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The Impact of Medical Record Documentation on Healthcare Provider Productivity:

(Review Artical)

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Abstract

Background: Physicians often characterize the electronic health record (EHR) as a burdensome obstacle to useful tasks, which has significant ramifications for physician welfare.

Aim of Study: This systematic review evaluates the organizational, physician, and information technology characteristics that are linked to the effects of electronic health records (EHRs) on physician well-being. Additionally, it emphasizes the suggested improvements to the design and functionality of EHRs, as advised by doctors working directly with them.

Methods: A comprehensive search was conducted in the MEDLINE, Embase, CINAHL, PsycINFO, ProQuest, and Web of Science databases to identify literature that discusses the use of electronic health records (EHR) by doctors and indicators of their well-being.

Results: After conducting a thorough analysis of 7388 articles, it was found that only 35 of them satisfied the predetermined criteria for inclusion. Various characteristics at different levels were linked to the well-being of doctors in relation to electronic health records (EHR). The predictors that may be influenced by interventions and are worth mentioning are: (1) the overall time spent on electronic health record (EHR) use, (2) The time spent on EHR outside regular working hours, (3) The availability of on-site assistance for EHR usage, (4) The perceived ease of use of the EHR system, (5) The amount of workload related to managing in-basket messages, and (6) the burden of documentation. Physician suggestions also reiterated these recurring ideas.

Conclusion: EHR-related well-being among doctors is influenced by several intricate elements. Our analysis reveals that doctors provide suggestions that cover a wide range of topics, including government rules, organizational policies, and adjustments to electronic health records (EHR). Subsequent studies should evaluate comprehensive therapies that target these characteristics. Physicians, being the main stakeholders, should be included in the design and execution of these changes to ensure that they are compatible with their demands and clinical workflows.

Key Words: *Health Record Systems – Electronic Health Record – Physician Burnout – Healthcare Provider Productivity – Subjective Well-Being.*

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Introduction

RECENT reviews indicate that physician burnout is prevalent, with rates ranging from 0% to 80.5%, and an average of 44% across studies **[1,2]**. This issue has gained significant attention from healthcare administrators due to its negative impact on physicians, such as increased rates of depression, substance use, reduced work hours, and leaving the medical profession **[3-10]**. Additionally, it affects patients by leading to decreased quality of care **[11-14]**. Cost analyses suggest that replacing a physician who quits due to burnout or job dissatisfaction can range from $250,000 to $1 million per physician, resulting in an annual aggregate cost of approximately $4.6 billion **[15-17]**. Consequently, there have been suggestions to revise the "triple aim" to include a fourth aim that focuses on promoting clinician job satisfaction **[18-22]**.

The Stanford model of professional fulfillment, a significant framework, identifies three key elements of well-being: personal resilience (i.e., self-care strategies), culture of wellness (i.e., the supportive nature of the work environment), and efficiency of practice (i.e., the policies and systems within the organization that impact medical practice). While numerous wellness interventions have prioritized enhancing personal resilience, interventions that address practice efficiency are considered

more likely to lead to substantial improvements in physician well-being [23].

Physicians often observe that the electronic health record (EHR) is a source of practice inefficiency. They see it as a burdensome system that disrupts workflow and adds unnecessary tasks to their profession. As a result, there has been a rise in the quantity of research examining the impact of EHR use on the well-being of physicians. Due to the significant growth of this field of research in recent years, it is necessary to provide a concise overview of the current understanding of the relationship between physician usage of electronic health records (EHR) and their well-being. Studies that focus on physician perspectives are critical in addressing particular concerns related to electronic health record (EHR) problems and possible solutions, since they give valuable insights from frontline workers [24,25].

Aim of work:

The purpose of our study is twofold: To evaluate the many aspects at several levels (organizational, physician, and information technology [IT]) that are linked to the effects of electronic health record (EHR) on physician well-being and burnout, and to identify prospective changes to EHR that are advocated by doctors and show promise. We will provide a concise overview of the existing research on factors that predict and possible strategies to address physician burnout linked to electronic health records (EHRs). This information may be valuable for health system executives, legislators, and EHR suppliers that want to enhance professional well-being.

Methods

A systematic review was conducted using the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analysis) standards.

Search strategy:

The PubMed database was used to locate all scholarly literature and gray literature (such as conference abstracts) that examined electronic health records (EHRs), doctors, and well-being. Furthermore, the Embase, CINAHL, PsycINFO, ProQuest, and Web of Science databases were meticulously examined to ascertain any supplementary research of significance. Databases were searched using regulated vocabulary, topic headings, and shortened and phrase-searched keywords in the title or abstract, as permitted by each database. As an example, the search phrases we used to explore well-being included topics such as "burnout," "stress," and "professional satisfaction." Each paper considered for full-text screening underwent a comprehensive search in both directions (backward and forward) to find any new citations. Ultimately, we included 6 studies in the screening process, since they were recommended by individuals we personally know.

