Burnout Syndrome in the Era of Electronic Health Records: A Scoping Review

Síndrome de Burnout na era do registro eletrônico em saúde: Revisão de escopo

Síndrome de Burnout en la era de los registros de salud electrónicos: revisión de alcance

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ABSTRACT

Burnout Syndrome is characterized as a psychosocial phenomenon, resulting from the inability to adapt and cope with stressors to which the professional is exposed. The use of technological innovations such as the Electronic Health Record has been associated as one of the potential factors for Burnout Syndrome. To analyze the scientific evidence on Burnout Syndrome in Electronic Health Records use. This

is a scoping review study conducted in the PubMed, Scopus, Embase, WoS and Cochrane databases. Data collection took place in February and March 2021 using the following descriptors: Burnout, Electronic Health Records, Health Information Systems, Occupational Burnout, Professional, Psychological Distress. Of the 996 studies found, 44 were selected for full reading, of which 21 articles made up the final sample. The studied population was predominantly made up of nurses and doctors who worked in primary care and hospitals. It was observed that exhaustion, stress, emotional exhaustion, dissatisfaction and depersonalization were the most predominant stressors related to the use of Electronic Health Records. Regarding the level of evidence of the articles, 95% of them presented level IV and only 5% level III. Electronic Health Records have contributed more agility and efficiency to their users, although there are still divergent points that need to be reviewed in order to help reduce physical and mental exhaustion in nurses and physicians as a result of this software.

Keywords: nursing; professional exhaustion; electronic health records; health information systems; health personnel.

RESUMO

A Síndrome de Burnout caracteriza-se como um fenômeno psicossocial, resultante da incapacidade de adaptação e enfrentamento dos estressores aos quais o profissional está exposto. A utilização de inovações tecnológicas como o Registro Eletrônico em Saúde tem sido associada como um dos potenciais fatores para a Síndrome de Burnout. Analisar quais são as evidências científicas sobre a Síndrome de Burnout no uso do Registro Eletrônico em Saúde. Trata-se de um estudo de revisão de escopo, realizado nas bases de dados da PubMed, Scopus, Embase, WoS e Cochrane. A coleta dos dados ocorreu nos meses de fevereiro e março de 2021 utilizando-se os seguintes descritores: Burnout, Electronic Health Records, Health Information Systems, Occupational Burnout, Professional, Psychological Distress. Dos 996 estudos encontrados, 44 foram selecionados para leitura na íntegra, destes, 21 artigos compuseram a amostra final. A população estudada foi predominantemente composta por enfermeiros e médicos que atuavam na atenção primária e hospitais. Observou-se que o esgotamento,

estresse, exaustão emocional, insatisfação e despersonalização foram os estressores mais predominantes relacionados a utilização dos Registros Eletrônicos de Saúde. No que diz respeito ao nível de evidência dos artigos, 95% deles apresentaram o nível IV e somente 5% o nível III. O Registro Eletrônico de Saúde trouxe maior agilidade e eficiência aos seus utilizadores, mas ainda persiste pontos divergentes que precisam ser revistos, a fim de auxiliar na redução do desgaste físico e mental dos profissionais enfermeiros e médicos em decorrência desse software.

Palavras-chave: enfermagem; esgotamento profissional; registros eletrônicos de saúde; sistemas de informação em saúde; pessoal de saúde.

