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Clinicians' burnout and electronic health records use: implications for health data management

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ABSTRACT

Background/Objective: This study sought to review association between electronic health records (EHRs) use and clinicians' burnout. ***Methods/Design*:** This is a narrative review of literature. The study reviewed 59 published articles and texts on clinicians' burnout and EHRs use. ***Results:*** The review shows that lack of EHRs in this information-driven and technologically advanced health care environment can hinder quality of health data and may lead to poor health care quality. The use of EHRs though enhances health care service provisions, poses on clinicians, ergonomic problems such as eye strains, wrist pain, back pain, stress and most importantly, clinicians' burnout. This is largely due to poorly designed software solutions, ambiguous workflows and unnecessary documentation requirements for non-clinical purposes. ***Conclusion:*** Clinicians' use of EHRs and other Health ITs has become a necessary part of health care delivery systems for its ease of use and inherent enhancement of care process. Nevertheless, EHR-related stress, dissatisfaction and burnout due to ill-defined software solutions, ambiguous and onerous workflows, and unnecessary documentation requirements have become the order of the day. Clinicians' burnout is a threat to care process, a burden on the clinicians who provide the care, inimical the health of health care consumers and an impending systemic havoc to the overall goal of health care delivery systems. Therefore, all health stakeholders should ensure that EHR solutions are purposively redesigned, only essential documentation requirements maintained, welfare of every healthcare provider is given top priority and EHR-based continuing education is provided at work environment.

***Keywords*:** Clinical documentation; clinicians' burnout; electronic health records; health care data management; work-related stressors

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INTRODUCTION

Electronic health records (EHRs) and other health information technologies continue to permeate the healthcare systems and as well, the profession of managing patient's health records and health data is rapidly changing in line with the evolving technologies and workplace requirements[1]. With these developments, health data quality and data integrity will largely be depended on the quality of training received by contributors and managers of health data

contained in the patient's health record, which is a major fundamental component of the healthcare delivery systems[1,2]. A computerized healthcare system is promising and has the potentials for improving healthcare information management and medical care quality[3,4]. There is a growing awareness on EHRs and other health ITs and the use of patients' health records for healthcare quality and most healthcare providers acknowledged the importance health IT[5]. Electronic health records use demands that users stay in a position for long periods and that they need to understand the limits and failures of their decisions while interacting with the computer in order to manage the risks of unintended consequences[6,7]. Healthcare stakeholders consider EHRs and other health ITs as a critical tool to transform the industry, they are likely to report satisfaction with its meaningful use and they admitted that there are a lot of problems that EHRs has come to solve[3,8,9]. Nevertheless, they can easily associate additional burden with the EHRs when the system is seen as disrupting clinical workflows[10]. Due to the complex and socio-technical nature of the health care system, failures and other undesirable outcomes may be unavoidable[3].

Although the EHR system has facilitated seamless, on point-of-care access to quality health information, it has also come with colossal burden[11]. For instance, poorly designed electronic clinical decision support (CDS) tools can require excessive interaction and hampers clinicians' ability to efficiently review patient safety alerts[10]. Study has shown that EHRs freely opens health information to cyber threats, which may negatively affect medical confidentiality[12]. This is the much reason health sector should be concerned about the engagement of unqualified personnel in the system. This is especially, in the management of patients' health records as this may pose danger to patient health outcomes, threatens the validity of research and introduces confidentiality, ethics and medico-legal concerns[13]. Healthcare systems in developing nations are predominantly paper-based and stakeholders have opined that implementations of EHRs and other health ITs will reduce such worrisome situations where clinical documentation was seen to be suboptimal[13,14]. There have been calls also, to perfect the current paper-based practice in order to evolve a seamless adoption and implementation of EHRs[15]. More importantly, EHRs use has been reported to be associated with clinicians' burnout. For an instance, users of EHRs with a moderate number of functions report more stress and less job satisfaction than users with low numbers of EHRs functions[16]. This study sought to review the relationship between electronic health records and clinicians' (healthcare professionals') burnout.

METHODS

This is a review of literature. Two databases PubMed and Google Scholar were searched between 5th May and 11th July, 2020 for relevant literature. Two independent investigators/reviewers among the authors (AIT, SQB) searched the databases using the following search terms; electronic health records, electronic medical records, burnouts, work-related stressors, ergonomics in healthcare services, burnouts among health workers, nurses' burnouts, physicians' burnouts, burnouts among health records officers and clinicians' burnouts.