Selection of studies:

We included research that investigated the widespread use of electronic health records (EHRs) or focused on particular components of EHRs, such as in-baskets. We conducted research that specifically examined burnout by either directly measuring it or evaluating related indicators like as frustration.

Characteristics at the organizational level:

In terms of practice environment, office practices had fewer daily logins compared to hospital-based practices. Additionally, private group practices were shown to have superior ease of use. Perceived physician productivity was linked to private and hospital group practices [26,27]. There is a negative correlation between the size of an organization and the perceived productivity and ease of use of electronic health records (EHR). In addition, the number of doctors in a practice does not have any impact on burnout or satisfaction with EHR.

Characteristics of physicians:

Advanced age among physicians was found to be correlated with lower scores in usability, perceived ease of electronic health record (EHR) use, perceived physician productivity, and overall satisfaction with EHR [28-30]. This association was observed in several studies. However, a more recent study did not find any differences in the likelihood of reporting satisfaction with remote access to EHR and the utilization of computers in patient rooms. One study indicated that specialists received fewer in-basket messages compared to generalists [31]. Another study found that there were differences in usability scores among different specialties, with general internal medicine physicians rating the electronic health record (EHR) usability higher than their colleagues in family medicine, radiology, general surgery, and orthopedic surgery [32].

However, another study observed no differences among specialties in terms of work-life balance or EHR-related burnout [33]. Additionally, another study concluded that perceived EHR productivity and ease of use varied among different specialties [34]. One study found no correlation between the use of electronic health records (EHR) and work-life balance or burnout. However, it was observed that physicians with greater patient care responsibility tend to spend more time using the EHR on days when they are not scheduled to see patients [35]. Another study found that having more patient care responsibility was linked to receiving fewer in-basket messages [36].

Attitudes and practices of physicians towards electronic health records (EHR):

According to a research, increased satisfaction with the in-house support staff for electronic health

record (EHR) was linked to greater satisfaction with the EHR itself **[26]**. Perceptions of usability were influenced by two factors: The clarity of prompts displayed on the EHR interface and the clear presentation of information. These factors were associated with higher perceived ease of EHR use and lower levels of perceived cumbersomeness. Intuitive interfaces were linked to lower levels of perceived effort. Higher usability scores and ease of EHR use were connected to improved perceptions of EHR remote access and computer use, as well as lower reported burnout, emotional exhaustion, and depersonalization scores **[28]**. On the other hand, non-user-friendly EHRs were associated with burnout. Perceiving the EHR as cumbersome was linked to higher frustration levels. Increased workload, specifically a larger number of tasks in the in-basket, was shown to be correlated with higher levels of reported burnout and poorer job satisfaction ratings. Additionally, a higher weight of paperwork was connected with burnout, but it did not have any impact on satisfaction with electronic health records (EHR) **[29]**. There was a correlation between frequent clicking activity in the EHR and greater burnout levels. However, the number of keystrokes did not have any relationship with EHR satisfaction **[26,28]**.

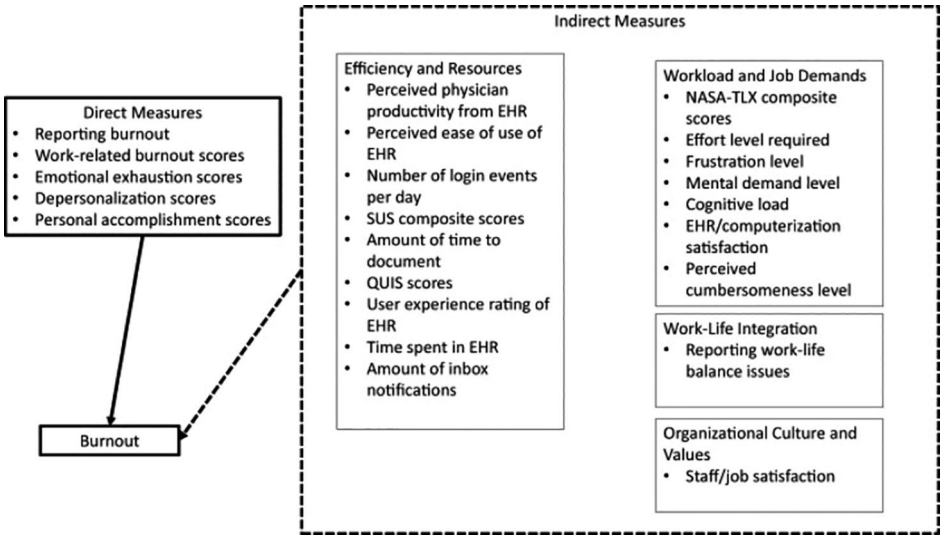

Fig. (1): Factors influencing the measurement of physician well-being indicators connected to electronic health record (EHR) use.