RESUMEN

El Síndrome de Burnout se caracteriza como un fenómeno psicosocial, resultante de la incapacidad de adaptarse y afrontar los factores estresantes a los que está expuesto el profesional. El uso de innovaciones tecnológicas, como la historia clínica electrónica, pudiera ser uno de los factores potenciales para el Síndrome de Burnout. El objetivo fue analizar la evidencia científica sobre el Síndrome de Burnout en el uso de la Historia Clínica Electrónica. Este es un estudio de revisión de alcance realizado en las bases de datos PubMed, Scopus, Embase, WoS y Cochrane. La recolección de datos ocurrió en febrero y marzo de 2021 utilizando los siguientes descriptores: burnout, registros electrónicos de salud, sistemas de información de salud, burnout ocupacional, profesional, angustia psicológica. De los 996 estudios encontrados, se seleccionaron 44 para lectura completa; de estos, 21 artículos constituyeron la muestra final. La población estudiada estuvo compuesta, predominantemente, por enfermeras y médicos que trabajaban en la atención primaria y hospitales. Se observó que el agotamiento físico y emocional, el estrés, la insatisfacción, así como la despersonalización fueron los estresores más predominantes, relacionados con el uso de la historia clínica electrónica. En cuanto al nivel de evidencia de los artículos, el 95 % de ellos presentó nivel IV y solo el 5 % nivel III. La historia clínica electrónica ha brindado mayor agilidad y eficiencia a sus usuarios, pero aún existen puntos divergentes que deben revisarse para

ayudar a reducir el desgaste físico y mental de enfermeras y médicos, debido al uso de este *software*.

Introduction

Electronic records are irreversibly replacing paper ones.[1] Among them, the Electronic Health Record (EHR) translates into a compilation of processable information about the individual's health care, stored and transmitted in a secure and accessible way by multiple authorized users.[2] As a result, organization of the activities in health services has undergone significant changes and, consequently, so has the way in which people and institutions deal with this information.[3]

Studies that evaluated the quality standards functionalities from Digital Information and Communication Technologies (DICTs) in the health field identified problems related to their use, adoption and usability.[4,5,6] Technical limitations such as software updates, slow system operation, slow login, and the combination of network slowness and interoperability problems can exert an impact on the ease and effectiveness of EHR use. The users' acceptance or rejection regarding adherence to the DICTs and the absence of a professional qualification policy, permanent education and support services, are other factors that have repercussions on success of these technologies.[7,8,9]

Such operational and technological issues have been associated as one of the potential causal factors for Burnout Syndrome.[10,11] This syndrome, also known as Professional Exhaustion syndrome, is characterized as a psychosocial phenomenon, resulting from the inability to adapt and cope with stressors to which professionals are chronically exposed, experiencing work-related stress, without the ability to alleviate these symptoms or to invigorate themselves.[12,13,14]

Inappropriate EHR use is often related to professional fatigue, low patient satisfaction and increased error rates at the interfaces.[1] There is evidence of a 30% increase in the risk of exhaustion associated with dissatisfaction with the EHR.[15] Another study points that stress and professional burnout among American physicians have increased considerably with the implementation of electronic medical records in their routine.[16,17,18] Nurses and physicians are particularly vulnerable to Burnout Syndrome due to job dissatisfaction and to emotional and physical exhaustion.[19] The professionals report that they spend more time on administrative tasks, taking up more than half of their day with documentation.[20,21]

Several studies examined the impact of the EHR on health professionals' well-being. The pressure to document, the stress associated with documentation, the lack of time allotted for documentation, and the high volume of messages in the EHR inbox were some factors associated with low job satisfaction and increased exhaustion levels among the professionals.[18,21,22,23,24] In addition, a number of studies show that the presence of Burnout Syndrome can influence the quality of the service provided by the workers, as well-being and professional satisfaction are important factors for them to perform their functions more efficiently.[1,25] It is also worth mentioning that, through its Ministry of Health, Brazil has been restructuring the information in Basic Health Units (BHUs) through a new health information system called Citizen's Electronic Health Record (*Prontuário Eletrônico do Cidadão*, PEC). This system has several functionalities, including the EHR.[3]

In view of this, this study intends to identify the Burnout symptoms related to EHR use and to expand the knowledge about what has been produced scientifically and its relevance to the present day. Thus, the objective of this study was to analyze the diverse scientific evidence on Burnout Syndrome in EHR use.

Methods

This is a scoping review study protocol registered in the *Open Science Framework* (https://osf.io/h5auv/) and developed based on the PRISMA-ScR international guide[26] recommendations and on the method proposed by the *Joanna Briggs Institute* (JBI).[27]

The five stages of scoping reviews were followed, namely: 1) identification of the research question; 2) identification of the relevant studies; 3) selection of the studies; 4) data analysis; and 5) grouping, synthesis and presentation of the data.