In the search process, there were no restrictions in terms of workplace type and country but, publication date was restricted to ten years (2011 – 2020) except theories or major textbooks on the subject matter. Aside few collections on general discourse on health records, EHRs and burnouts, literature that discuss the relationship between EHRs use and burnout were selected for review. Of the 65 articles found relevant out of the 110 retrieved, 59 (90.8%) were reviewed having met the review criteria. The major criterion was that literature must relate EHRs use to burnout.

Search outcome shall be discussed under the following four subheadings:

i. Essentials of EHRs in healthcare system
ii. Work-related burnouts
iii. EHR-related burnouts among clinicians (all healthcare professionals)

iv. Woes of burnouts in healthcare services delivery

RESULTS

Essentials of EHRs in healthcare system

Electronic health records (EHRs) have great potentials to improve healthcare, lack of which hinders quality health data[9,14]. Some identified benefits of EHRs include having data all in one place, data accessible from many sites, its speed, accuracy, ease-of-operation, data security, ability to connect with subspecialists and other clinicians, ease of access and elimination of 'griffonage' (incomprehensible handwriting)[3,17]. Clinicians have envisioned the workability of holistic paperless healthcare environment when health record will be used to support the best care for the patient rather than as a mere encounter-based document to support billing[1,10]. Studies have specifically established that EHRs and other health ITs has the potentials to improve medical care safety and quality and to enhance medical confidentiality[4,5,18]. Several factors that influence clinicians' attitudes toward EHRs adoption and use include perceived ease of use, perceived usefulness, management support, users' involvement, users' autonomy, physician-patient relationship, social influence, performance expectancy, facilitating conditions, effort expectancy, profession, previous exposure to the technologies and salary levels[19-21]. Researchers have reported gaps in EHRs knowledge and skills among clinicians[3,5,22-24].

Common barriers to EHRs implementation include cost of implementation and maintenance, unwillingness to adapt to changes, inadequate or ill-suited condition for training, disparaged connectivity, and slothful migration from paper-based to EHRs[24]. It is designed to make the administration of medical care easier for clinicians, safer for patients, with great potential to improve care but, frustrations with technology have, in many cases, poses perverse effects[9]. Electronic health records comes with positive and negative aspects in relation to burnout and stress but its use may not be the most important stress creator and such techno-stress can easily be avoided[25]. Studies have reported that clinicians as well as patients were concerned about reduced confidentiality with their health records when held on computer and that emerging technologies will open health information freely to cyber threats[4,5,12,17]. Adverse physical outcomes due to ergonomic problems such as eye strain, neck, back, and wrist pain, and mouse shoulder have also been reported[26]. Significant association has also been found between EHRs implementation and a decreased time used for combined patient care and documentation[27]. Nevertheless, it has been reported that EHRs has the capacity to enhance healthcare data management and in effect, improve healthcare quality[4].

Work-related burnouts

Burnout is the consequences of prolonged stress and anxiety experienced by people working in the healing and other professions[28]. It is a long-term stress reaction which includes emotional exhaustion, depersonalization, and a lack of sense of personal accomplishment[29]. It is a major challenge at workplace with adverse physical outcomes due to ergonomic problems such as eye strain, neck, back, and wrist pain, and mouse shoulder[26]. Burnout is a combination of exhaustion, cynicism, and perceived inefficacy resulting from long-term job stress[30]. It is often complicated by disruptive behaviour, such as depression, substance abuse, interpersonal conflicts, and even suicidal ideation[11]. The validity of burnout as an independent diagnosis remains controversial[30]. However, burnout has emerged as a major problem plaguing 21st century healthcare delivery system and it is highly prevalent among healthcare providers and their trainees[30,31]. It imposes on clinicians, significant personal and professional consequences, which include alcohol abuse or dependence, suicidal ideation, career regret, sub-optimal professional development[31]. In the Kingdom of Saudi Arabia for an instance, the degree of burnout among resident physicians is reported to be high[32]. When EHRs workflow is poorly designed, clinicians become frustrated and this creates time pressure[31]. It has been reported that healthcare providers were constrained majorly by shortage of time while using EHRs[21].