A research found that increased time spent on the Electronic Health Record (EHR) each week was linked to higher levels of emotional weariness and depersonalization. Training level, specifically whether one is a resident or an attending physician, influenced personal accomplishment scores **[37]**. Generally, residents reported lower scores compared to attending physicians. Another study, using a different burnout measurement tool, discovered that spending more time each week on the electronic health record (EHR) was linked to lower work-related burnout **[38]**. Additionally, a third study revealed that increased time spent on the EHR was associated with higher satisfaction with the user interface **[39]**.

Spending more time using the electronic health record (EHR) after work hours was linked to higher levels of burnout, increased frustration with the EHR, and more concerns about work-life balance. This was found in several studies **[40-44]**. Additionally, one study discovered that residents who spent more time typing in the EHR after work hours reported feeling more detached from their patients and had lower feelings of personal accomplishment **[45]**. In contrast, attending physicians did not show any association with detachment from patients and had higher personal accomplishment scores **[46]**. Lastly, a more recent study found that using the EHR on weekends, holidays, and days with patient appointments was connected to higher levels of reported burnout. Nevertheless, the amount of time spent on Electronic Health Record (EHR) tasks during days without patient visits (such as administrative time) or on weeknights did not have any correlation with burnout, as shown by a study conducted **[47]**.

Electronic health record functionality:

Multiple researches examined certain Electronic Health Record (EHR) functionalities. The majority of functions showed no correlation, however, computerized provider order entry was linked to higher burnout scores. Conversely, patient care summaries, clinical notes, and diagnosis features were linked to lower burnout scores. Overall, having an EHR with a limited number of functions was associated with lower stress scores and higher job satisfaction scores, but had no connection to burnout or intention to leave the practice **[48-50]**.

Physicians' suggestions to enhance electronic health record (EHR)-related measures:

All suggestions largely focused on enhancing the efficiency of practice. The physician suggestions included three main areas: government policy, organizational policy, and information technology (IT). For example, government policy interventions intended to reduce documentation requirements, organizational policy ideas aimed to establish team-based care or documentation models, and recommended IT solutions focused on addressing usability concerns and developing tools to enhance personal productivity **[51-54]**.

Discussion

The objective of this systematic review was to evaluate the organizational, physician, and IT characteristics that are linked to the effects of electronic health records (EHRs) on physician well-being. Additionally, the research aimed to identify possible enhancements to the design and functionality of EHRs, based on recommendations from frontline doctors. This is the first comprehensive analysis that examines the impact of the Electronic Health Record (EHR) on physician burnout and well-being. Additionally, it explores the solutions recommended by doctors to mitigate the challenges connected with the EHR. In summary, our evaluation revealed that essential organizational elements, such as internal electronic health record (EHR) assistance and the use of scribes, enhance the well-being of physicians. Additionally, our analysis revealed that IT-related elements, such as the ease of use of electronic health records (EHR) and the consequent workload of paperwork, continue to be significant determinants that impact the well-being of physicians. In addition, our analysis revealed many solutions suggested by doctors, such as the use of shared templates and team-oriented documentation that may be experimented with in order to enhance the well-being of physicians. The following paragraphs provide practical and policy-related recommendations.

Previous studies have found that having an on-site EHR support team is beneficial. This is consistent with research that has looked at the impact of in-house EHR support and optimization on physicians' workflows. It has also been shown that local IT support can improve physicians' attitudes towards the EHR and increase organizational responsiveness to their needs. On the other hand, the absence of IT support can have a negative effect on EHR usage and patient outcomes. By providing local EHR support and optimization services, physicians' time can be freed up, allowing for more fulfilling tasks such as direct patient care. Recent research indicates that optimizing electronic health record (EHR) systems can lead to increased satisfaction with the EHR and reduced burnout among various types of clinicians. Additionally, an EHR support team can offer training to clinicians, which has been shown to improve satisfaction with the EHR. Considering the significance and cost of on-site EHR support, it would be beneficial for future studies to assess its cost-effectiveness and explore more affordable alternatives, such as virtual EHR support, that could be used in healthcare settings with limited resources.