The Population, Concept and Context (PCC) strategy[27] was used to formulate the research question, defined as follows: P- Professionals that use electronic health records; C- Professionals with signs of Burnout Syndrome; and C- In the health care context. The following guiding question was defined based on these definitions: "Which is the scientific evidence on Burnout Syndrome in EHR use?".

The pre-established inclusion criteria corresponded to original articles, published in full and in all languages, primary studies, systematic reviews, integrative reviews, meta-analyses and/or meta-syntheses, books and guidelines, published or made available until March 2021. The studies that did not contemplate the guiding question were excluded, as well as editorials, experience reports, abstracts and duplicate studies.

The databases used were the National Library of Medicine (PubMed), The Cochrane Library, Embase, Scopus and Web of Science (WoS). The search in those databases was conducted in February and March 2021. In all these databases, the research took place through the advanced search. Initially, a research was conducted in the PubMed database in order to identify the most frequently used descriptors in the studies that addressed the topic of interest. Subsequently, the publications were evaluated to identify the descriptors related to the research strategy items.

The following controlled descriptors from the terminology recommended by the Medical Subject Headings (MeSH) and/or the Descriptors in Health Sciences (*Descritores em Ciências da Saúde*, DeCS) were selected: ("Electronic Health Records" OR "Health Information Systems" OR "Medical Records Systems, Computerized" OR "Medical Informatics") AND ("Burnout, Professional" OR "Occupational Burnout" OR "Burnout, Psychological" OR Burnout OR "Psychological

Distress"), mutually combined by means of the AND/OR Boolean operators. The search key developed was created by a librarian with experience in database searches.

The studies found in the databases by means of the search keys were exported to the Rayyan QCRI software. Subsequently, duplicate studies were removed and the titles and abstracts were read by three reviewers using the triple-blind method in order to identify potentially eligible studies according to the established criteria. Inclusion or exclusion of the articles in which doubts and/or disagreements emerged among the reviewers regarding their eligibility were solved by consensus between them.

For the stage of separating, summarizing and reporting the essential elements found in each study, a structured form was used to tabulate these data.[28] This instrument allowed the synthesis, objective interpretation of the data and the analysis, nature and distribution of the studies incorporated in the review. Items such as the following were grouped: authors, title, year of publication, journal, country where the study was conducted, methods used, database and synthesis of the findings in each study. Thus, all the fundamental information involved in the context of the problem under study was identified in each publication. In order to perform a critical evaluation of the sources, it was decided to classify the level of evidence (LoE) of the studies according to the JBI proposal, categorizing them from 1 to 5.[29]

The LoE analysis followed this hierarchy proposal: evidence resulting from the meta-analysis of multiple randomized controlled clinical trials (Level I); evidence obtained in individual studies with an experimental design (Level II); evidence from quasi-experimental studies, such as pre- and post-test, non-randomized single-group studies, time series or case-control studies (Level III); evidence from descriptive studies (non-experimental) or with a qualitative approach (Level IV); evidence from case or experience reports (Level V); and evidence based on experts' opinions (Level VI).[29]

According to Resolution N.º 466/2012, appraisal by a Research Ethics Committee (*Comitê de Ética em Pesquisa*, CEP) was waived because this is a bibliographic study; however, ethical aspects and copyrights were respected and referenced.[30]