Specifically, surgeons become unease in carrying out their specialized duty due to fear of litigation that may affect their reputation[11]. Emotional exhaustion had the strongest relationship when it comes to healthcare with quality, followed by depersonalization and reduced personal accomplishment[33]. This is in addition to job strain, over-commitment and lack of social support, which explain most of the variance related to burnout[34]. A burnt-out worker, who had experienced unemployment, restructuring and manpower reduction, tends to have greater job stress than those who had not experienced all of these[35]. Various stressors in the work environment, such as workload and ambiguity, boredom and the routine nature of the job we perform are all related to burnout[28]. Usually, back pain occurs due to sprains and strains in the back as an outcome of static or an awkward posture[32]. Being young at a middle-aged, being a female, working overtime, being a nurse or physician assistant, engaged in a job with high strain, frequent over-commitment and low social support, were associated with high burnout[6,25,29,34,36]. Notably, workers with low computer self-efficacy showed an increase in their burnout levels (i.e. exhaustion and cynicism) while workers with high computer self-efficacy showed a decrease in their burnout levels when computer training was high[37]. Computer training is one major strategies commonly used to control potential stressors[37]. More intensive exposure to technology is associated with a more positive appraisal, which, in turn, is associated with lower levels of burnout[38].

EHR-related burnouts among clinicians (all healthcare professionals)

There is an apprehensive disconnection between the theory behind EHR systems and the reality of using them in practice[39]. A loss of autonomy, over-reliance on computer data, onerous rules, an asymmetric reward system, a sense of powerlessness and EHRs that are not designed primarily for patient care, all led to burnout among medical practitioners and their trainees[40]. Providers' burnout is an escalating problem receiving little attention from healthcare leaders[29]. As a result, physicians are quitting in large numbers, which further increase the stress on those still practicing[40]. Studies have shown that nurses, physician assistants, physicians, medical technicians and health records officers experienced burnout[34,35]. In USA, more than half of physicians as well as nurses, experience symptoms of burnout[30,41]. Physicians working in the specialties at the frontlines of care are among the highest risk of burnout[41]. EHRs usability scores were strongly and independently associated with physician burnout in a dose-response relationship[42,43]. Patti *et al*. reported that the rate of burnout among surgeons is much greater than among the general population (53% vs. 28%)[11]. Between 2011 and 2014, the prevalence of burnout increased among physicians and nurses but, stable among other clinicians[41]. Similarly, 53% of residents and teaching physicians reported burnout, 75% of whom attributed some or a lot of it to their use of the EHRs[34]. Studies have shown that the majority of residents work 80 or more hours per week while physicians spend around 35% of their time documenting patient data[6,27].

Furthermore, some studies identified the following problems with EHRs; excessive data entry requirements, inefficiently or poorly designed user interfaces, insufficient health information exchange, information overload, interference with the patient-physician relationship, ergonomic problems, problematic workflows, systems issues, and provider and patient communication behaviour and expectations[26,31,43,44]. Although EHR is ubiquitous in developed nations like the USA, it is a clear opinion that it has become a driving force for professional dissatisfaction and burnout[9,31,45]. The use of clinical documentation for nonclinical purposes such as regulatory, clerical, or administrative requirements is increasing and it is a source of frustration among clinicians[42,46]. The documentation burden has been so intense that in some cases, physicians intentionally cancel other schedules to complete electronic documentation of previous patients. This creeps into their valuable care time and it is indeed associated with burnout[46,47]. Although Hameed *et al*. reported that there was no association between working more

hours and burnout, insufficient time for documentation has been reported as the most strongly predicted burnout symptoms[26,30-32,36]. Time pressure was more related to adverse physician outcomes in the high EMR function cluster[16]. This is corroborated by a recent study that the need to complete EHRs at home after work hours has been seen as a major stressor[48]. Improving EHRs usability promises to help reduce clinicians' burnout[9,42]. Efforts to reduce stress and burnout attributable to EHRs and improve clinicians' satisfaction include clinician transparency, good control over workload, redesigning clinical workflow, adapting organization workflow, improving EHR system design, and clinicians are advised to look after their own well-being first in order to provide optimal care for others[32,48,49].