Another significant discovery emphasized the importance of including support personnel or scribes in the process of documenting electronic health records (EHR), indicating that care models that include a team approach may enhance well-being. Increasing evidence suggests that these models are linked to reduced burnout and increased job satisfaction scores. It is worth noting that the American Medical Association supports these models. In the context of electronic health records (EHR), support staff can handle administrative tasks that do not necessitate a physician's specialized knowledge. This may alleviate the workload associated with managing in-basket tasks and using electronic health records outside of regular working hours. In the same way, scribes may assist in decreasing the amount of paperwork required and the time spent using the Electronic Health Record (EHR) during patient appointments or outside of regular working hours. Electronic health records (EHRs) can facilitate these team models by providing features that enable nursing staff to input or prepare orders for physicians to review, allow team members to share in-basket folders, and establish routing rules that enable support staff to screen incoming in-basket messages and telephone encounters.

The presence of low electronic health record (EHR) usability was also recognized as a notable issue, highlighting the need of seeking advice from physicians when pinpointing areas for enhancing the EHR. These specific enhancements should be rooted in a design approach that prioritizes the needs and preferences of users, and should be informed by continuous input from physicians. Regrettably, a significant majority of physicians (66%) have stated that they were not involved in discussions concerning the enhancement of their organization's Electronic Health Record (EHR). To effectively tackle issues related to EHR usability, it is imperative to adopt additional participatory methods that incorporate physician feedback. Inclusion of psychologists in these discussions may prove beneficial in integrating cognitive sciences into the design of EHR. Furthermore, we suggest implementing interventions at multiple levels to enhance EHR usability. The Office of the National Coordinator for Health Information Technology has just concluded the public comment session for criteria formulation of the EHR Reporting Program at the policy level. The initiative intends to publicly provide comparative statistics on EHRs in 2022 **[55]**. Once these data are accessible, researchers will have the opportunity to examine the relationship be-

tween the extent of usability testing conducted by EHR suppliers and identify differences in usability across different EHR systems. At the organizational level, it has been suggested to use voice dictation and virtual scribes to reduce the amount of clicking and typing. We also propose the use of an interdisciplinary committee to review proposed changes to the EHR system, focusing on identifying workflow mismatches, usability risks, and adherence to best practices (such as published usability heuristics). At the IT level, artificial intelligence, such as predictive text, can help alleviate the burden of documentation by reducing the need for typing. The recently enacted 21st Century Cures Act includes strategies to address issues such as typing and clicking burden, cognitive overload, and EHR usability. These strategies involve implementing biometric authentication processes, reorganizing the reporting of lab results based on criticality, and maintaining a consistent user interface across the EHR.

In addition, physicians suggested various measures to enhance electronic health records (EHRs), such as minimizing regulatory obligations that contribute to excessive recordkeeping. The affordable care act implemented various payment programs based on value, including the hospital value-based purchasing program. This program has enhanced the delivery of care but has also led to an increased burden of documentation. While the aforementioned points may enhance the efficiency of the documentation process, physicians have expressed frustration with the regulations that impose these demanding requirements. Nevertheless, there is still a significant amount of work to be done in developing comparable policies for private payers and other healthcare settings. As a result, numerous prominent professional associations have recommended the adoption of a "minimum data set" that would enable payers to automatically receive structured electronic health record (EHR) data for reimbursement purposes. While this approach could alleviate administrative tasks for physicians, further efforts to enhance interoperability capabilities among different EHR systems may be required to fully implement this proposal.

Physicians also suggested many suggestions at the organizational and IT level related to the impact of a wellness culture (such as using shared templates and team-based documentation) and personal resilience treatments (such as establishing boundaries for work outside of work). The findings of the study align with the Stanford Model of Professional Fulfillment, which explains the factors that contribute to physician burnout. The study revealed that electronic health record (EHR) systems have a significant impact on the efficiency of medical practices, the level of cooperation and support within the healthcare team and work environment, and the efforts made by physicians to balance work and personal life. Most research has consistently shown a strong correlation between the adoption of Electronic Health Records (EHR) and personal productivity as well as the level of work-life balance. Nevertheless, contemporary research also proposes that treatments that address all three factors contributing to physician burnout may result in the most significant and impactful transformation for doctors. Therefore, investigating the effects of these multidimensional treatments on physician well-being is an important area for future study.