Results

The search identified 996 publications in the databases: 462 in PubMed, 330 in Scopus, 122 in WoS, 72 in Embase and 10 in Cochrane, excluding 258 due to duplicity. After analyzing the titles and abstracts, 193 papers were pre-selected, of which 149 were excluded for not answering the research question. Of the remaining 44 papers, 21 that met the inclusion criterion were selected. Figure 1 presents the stages followed to select the publications.
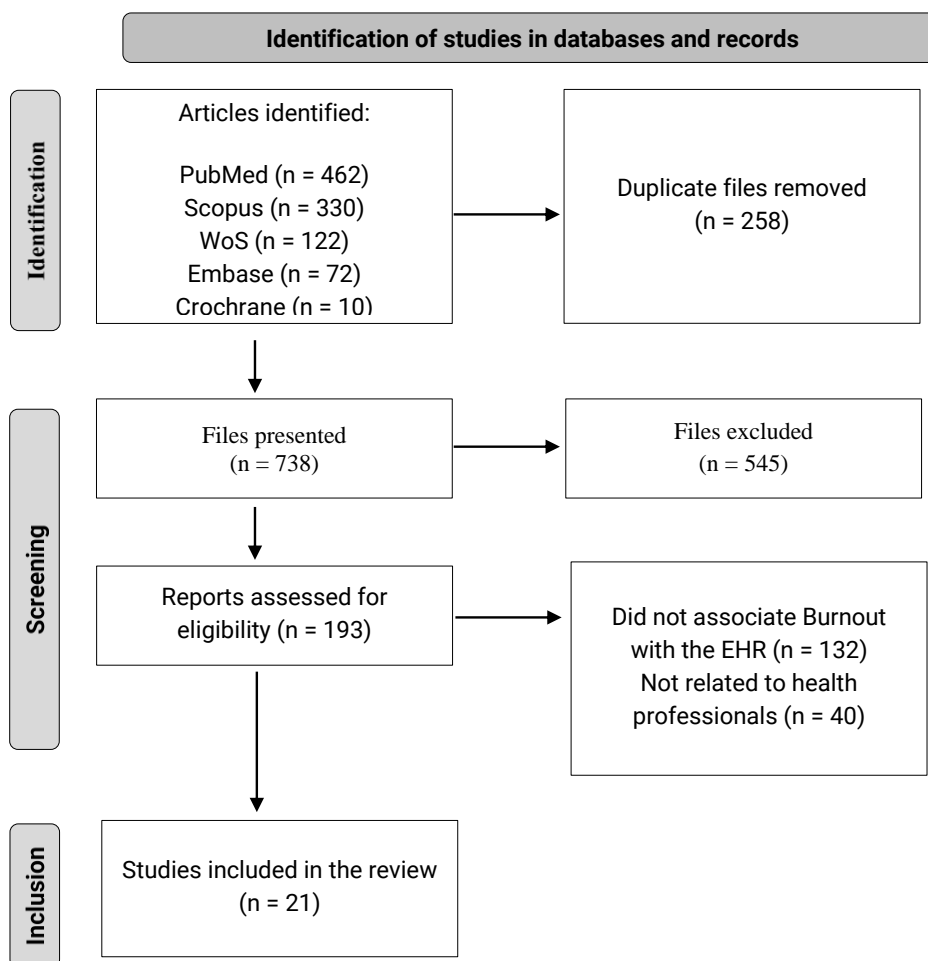
Source: Adapted from PRISMA-ScR. Divinópolis, Minas Gerais, Brazil, 2021.

Fig. 1 – Flowchart corresponding to selection of the publications in the databases.

According to the publications selected, fourteen (66.7%) were developed in North America, four (19.0%) in Europe, one (4.8%) in Asia and two articles (9.5%) do not describe their locus for being a review. More than half of the studies were classified

as cross-sectional (66.6%; n = 14), followed by descriptive (9.5%; n = 2) and qualitative (95%; n = 2) studies, review articles (9.5%; n = 2) and a retrospective cohort (4.9%). Regarding the year of publication, one article was published in 2014 (4.9%) and 2016 (4.9%) each, two in 2017 (9.5%) and 2021 (9.5%), three in 2018 (14.2%) and six in 2019 (28.5%) and 2020 (28.5%). The population under study consisted mainly of nurses and physicians working in primary care and medium-complexity units (hospitals, outpatient services, specialized clinics). In turn, the most frequent signs and symptoms were stress (23%) and exhaustion (21%). Regarding the level of evidence of the studies, 95% of the articles were level IV (n = 20) and only 5% was level III (n = 1).

