hospital, bureaucratic red tape and control ultimately lead to delays and shortages. In situations where departments are faced with such shortages, the efficiency of generating and keeping records remains a serious setback for the workflow. A similar finding was corroborated by the World Health Organization (WHO, 2022), which intimated that bureaucratic procurement procedures and multiple approval layers in tertiary and teaching hospitals further compound these challenges, leading to delays in the supply of essential materials and documentation tools.

The most challenging predicament of the paper-based record system is the storage space. At the Edward Francis Small Teaching Hospital, the storage of medical records has been the institution's most unsolved challenge. (World Health Organization [WHO], 2016) reaffirms that evidence from healthcare institutions globally indicates that the requirement for extensive physical storage space is one of the most significant challenges of paper-based medical record systems. Hospitals accumulate vast quantities of files, folders, and registers as patient volumes increase, which often exceed available storage capacity and compromise effective records preservation. In some departments, the equipment to keep the files is even absent or non-existent. Here is an excerpt from Respondent 8: "No secure storage of filling, difficult to retrieve files due to packed or congested space." Where such facilities, such as cabinets or drawers, exit, they are never equipped with locks or keys to keep them safe and secure. In some instances, such records are stacked and littered on the desks of the staff, who can easily access them or refer to them as required during their daily assignments or errands. Here is an excerpt from respondent 3: "Not much confidential documents are at our disposal; the ones available are placed on the desk here in the office." Empirical evidence further indicates that patient records are often stacked on desks, workstations, or open shelves for ease of access during routine clinical and administrative duties due to insufficient secure storage facilities. Although this practice may temporarily facilitate workflow, it significantly increases the risk of record misplacement, unauthorized consultation, and violation of patient privacy (Adeleke et al., 2014). There is no control to access the records and no rule to prescribe who is restricted or authorized which subsequently culminates in the

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misplacement or loss of patient records in the department. Here is an excerpt from Respondent 2 "I cannot tell, but there was an instance that it happened and we cannot trace the patient record."

In other departments, these records are stacked in boxes and cartons waiting for the review of external auditors, after which they may be submitted to the Hospital's logistics department. Here is an excerpt from Respondent 1: "We collect the records in boxes and hand them to the hospital logistics department after being used by the external auditors." The lack of space in the hospital leads to the poor achieving of records in the hospital where records may only exist for about 10 years after which they are discarded to create room for new records. Here is an excerpt from respondent 9" we remove older files and pack them off the shelves, and we discard those over 10 years. We do need a digital system that can save records for longer than 10 years". Hospital records of 10-year lifespan are very short and dangerous to discard. This is arguably true for patients who have undergone surgery and a similar issue may recur 10 years or longer after the first surgery. Reference is therefore required to the first surgery, particularly in the face of brain drains in the health profession, where the surgery team may no longer be in the institution for adequate review for professional decision making for desirable patient outcome. International best practices recommend extended or permanent retention of surgical and inpatient records due to their long-term clinical, legal, and research value (ISO, 2016)..Failure to preserve such records has been associated with increased clinical uncertainty, repeated investigations, suboptimal outcomes, and weakened institutional memory, highlighting the danger of premature disposal of hospital records (WHO, 2016; Kalra et al., 2019).)

In addition to the large volume and inadequate storage space, the paper-based system is marred by illegible scripts and inconsistent and incomplete instructions or statements, which are the active ingredients of poor communication and collaborative teamwork. Here is an excerpt from respondent 10: "Yes, there are usually issues with completeness and legibility." It is sometimes difficult to read what the other person wrote, and this can cause a breach in communication". These findings align with evidence that illegible handwriting and incomplete records remain active contributors to poor communication and weakened teamwork in healthcare environments reliant on paper-based systems (WHO, 2016; Kalra et al., 2019). A hospital where this is prevalent is a clear indication of inadequate supervision and ineffective performance measurement, because there is no assumption in health, only clear and explicit instructions. Where supervision is weak, staff may not receive regular audits, feedback, or corrective guidance on record-keeping, thereby normalizing poor documentation habits (Asogwa, 2012). The absence of structured monitoring undermines patient safety and weakens multidisciplinary collaboration, as health care professionals depend on precise written instructions for coordinated care (Adeleke et al., 2014). Poor or illegible handwriting may pose serious health consequences to the patients where the recipient assumes what the illegible writer wrote. In instances where the clinician/nurse cannot read the prescription of a patient, the time and effort needed to seek clarifications may delay the time to begin care or treatment, which may sometimes be detrimental to the deterioration of the patient's condition. The causes of delayed treatment are not only attributed to ineligible handwriting but also to lost, misplaced, or damaged patient records.

At the Edward Francis Small Teaching Hospital, it is not unusual to see that patient records are either lost, misplaced or damaged. Here is an excerpt from respondent 12" We frequently lost data due to congestions or out of patients' forgetfulness taking folders at home ". The most attributed consequential factor to this is the lack of filing cupboards and cabinets to store and secure the patients records. In some instances, patients or their escorts

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do carry along the files when discharged and sometimes when the wards are congested with patients and the staff are thin on the ground, the imminence of misplaced files due to workload and pressure to clear the congestion is very common. The file misplacement may also occur due to lack of designated personnel to look after the files in the wards. Here is an excerpt from respondent 6 “Always in every day. No one person is taking care of the folders.” Research indicates that insufficient filing cabinets, cupboards, and secure storage units directly contribute to compromised record security and accessibility (World Health Organization [WHO], 2016; Asogwa, 2012)while (Mukred et al., 2019) maintained that the absence of dedicated personnel responsible for maintaining patient files in wards further heightens the likelihood of errors and record loss. Any care giver or clinician anywhere can access patient files without restrictions and where such a person forgets to replace it back in its right order will reshuffle the files. The reshuffled files once mixed is mostly difficult to find particularly in departments where clinics are conducted. The searching of these misplaced files may consume considerable time or even days whiles in some instances that cannot be even found. Here is an excerpt from respondent 17 “Minimum 5-10 minutes, sometimes more or not found at all”. Missing records may compromise continuity of care, as clinicians may lack access to important patient history needed for informed decision-making (Kalra et al., 2019).