Furthermore, there were significant constraints associated with this systematic study. Due to the absence of rigorous research designs such as randomized controlled trials and quasi-experimental studies, we were unable to make clear judgments based on the present data. Furthermore, we included both publications that directly evaluated exhaustion using a validated instrument and those that evaluated a substitute measure for burnout, potentially impacting the interpretation of findings. In order to gain insights into physicians who have not yet developed burnout but are showing intermediate symptoms that could potentially lead to burnout if not addressed, we included indirect measures. Burnout is typically a result of various factors or events that affect well-being over time. Furthermore, the pooling of results across the quantitative studies was not feasible owing to the variety in the kinds of measurements used.

Furthermore, the incorporation of gray literature might have influenced our results. Nevertheless, we contend that including them offers a more thorough depiction of physician well-being indicators associated to electronic health records (EHR). Furthermore, it is important to note that while the publications analyzed in this research cover a period of almost ten years, it is acknowledged that much progress has been made in the creation of electronic health records (EHR) and the establishment of best practices since 2010. We observed negligible disparities in the progression of literature and research results over time, however there are noteworthy outliers where recent studies have specifically concentrated on after-hours electronic health record (EHR) use and usability measurements. As the field evolves, this assessment will need updating.

Conclusion:

The results of this research indicate that the well-being of physicians in relation to electronic health records (EHR) is influenced by several aspects, such as the ease of use of the EHR system, the features of the EHR system, and the individual traits and beliefs of the physicians. Simultaneously, our research indicates that doctors possess distinct and achievable recommendations on how to alleviate the strain associated with electronic health records (EHR). Future endeavors should prioritize the implementation of the techniques and enhancements desired by these primary consumers. Further re-

search is required to evaluate multicomponent therapies that target these intricate aspects and include doctors in the development of the interventions.

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تأثير توثيق سجلات المرضى على إنتاجية مقدمى الرعاية الصحية: استعراض

الخلفية: غالبًا ما يصف الأطباء السجل الصحي الإلكترونى (EHR) بأنه عقبة مرهقة تعوق القيام بالمهام المفيدة، وهو الأمر الذى يترتب عنه تداعيات كبيرة على رفاهية الأطباء.

هدف العمل: يقوم هذا الاستعراض النظامى بتقييم الخصائص التنظيمية والطبية وتكنولوجيا المعلومات التى ترتبط بتأثير سجلات الصحة الإلكترونية (EHR) على رفاهية الأطباء. بالإضافة إلى ذلك، يسلط الضوء على التحسينات المقترحة لتصميم ووظائف سجلات الصحة الإلكترونية (EHR)، كما ينصح بها الأطباء الذين يعملون مباشرة معها.

الطرق: تم إجراء بحث شامل فى قواعد بيانات MEDLINE وEmbase وCINAHL وPsycINFO وProQuest وWeb of Science لتحديد الأدبيات التى تناقش استخدام سجلات الصحة الإلكترونية (EHR) من قبل الأطباء ومؤشرات رفاهيتهم.

النتائج: بعد إجراء تحليل شامل لـ ٧٣٨٨ مقالة، تبين أن ٣٥ منها فقط استوفت المعايير المحددة مسبقًا للإدراج. ترتبط العديد من الخصائص على مستويات مختلفة برفاهية الأطباء فيما يتعلق بسجلات الصحة الإلكترونية (EHR). العوامل التى قد تتأثر بالتدخلات وتستحق الإشارة إليها هى: (١) الوقت الإجمالى الذى يقضونه فى استخدام سجلات الصحة الإلكترونية (EHR)، (٢) الوقت الذي يقضونه فى استخدام EHR خارج ساعات العمل العادية، (٣) توفر المساعدة في الموقع لاستخدام EHR، (٤) السهولة المُدركة فى استخدام نظام EHR، (٥) كمية العبء المتعلق بإدارة رسائل البريد الوارد، و (٦) عبء التوثيق. كما أعاد الأطباء تكرار هذه الأفكار المتكررة.

الاستنتاج: تتأثر رفاهية الأطباء المرتبطة بسجلات الصحة الإلكترونية بعدة عناصر معقدة. يكشف تحليلنا أن الأطباء يقدمون اقتراحات تغطى مجموعة واسعة من المواضيع، بما فى ذلك قواعد الحكومة والسياسات التنظيمية والتعديلات على سجلات الصحة الإلكترونية (EHR). يجب على الدراسات اللاحقة تقييم العلاجات الشاملة التى تستهدف هذه الخصائص. يجب أن يتم تضمين الأطباء، كونهم أصحاب المصلحة الرئيسيين، فى تصميم وتنفيذ هذه التغييرات لضمان توافقها مع مطالبهم وسير العمل السريرى الخاص بهم.