Table 1 - Description of publications according to the year of publication, the title of the article, the location of the study, the type of study, the signs and symptoms, the area of activity of health professionals, the type of service in which the electronic record is inserted and the level of evidence

Year	Title	Study locus	Type of study	Signs and symptoms	Performance area	Type of service where the EHR is found	LoE
2014	Electronic medical records and physician stress in primary care: Results from the MEMO Study	USA	Cross-sectional	Stress, exhaustion, dissatisfaction	Family Medicine and general clinicians	Clinic, Primary Care	IV
2016	Relationship Between Clerical Burden and Characteristics of the Electronic Environment with Physician Burnout and Professional Satisfaction	USA	Descriptive	Exhaustion, emotional wear out, depersonalization, low personal fulfillment, dissatisfaction	Medicine from all specialties	Primary Care, hospital, private clinics, medical centers	IV
2017	Electronic Health Record Effects on Work-Life Balance and Burnout Within the I3	USA	Cross-sectional	Physical and emotional wear out, exhaustion and frustration	Medicine	Primary Health Care	IV

	Population Collaborative						
2017	Electronic health record alert-related workload as a predictor of burnout in primary care providers	USA	Cross-sectional	Exhaustion, physical fatigue, cognitive tiredness and emotional wear out	Nursing and Medicine	Primary Health Care	IV
2018	Estimating the association between burnout and electronic health record-related stress among advanced practice registered nurses	USA	Cross-sectional	Stress, exhaustion and frustration	Nursing	Medical office, outpatient service and hospital	IV
2018	Exploring the Association Between Electronic Health Record Use and Burnout Among Psychiatry Residents and Faculty: a Pilot Survey Study	USA	Descriptive	Depersonalization, emotional wear out and stress	Medicine	Hospital	IV
2018	The electronic elephant in the room: Physicians and the electronic health record	USA	Qualitative	Exhaustion	Nursing and Medicine	Outpatient	IV
2019	Association of Electronic Health Record Design and Use Factors with Clinician Stress and Burnout	USA	Qualitative	Stress	Medicine	Hospital	IV
2019	Burnout and EHR use among academic primary care physicians with varied clinical workloads	USA	Cross-sectional	Exhaustion, stress, emotional wear out	Nursing, Medicine	Primary care clinic	IV
2019	Electronic health record associated stress: A	Canada and USA	Cross-sectional	Emotional wear out and depersonalization	Medicine	Medical center	IV

	survey study of adult congenital heart disease specialists						
2019	Experienced time pressure and stress: Electronic health records usability and information technology competence play a role	Finland	Cross-sectional	Psychological stress	Nursing	Hospital, primary care, private service, social care, others	IV
2019	The burden and burnout in documenting patient care: An integrative literature review	Databases	Integrative literature review	Exhaustion, stress, dissatisfaction	Nursing and Medicine	Hospital, outpatient	IV
2019	Usability Factors Associated with Physicians' Distress and Information System-Related Stress: Cross-Sectional Survey	Finland	Cross-sectional	Stress, anguish, psychological distress	Medicine	Primary Health Care and in-hospital assistance	IV
2020	Are specific elements of electronic health record use associated with clinician burnout more than others?	USA	Retrospective cohort	Exhaustion, stress, emotional wear out, frustration	Medicine	Outpatient and hospital	III
2020	Association of Electronic Health Record Use with Physician Fatigue and Efficiency	USA	Cross-sectional	Fatigue	Medicine	Hospital (ICU)	IV

2020	Perceived electronic health record usability as a predictor of task load and burnout among US physicians: Mediation analysis	USA	Cross-sectional	Emotional wear out, depersonalization	Medicine from all specialties	Private practice, academic medical center, veterans' hospital, active military practice, others	IV
2020	Tailoring EHRs for Specific Working Environments Improves Work Well-Being of Physicians	Finland	Cross-sectional	Stress	Medicine	Primary Health Care and in-hospital assistance	IV
2020	The Associations of Electronic Health Record Usability and User Age with Stress and Cognitive Failures Among Finnish Registered Nurses: Cross-Sectional Study	Finland	Cross-sectional	Stress	Nursing	Hospital, health center, private clinics, social services	IV
2020	The influence of electronic health record use on physician burnout: Cross-sectional survey	Canada	Cross-sectional	Exhaustion, stress, emotional wear out, frustration	Medicine	Mental health university hospital	IV
2021	Electronic Health Record-Related Stress Among Nurses: Determinants and Solutions	Saudi Arabia	Cross-sectional	Stress	Nursing	Hospital	IV
2021	Exploring the relationship between electronic health records and provider burnout: A systematic review	Database	Systematic literature review	Exhaustion, emotional wear out, depersonalization, low personal fulfillment, physical fatigue and cognitive tiredness	Nursing, Medicine	University hospital	IV

