



HEALTH INFORMATION TECHNOLOGY AND ITS IMPACT ON ALL HEALTH WORKERS IN QUALITY OF HEALTH CARE

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Abstract:

In light of the dynamic landscape of health information technology and its multifaceted influence on healthcare delivery, a systematic review is an excellent approach to report the updates about health information systems. This review aims to critically analyze existing literature to provide a comprehensive understanding of the impact of health information technology on the quality and efficiency of healthcare. **Methods:** The systematic review employed a comprehensive search strategy, utilizing carefully chosen search terms, including Medical Subject Headings (MeSH) terms, to balance sensitivity and specificity. The search covered major databases such as PubMed/MEDLINE, Embase, CINAHL, Scopus, and the Cochrane Library, ensuring a thorough retrieval of relevant studies on the impact of health information technology on healthcare quality and efficiency. The inclusion criteria targeted primary interventional research articles within a specified timeframe, up to September 2023. The transparent study selection process involved initial screening of titles and abstracts, followed by a detailed assessment of full-text articles. Rigorous data extraction using a standardized form encompassed study characteristics, demographics, technology interventions, and outcomes. The synthesis of findings employed a narrative approach, while the assessment of risk of bias contributed to the overall quality appraisal, collectively ensuring the reliability and validity of the systematic review's outcomes. **Results:** The eight interventional studies included in the systematic review demonstrated a wide range of impacts from health information technology (HIT) interventions. Notable reductions in medication errors were reported, ranging from 22% to 45% with the integration of advanced functionalities. Telehealth interventions showcased a 19% to 53% decrease in hospital admissions through remote monitoring and virtual consultations. Across the studies, significant improvements in healthcare quality metrics were observed, including a 21% to 35% reduction in medication errors and a 15% to 27% enhancement in adherence to evidence-based clinical guidelines. The implementation of health information exchange (HIE) systems contributed to a substantial 18% to 33% reduction in redundant diagnostic testing. These percentages underscore the potential of HIT to enhance patient care and operational efficiency in diverse healthcare settings. **Conclusions:** For decision-makers in healthcare, the synthesis of findings underscores that well-designed health information technology

interventions show significant, measurable benefits, including reduced medication errors, decreased hospital admissions, and improved adherence to clinical guidelines, affirming their potential to optimize patient care and enhance operational efficiency. **Keywords:** Healthcare, Technology, Intervention, Efficiency, Quality. **Introduction** Health Information Technology (HIT) has revolutionized the healthcare landscape, ushering in an era of digital transformation with promises of improved quality and efficiency[1]. As of the latest available data, over 96% of hospitals in the United States have adopted certified electronic health record (EHR) systems, marking a substantial increase from just 9.4% in 2008[2]. This surge in adoption reflects a paradigm shift towards a more interconnected and data-driven healthcare system, with an estimated 89% of office-based physicians actively using EHRs in their practices. The impact of HIT on healthcare outcomes cannot be overstated, and understanding its influence on both the quality and efficiency of healthcare delivery is paramount in shaping the future of patient care[3]. Furthermore, the increasing integration of HIT has led to notable improvements in patient safety. Studies suggest that computerized physician order entry (CPOE) systems have contributed to a 52% reduction in medication errors, showcasing the potential of technology in preventing adverse events[4, 5]. Additionally, the use of electronic prescribing systems has demonstrated a remarkable 73% decrease in prescription errors, underscoring the role of HIT in enhancing medication management. These statistics highlight the tangible benefits that technology can bring to patient safety, offering a compelling case for the continued exploration of HIT's impact on healthcare quality[6]. During the ongoing discourse on healthcare costs, the potential for HIT to streamline operations and reduce expenses is a critical aspect. Reports indicate that the implementation of the health information exchange (HIE) systems has resulted in an approximate 35% reduction in redundant diagnostic testing[7]. Moreover, the widespread use of telehealth technologies has led to a staggering 81% decrease in hospital admissions for certain chronic conditions, emphasizing the role of HIT in preventive care and cost containment[8]. These figures illuminate the significant cost-saving potential that health information technology holds within the healthcare ecosystem. Despite the promising strides in HIT adoption and its associated benefits, concerns regarding interoperability and usability persist. Approximately 34% of healthcare providers express dissatisfaction with the interoperability of

their EHR systems, hindering seamless information exchange. Moreover, user satisfaction with HIT systems remains a challenge, with nearly 47% of clinicians reporting usability issues. These statistics underscore the need for a comprehensive understanding of the challenges associated with HIT implementation to maximize its potential impact on healthcare quality and efficiency[9, 10]. In light of the dynamic landscape of health information technology and its multifaceted influence on healthcare delivery, a systematic review is warranted. This review aims to critically analyze existing literature to provide a comprehensive understanding of the impact of health information technology on the quality and efficiency of healthcare. By synthesizing evidence from diverse studies and identifying key trends and challenges, this review aims to inform policymakers, healthcare professionals, and researchers about the current state of HIT.

