THE IMPORTANCE OF TECHNOLOGY AND THE CHALLENGES OF MODERN TECHNOLOGY IN HEALTH CARE

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Background:

As community demand for quality health care services and the cost of providing these services continue to rise, a growing amount of focus is being placed on the potential of health information technology (HIT) to reduce health care spending and improve the efficiency, quality, and safety of medical care. The provision of safe and effective healthcare remains a continuing challenge for clinicians, especially in light of the growing awareness of medical error [1]. The desire of many health care systems to improve consistency and safety in patient care has prompted substantial investment in the development of evidence-based clinical guidelines [2] over the past several decades. However, the effective dissemination of these guidelines has remained a difficult task, and HIT has been proposed as a means to effectively implement these guidelines in practice [3].

Despite the fact that more information and communication technology (ICT) will be deployed in the next decade than ever before, these advancements do pose risks to patients, leading some to dub this the "dangerous decade" for health information technology [4]. Poor communication between physicians and nurses is widely recognized as one of the most common causes of adverse events in hospitalized patients [5] and a major underlying cause of all sentinel events [6]. HIT is frequently marketed as offering potential solutions to problems uncovered by root cause analyses, including a variety of communication channels that physicians and nurses are rapidly adopting: the electronic medical record, computerized provider order entry, email, and pagers. While there is no doubt that the increasing use of ICT will alter how nurses and physicians communicate, there is already evidence that communication technologies can paradoxically contribute to an increase, not a decrease, in communication problems. Consequently, it is crucial to comprehend how communication technology is utilized in health care and when it is most likely to achieve the goals of improved communication and safer care [7,8].

Recent healthcare reform in the United States has impacted technology, innovation, and the delivery of care in numerous ways. The medical device industry constitutes a significant portion of the healthcare system. As of 2019, the industry consists of 859 companies in the United States with a total revenue of $41.3 billion [9].

As the use of newer communication technologies increases, physicians and nurses who once frequently met at the point of care delivery to discuss a patient face-to-face are now increasingly separated by location and time and use a variety of technologies to transmit their conversations [10]. This modification may improve communication efficiency, but it may also increase message ambiguity and contribute to an increase in adverse events, particularly in complex situations [11]. Communication practices that consist solely of sending messages through a single medium, such as a pager, disregard the fact that a message sent via pager will differ from the same message sent verbally, because content conforms to the medium in which it is presented [12].

Communication practices and work connections constitute the context within which communication technology exists. The use of rich media as well as the location and accessibility of computers influence communication patterns. Media richness is defined as a property of a communication medium that enhances the capacity of information transmitted via that channel to alter understanding [13]. Based on a medium's potential for immediate feedback, amount of cues and channels employed, personalisation, and language diversity, media are classified as rich or less rich [13]. Physician and nurse communication practices might or might not take into account the variety of available media. The theory of media richness proposes that while communicating about complicated, ambiguous matters, individuals should utilize rich media such as face-to-face conversations and telephones. Rich media reduce ambiguity by allowing communicators to overcome varying frames of reference and by facilitating the processing of complicated communications. Less rich media provide fewer clues, limit feedback, and tend to be impersonal, but they are good for digesting messages and conventional information [13]. Computer applications (e.g., physician and nursing notes on electronic medical records (EMRs), computerized provider order entry (CPOE), and electronic text) fall on the poorer end of the spectrum; computer applications are impersonal when there is limited opportunity to personalize the documentation or utilize a variety of language options.

The position and accessibility of computers affect communication patterns by interfering with the development of distributed cognition [14], the notion that knowledge regarding a patient's condition and treatment is dispersed among the physicians and nurses (and other professions) providing care [15]. When physicians and nurses are distributed to multiple distant places to use communication technologies instead of being co-located, opportunities for exchanging knowledge from varying perspectives are limited [16], making

it possible for a message's content to be misconstrued.

The impact of health information and communication technologies on communication is also influenced by the hierarchy and stability of a health care team's work relationships. Physicians and nurses must collaborate to resolve patient care issues requiring the input of multiple specialties [17]. In these scenarios, communication must support consensus formation, which can be challenging for a variety of reasons, but we have identified two in our theoretical model. First, the hierarchical nature of the interaction between physicians and nurses might impede consensus formation if nurses remain silent about a patient care issue for fear of being embarrassed or reprimanded by physicians [18]; nurses' silence may lead to unfavorable outcomes [19]. Thus, collaborative rather than hierarchical interactions are encouraged to ensure that all perspectives on a complicated subject are considered and that consensus is reached. Second, team stability may be particularly pertinent to the relationship between communication technology and communication [20]. Stability on a team is characterized by the same persons working on collaborative tasks [20]. Stability on a team is essential because it enables the establishment of the relationships required to permit the understanding of diverse perspectives [21]. Individuals whose communication increases become more similar as they share more of their beliefs and information [22]. Stable physician presence on the health care team makes it easier for clinicians to discover common ground (shared knowledge) and construct a shared reality [23, 24].

Type and capabilities of HIT/HIS Included research addressed the following key system types: clinical decision assistance for providers, computerized order input for providers, and electronic health records. Typically, clinical decision support systems were incorporated into electronic health record systems or computerized provider order input systems. However, a clinical decision support system with extensive functionality is compatible with electronic health record systems and computerized provider order input [25]. Two studies [26,27] evaluated the interventions of stand-alone decision support systems with limited data interoperability, in which clinicians were forced to manually update system-generated data into an electronic health record. Two investigations lacked adequate depth in their descriptions of the evaluated systems, and clinician interaction with the systems was not documented [25]. The efficiency of computerized provider order input systems was evaluated in three studies [25,28,29]. These order entry systems were automatically linked to patients' health records or clinical decision support systems in order to provide evidence-based recommendations on drug administration and other services, such as reminders for follow-up therapy and preventive care. In most instances, electronic health record systems are linked to clinical and administrative systems, and patient records can be automatically updated. Only one study compared the effectiveness of an independent patient records system to a paper-based system [30]. Clinicians made extensive use of electronic health records systems with reminders to test patients for diabetes mellitus, deep vein thrombosis, latent TB infections, and adverse drug responses [25,26]. In addition, it was commonly believed that electronic health record systems could generate a specialized report or health summary to assist clinical personnel in providing medical care [31].

This review aimed to highlight the impact of technology on health care, advantage and expected complications by reviewing the literature in this topic, and also to emphasize the advantage of it.

Methodology:

A computer-assisted searches of electronic databases of medical references, accompanied by complementary manual searches of the literature. In collaboration with a research librarian, the MEDLINE database and the Cochrane Central Register of Controlled Trials were searched with the following key words: ‘technology on health care’ and ‘HIT’ combined via the AND operator to the keyword ‘advantage’ after all search terms had been exploded by the Medical Subjects Heading (MeSH) thesaurus. Returned results were restricted to clinical trials. The two databases were searched for materials published through past decades to May, 2022. The references of relevant articles were reviewed as part of a complementary manual search.

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