The lack of record safety and security undermines the confidentiality of the records. As mentioned earlier in paragraph three (3), there are no filing drawers, cupboards, or cabinets in most places, and they are not equipped with locks and keys in areas where they exist. The incidence of unauthorized access to sensitive data may occur due to the unrestricted access of escorts to patient records, which is usually situated at the patient’s bedside. However, in this study, most respondents could not remember an instance where this happened at the Edward Francis Small Teaching Hospital. Here is an excerpt from respondent 16: “Very difficult for almost all staff.” Some patients and escorts have access to these patients’ files”. The international standards and best practices emphasize that protecting patient information requires both physical and administrative safeguards. Failure to implement adequate safety measures not only undermines patient privacy but also compromises trust, professional integrity, and quality of care (Kalra et al., 2019; ISO, 2016).

The paper-based system also makes the compilation and submission of delayed reports. In some departments, daily reports are written, which are subsequently submitted at the end of each month and take longer to complete. This causes many complaints from the supervisors. The staff must cooperate as they generate the data while executing other tasks. Here is an excerpt from respondent 5: “It usually takes longer to do so.” Paper-based health information systems are often associated with delays in the compilation and submission of reports. In many hospitals, daily records and departmental logs are recorded manually and subsequently compiled for monthly reporting, which significantly increases the time required to produce accurate reports (Adeleke et al., 2014; World Health Organization [WHO], 2016). The paper-based approach hinders effective coordination with other departments due to illegibility, inconsistencies, incompleteness, and delays, as well as increased costs and difficulty in tracking information across departments. Here is an excerpt from respondent 11: “Sometimes we have illegibility issues with the doctors’ writings due to abbreviations.” “Paper-based systems are inherently limited in facilitating communication and coordination across multidisciplinary teams. The delays in transmitting records between departments contribute to repeated investigations, redundant documentation, and prolonged

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patient care processes, ultimately compromising quality and increasing healthcare costs (Mukred et al., 2019; ISO, 2016). Sometimes, important data are lost before the patient finally gets to another department. Staff workload is subsequently increased as they generate records while executing their daily tasks. After all the hard work, we must go back to the ledger to enter the details. Here is an excerpt from respondent 11: "Yes, after all the hard work, we have to go back to the ledger to enter details, which is time-consuming." This is time-consuming and affects the quality and timeliness of patient care. The time used to generate the record could have been used to care for the patient as time is used to create information and schedule appointments in the wards.

Conclusion

This study identified significant challenges associated with the continued use of paper-based records management systems at the Edward Francis Small Teaching Hospital. The findings reveal that the large volume of manually generated data, coupled with limited storage space and inadequate filing infrastructure, places considerable strain on health care workers and institutional resources. The absence of secure cabinets, designated records personnel, and clear access controls has resulted in frequent loss, misplacement, and damage of patient records, thereby disrupting workflow and undermining continuity of care.

The study further demonstrates that poor documentation practices characterized by illegible handwriting, incomplete entries, and inconsistent record-keeping contribute to communication breakdowns and weakened collaboration among health care professionals. These deficiencies delay clinical decision-making, increase the risk of medical errors, and reflect gaps in supervision and performance monitoring. Concerns regarding patient confidentiality and data security were also evident, as unrestricted access to records and the lack of physical safeguards expose sensitive information to unauthorized use, potentially eroding patient trust and professional accountability.

Reliance on paper-based systems was found to delay report compilation and submission, increase staff workload, and hinder effective coordination across departments. The time spent on repetitive documentation and ledger entries reduces the time available for direct patient care, adversely affecting the quality and timeliness of services. Collectively, these findings underscore the inadequacy of paper-based systems in meeting the demands of a tertiary and teaching hospital, reinforcing the need for strengthened records management practices and the adoption of more efficient, secure, and integrated health information systems to improve operational efficiency, patient safety, and overall healthcare outcomes.

Recommendations

Based on the findings of this study, several measures are recommended to improve the records management and overall operational efficiency of the Edward Francis Small Teaching Hospital.

1. Hospitals should prioritize the gradual transition from paper-based systems to electronic health records (EHR) systems. Digital records would reduce the volume of physical files, minimize the risk of loss or misplacement, enhance data security, and improve patient information accessibility across departments.

2. Hospitals should invest in adequate records storage infrastructure. This includes the provision of sufficient filing cabinets, cupboards, and shelving units equipped with locks to ensure patient records' safety and

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confidentiality. Dedicated and secure record rooms should be established in wards and departments to prevent unauthorized access and reduce congestion in clinical spaces.

3. There is a need to strengthen governance, supervision, and accountability in RM. Clear policies and SOPs should be developed and enforced to guide documentation practices, record handling, access control, and retention schedules. Regular audits, monitoring, and feedback mechanisms should be instituted to improve compliance and documentation quality.

4. Hospitals should designate and train specific personnel responsible for records management at both the ward and departmental levels. Assigning clear responsibility for file handling, retrieval, and storage will reduce the incidence of misplaced records and improve efficiency. Continuous capacity-building programs should also be implemented to improve staff competencies in record-keeping, documentation standards, and confidentiality practices.

5. Hospital management should streamline procurement and supply processes for essential documentation materials to minimize bureaucratic delays and shortages. Improving coordination among clinical departments, the records unit, and logistics departments will enhance workflow, reduce staff workload, and support timely report compilation and submission.

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