Woes of burnouts in healthcare services delivery

One major aim of designing, adopting and implementing EHRs is to streamline workflows, reduce clerical burden and improve care but, EHRs has created more documentation burden[4,5,12,17,30]. The emergence of EHRs with the attendant increase in documentation requirements has increased the amount of time spent on computers systems among clinicians[30]. An average family physician now spends approximately 28 hours per month on nights and weekends when he or she is not on duty[31]. Therefore, clinicians are concerned that adopting a structured and standardized EHR will lead to increased documentation tasks and time, which may affect patient care during consultations[27]. Consequently, it has been established that increased after-hours EHR work predisposes burnout and impaired work-life balance[34]. Clinicians who work with highly functioning EHRs do experience a variety of adverse personal outcomes in association with time pressure during office visits and physical examinations[16]. Whereas, spending more than the median 6 hours a week on after-hours EHR work was strongly associated with less satisfaction with work life balance and a greater likelihood of burnout[34].

Burnout affects clinicians' well-being, effectiveness, productivity, and the ability to provide quality care[50]. Beyond its impact on their duties, burnout inflicts personal consequences on clinicians. These include broken relationships, substance abuse, suicide, and depression[50]. On the other hand, physicians spent more time in the EHRs than they do treating patients[30]. Worst still, burnout has placed enormous detrimental implications on the quality of the overall healthcare system[50]. For instance, a burnt-out physician is more likely to leave his practice, thus, reducing access to quality care[29]. The relationship between burnout and medical error is likely bidirectional[41]. Medical errors such as a simple telephone miscommunication between a doctor and a nurse can have serious, costly or fatal consequences[48]. Feeling overloaded, feeling poorly managed and resourced, and dealing with patients' suffering, are three sources of stress associated with both burnout and psychiatric morbidity[51]. As providers encounter more job stressors, they may have impaired attention, retrogressed recall in paying attention to detail, diminished vigilance, increased safety lapses, then, care quality wanes and the patients may likely report low provider professionalism or satisfaction[52]. Providers experiencing burnout may be liable to have more agitated or aggressive attitudes toward their patients, their work, or their colleagues, which can harm patient satisfaction and care team communication[52].

Clinicians' burnout is prevalent across healthcare settings and may impair clinicians' ability to maintain safe practices and detect emerging safety threats[53]. Patient satisfaction has been reported to have association with perceived clinician-patient communication while clinician burnout was associated with poorer perceived clinician-patient communication[54]. Burnout is an existential problem affecting the lives of surgeons as well as the lives of their patients[11]. Personal consequences of burnout include occupational injury, detrimental alcohol use, and a risk of suicide while professional consequences include effects on the quality of care, the patient experience, and patient outcomes[31]. Burnout has

clear and profound impacts on staffing, including absenteeism, redundancy, reduced productivity and clinicians' turnover[28,30]. The burnout epidemic is detrimental to patient care and may exacerbate the impending physician shortage[30]. Burnout among clinicians has also been established to have potentially profound effects on quality of care[31]. This preponderant extreme burnout among clinicians is a cause for concern as it affects quality, safety, and healthcare system performance[41]. A study found minimal relationships between burnout and decreased quality of care; also, between burnout and decreased safety. Aside the potentially tragic consequences for patients and clinicians, there are substantial economic costs to society and healthcare organizations[33].

DISCUSSION

Electronic health records is designed to make the administration of medical care easier for clinicians, safer for patients, with great potential to improve care but frustrations with technology have, in many cases, pose perverse effects[9,39]. Generally, sub-optimal adherence to documentation standards inherent in paper-based would have been avoided with EHRs[14]. However, EHR-related burnout among clinicians remains a major problem in our healthcare delivery system[45]. Burnout alters physician-patient relationships and quality of care[55]. Talking and listening to a patient might more easily be combined with documentation when a paper-based record is used than when a structured and standardized EHR is used[27]. Stress and burnout have significant implications on the quality of healthcare delivered by physicians as well as implications for the healthcare system as a whole[9,31,46,51-53,56]. Work-related burnout is associated with the selected components of the EHRs[9,56]. Length and degree of documentation requirements are work-related issues that contribute to clinicians' stress and these significantly decrease job satisfaction, increases job stress and burnout[43]. If not addressed, the burnout epidemic may continue to worsen, to the detriment of patients and healthcare providers[30]. We cannot halt burnout but, we can certainly help to avoid it as much as possible[28]. Work-related burnout could be reduced by a clinical team whose roles are clearly defined and special care for clinicians' health and welfare[28,49]. Organizations can also let clinicians devote more time to their favourite aspect of work (e.g., patient care, education, administration, or research)[30].