Methods To ensure a comprehensive search strategy, a set of carefully chosen search terms was developed to capture relevant literature. These terms included variations related to health information technology, quality of healthcare, efficiency, and related concepts. The use of Medical Subject Headings (MeSH) terms was also considered to enhance the precision of the search. The finalized search strategy aimed to balance sensitivity and specificity, providing a robust foundation for the systematic review. A systematic and exhaustive search was conducted across multiple electronic databases to retrieve relevant studies. Key databases included PubMed/MEDLINE, Embase, CINAHL, Scopus, and the Cochrane Library. The decision to include these databases was based on their wide coverage of medical and healthcare literature, ensuring a comprehensive retrieval of studies relevant to the impact of health information technology on the quality and efficiency of healthcare. Studies were included based on predefined eligibility criteria to maintain consistency and relevance. Inclusion criteria encompassed primary research articles with interventional design. The time frame for inclusion was set to include any interventional studies published before September 2023. Additionally, studies were required to focus explicitly on the impact of health information technology on healthcare quality and efficiency, incorporating a variety of study designs to capture a holistic view of the subject. The study selection process followed a systematic and transparent approach. Two independent reviewers initially screened titles and abstracts of identified articles for relevance based on the predefined eligibility criteria. Subsequently, full-text articles of

potentially relevant studies were obtained and further assessed for eligibility. Any discrepancies in study selection were resolved through consensus or consultation with a third reviewer. Data extraction was performed using a standardized form to capture relevant information from each included study. Extracted data included study characteristics, participant demographics, health information technology interventions, and outcomes related to healthcare quality and efficiency. The synthesis of findings involved a narrative approach to highlight the patterns, trends, and discrepancies across studies. Additionally, the risk of bias within individual studies was assessed, contributing to the overall quality appraisal of the evidence presented in the systematic review. This rigorous and systematic approach to study selection and data extraction aimed to ensure the reliability and validity of the findings in addressing the research question. Results and discussion The eight interventional studies included in this systematic review exhibited considerable variability in terms of sample size, population characteristics, interventions, and outcomes, allowing for a detailed comparison of the impact of health information technology (HIT) across different contexts[11-18]. The range of sample sizes across the studies was wide, with variations from a modest 135 participants to a substantial 3,210 participants. This diversity allowed for a comprehensive exploration of the impact of health information technology across varying scales of healthcare settings. In terms of interventions, the included studies showcased a spectrum of health information technology implementations. For instance, three studies evaluating the integration of advanced functionalities such as decision support systems and computerized physician order entry reported a notable 22-45% reduction in medication errors[15, 16, 18]. Telehealth interventions were also prevalent, with two studies reporting a 19-53% decrease in hospital admissions through remote monitoring and virtual consultations[11, 17]. Notably, interventions were tailored to the specific needs of the studied populations, emphasizing the adaptability of health information technology in diverse healthcare settings. The impact on healthcare quality was a primary outcome across the reviewed studies. Five out of the eight studies reported significant improvements in healthcare quality metrics, ranging from enhanced patient safety through a 21-35% reduction in medication errors to a 15-27% improvement in adherence to evidence-based clinical guidelines[11, 13, 16-18]. The interventions, particularly those involving

advanced EHR functionalities, demonstrated a positive correlation with clinical outcomes, emphasizing the role of health information technology in optimizing the quality of patient care. Efficiency gains were a notable outcome in four of the included studies. The implementation of health information exchange (HIE) systems and streamlined telehealth services contributed to notable reductions in redundant diagnostic testing, hospital admissions, and overall healthcare costs. For instance, two studies reported a 18-33% reduction in redundant diagnostic testing through the implementation of HIE systems[17, 18]. These findings underscored the potential of health information technology not only in enhancing the quality of care but also in optimizing resource utilization and promoting cost-effectiveness within healthcare delivery systems.

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