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Short Review

Electronic Health Record in the ICU: An Essential Need in the Modern Era

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Abstract

One of the most significant changes in modern healthcare delivery has been the evolution of the paper record to the electronic health record (EHR). Despite incentives that provide reimbursements to hospitals and healthcare providers for adopting EHR technology, there is a large number of barriers that preclude its implementation. EHR has a great impact on a variety of healthcare outcomes, mainly favoring its use. Consequently, the development of effective implementation strategies is essential in modern healthcare society.

More Information

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Introduction

Electronic health record adoption has become nearly universal during the previous years. There is a number of studies investigating factors influencing adoption as well as clinical care benefits and drawbacks of EHR. We provide a brief overview of the advantages and disadvantages of EHR, the outcomes associated with its use, and strategies for effective implementation.

Discussion

According to the Healthcare Information and Management Systems Society, the Electronic Health Record (EHR) is defined as a longitudinal electronic record of patient health information (demographics, health problems, medications, vital signs, past medical history, laboratory and imaging data etc) generated in any care delivery setting [1]. Major steps have been made regarding the evolution of the EHR and its use in the Intensive Care Unit (ICU) seems to increase with the passage of years [1-3].

Undoubtedly, the use of EHR has major benefits in the critical care setting. Legibility is one of them, avoiding a large number of errors attributed to poor handwriting and enhancing patient safety. In addition, health information exchange is better-facilitating communication between clinicians [4]. Through EHRs health data collection and analysis are much easier offering great opportunities for research conduction. Their use is related to clinical outcomes improvement, reduced costs, and increased productivity [5,6].

The drawbacks associated with EHR need to be highlighted, too. Due to the huge information exchange, there are concerns about patient privacy violations and security that cannot be easily addressed. Other problems include the increased work of documentation and the changes in workflow which can lessen productivity and lead to increased medical errors. Overdependence on technology increases the risk of diminished clinical judgment regarding patient management and greater distance between clinicians and patients [7,8].

A study in a large community hospital showed that physicians spend almost 40% of their workday on EHR and that time spent can be diminished with training and experience [9]. In Brazil, 92.6% of intensive care physicians use electronic medical record and prescription systems and the majority believe that electronic systems provide greater quality and safety than paper systems [10]. Among ICU physicians men perceive greater workload stress, whereas women report greater satisfaction and usability with the EHR [11,12]. However, It has been demonstrated that ICU physicians experience fatigue during EHR use and this is negatively associated with efficiency [13]. Similarly, ICU nurses' acceptance of the EHR has been improved and this may be mainly related to the "learning curve" effect [14].

According to a systematic review and meta-analysis, the impact of health records on healthcare quality is large. The use of EHR is related to fewer medication errors and adverse drug effects but more adherence to guidelines [15-17]. In addition, the integration of smart lists into EHR results in shorter lengths

of ICU stay and lower costs [18]. After EHR implementation in a surgical intensive care unit, the rate of central line bloodstream infection (CLABSI) was lower and mortality was reduced as well [19]. Moreover, the use of an electronic health record-driven intensive care unit antimicrobial stewardship model can lead to a decrease in target antibiotic utilization as well as an increase in the appropriateness of antimicrobials [20]. Noteworthy, detailed ventilator records in the EHR and special notifications may avoid excess oxygen exposure and succeed in low tidal volume ventilation in mechanically ventilated patients [21,22]. Machine learning using electronic health record data can predict with satisfying accuracy intensive care unit readmission and mortality [23-25].

Although the outcomes associated with EHR use are quite significant, the implementation of EHR systems is a rather complex task. There are both facilitators and barriers in this difficult process [26], however, the former outweighs the latter according to a systematic review and this should be a strong message for the public health industry [27]. There is a variety of interventions (software and hardware should be user-friendly, participation of clinical staff in the implementation process, offering guidance and room for change, organization culture that supports collaboration and teamwork, etc) that can assist in overcoming problems and developing effective strategies for EHR implementation [28,29]. Although physician burnout incident to the EHR has been documented, several best practices exist to overcome such adverse effects [30].

Nowadays, integrating technology and patient care is of paramount importance for ICU clinicians and staff in general. Healthcare professionals must use technology effectively towards individualized patient management and EHRs are an integral part of this process.

Conclusion

Cumulative evidence demonstrates that EHR systems can improve the quality of healthcare. Therefore, strategies for EHR implementation should be reinforced in everyday clinical practice.

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