Documentation responsibility has been linked to stress and in effect, burnout among clinicians[9]. EHRs might have been identified as a source of dissatisfaction and burnout, the real culprit is the documentation burden caused by regulations related to billing and reimbursement rather than the EHRs[57]. Physicians and other clinicians have become data-entry clerks, required to document not only diagnoses, physician orders and patient visit notes but also, an increasing amount of low-valued administrative data such as billing and reimbursement[9]. Although, EHR use cannot be disentangled from increasingly granular billing, compliance and documentation requirements, healthcare organizations can dedicate resources to help clinicians minimize unnecessary documentation[9,31]. Reducing the documentation burden for payments, quality measurements, and compliance could directly address some of the antecedent factors in EHRs use that are linked to clinicians' burnout[13]. Regulatory reform allowing clinicians to strip documentation to bare essentials would improve accuracy, enable better use for research, and reduce the tedious work that occupies so much of clinicians' time[9]. Concise documentation that highlights relevant data will come from smarter EHRs that actively participate in patient care[46]. Physician EHRs time could be reduced by having support personnel performs more routine data entry[27].

Advanced EHR education can improve crucial documentation that impacts quality, safety, accuracy, and timeliness of care[58]. Combining EHRs education content with physician wellness approaches, in a highly interactive, personalized, hands-on workshop setting, results in improved physician performance and well-being[58]. EHR innovations cannot help to mitigate clinician burnout without careful consideration of the socio-ecological context in which these innovations

occur. These include organizational culture, healthcare marketplace, technology ecosystem, and national policy[57]. Optimizing EHR skills is impactful on patient safety and care as it lessens the burden of a large portion of physicians' daily work, by improving critical skills and reducing time interfacing with all aspects of a patient's health records[58]. Therefore, there is a need to invest heavily in the training of all clinicians and especially, *health records and information management professionals*, who manage health data both in paper-based and electronic environments[8,35]. Physicians with greater clinic capacity with the right staffing would have better care coordination and are less likely to experience burnout[59]. To maximize the effectiveness, productivity, and longevity of clinicians, health sector leaders must recognize burnout in clinicians as a serious problem and respond appropriately[52]. In addition, establishment of compulsory continuing professional development education; nationwide health IT awareness for all clinicians; specific training in software development; training and retraining in advanced data analysis and effective mentorship would worth the while[1,3,5,8,21,23]. Improving the usability of EHRs is a key priority for reducing clinical burden, specifically through better alignment of the EHRs with optimal workflows for care delivery, clinical decision making, and other tasks. EHRs developers should consider implementing common approaches to basic clinical operations across the systems, so that clinicians do not have to utilize a significantly different interface each time they switch between systems[10].

Study limitations

First, most of the previous works reviewed in this study focused physicians more than other clinicians. This might probably be due to physicians' status of being the major contributors and users of patients' health records, EHRs and other health ITs.

Secondly, most of the articles reviewed are from the USA in spite of thorough and objective search efforts. Reasons for this may not be far-fetched as the USA is leading in EHRs and other health IT use.

The third limitation is that only a few of the studies discussed the contribution of health records and information management professionals, who have leadership roles in EHRs and other Health ITs. This may not mean that these professionals do not use EHRs and other health ITs as expected but, may be due to paucity of studies on burnout due to EHRs and other health ITs among this category of professionals.

CONCLUSION

Clinicians' use of electronic health records and other health information technologies has become a necessary part of healthcare delivery systems for its ease of use and inherent enhancement of care process. Nevertheless, EHR-related stress, dissatisfaction and burnout due to ill-defined software solutions, ambiguous and onerous workflows, and unnecessary documentation requirements have become the order of the day. Clinicians' burnout is a threat to care process, a burden on the clinicians who provide the care, inimical to the health of health care consumers and an impending systemic havoc to the overall goal of healthcare delivery systems and public health. Therefore, all health stakeholders should ensure that EHR solutions are purposively redesigned, only essential documentation requirements maintained, welfare of every healthcare provider is given top priority and EHR-based continuing education is provided at work environment.

Recommendations

i. There is a need to have well-designed EHRs with minimum datasets.
ii. Overbearing and boredom at workplace should be avoided.
iii. Meaningful use of EHRs and other health ITs should be facilitated.
iv. Clinicians should keep to the essential data entry requirements.
v. Clinicians' should avoid information overload on EHRs.

vi. Stakeholders in health care systems should address all ergonomic problems.

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