Source: Prepared by the authors (2022).

Discussion

Using electronic health records has significant potential to cause signs of exhaustion, stress, emotional wear out, dissatisfaction and depersonalization in the professionals working in health services. Such stressors are related to work overload[14] and to operational and technological issues inherent to the EHR, and can be determined by the quality of the functionalities of technological innovations such as usability products that include efficiency, memorization ease, minimization of errors, easy learning and satisfaction.[10,11,31]

The findings of this review reinforce that inappropriate EHR use, as well as its reliability, are associated with the professionals' high psychological distress.[11] On the other hand, a number of studies indicate that the higher the usability quality[32] and ease of EHR use, the lower the chances of developing Burnout symptoms.[25,33] The presence of Burnout Syndrome can influence the quality of the service provided by the workers, as well-being and professional satisfaction are important factors for them to perform their duties more efficiently.[1,25] According to Kroth and others[22] EHRs often increase the professionals' cognitive burden through excessive data entry requirements, leading to impairments in their mental health.

The burden of a high volume of messages in the inbox has been isolated as a determinant of professional exhaustion.[24,34,35] Inbox messages include communications from patients, other professionals, and alert messages generated from EHR algorithms. Tran and others[36] identified that the professionals spent approximately from 20 to 42 minutes per clinic day managing their inbox in their free time. Furthermore, there is diverse evidence that the alerts generated in the software can represent almost half of the messages in the inbox.[35] In this regard, a number of studies point to the need to improve the technological quality of the user interfaces to minimize time and lessen the load of inbox alerts.[36,37]

Another technological attribute with the potential to generate Burnout symptoms mentioned in the articles was the EHR design.[15,22] The inability to quickly navigate the software was a problematic factor related to the EHR design and this condition generates professional stress.[22] This problem can be remedied through a combination of technological improvements and staff training.

Implementation of the EHR can create significant administrative and cognitive burdens. A study carried out in Rhode Island (USA) showed that 46% of the professionals who use an electronic medical record believe that they lack sufficient time for documentation.[38] Another study identified that the increase in documentation time decreases the provision of direct care to the patients.[23] The high demand for EHR documentation exerts impacts on the professionals' free time, contributing to dissatisfaction, exhaustion and, consequently, imbalance between their professional and personal life.

In terms of solutions for the documentation burden, a number of articles discussed the possibility of nurses acting as "scribes" for physicians.[15,20] However, nurses have skills and responsibilities specific to their professional category that require time to document their activities in the care provided. Nurses spend more than half of their shift documenting the care provided to the patients and this is a considerable source of stress.[39,40,41]

This study can present limitations resulting from the bibliographic survey, due to a possible inconsistency in relation to the quality of the studies analyzed in this review. Regarding the design of the articles reviewed, most of them presented a low level of evidence (IV), which can exert an impact on the quality of the knowledge produced. It is important to highlight that, by using the classification of the level of evidence of the studies, it was sought to determine the confidence of the results found and to strengthen the conclusions about the state of the knowledge about the investigated topic.[42]

The studies reviewed in the article identified that the EHR contributed greater agility and efficiency to its users, although there are still divergent points that need to be reviewed in order to help reduce the professionals' physical and mental exhaustion as a result of this software.

Absence of national articles and of other professional categories was evidenced in this scoping review. Thus, it is expected that the gaps herein presented will ease the development of new research studies through the design of robust methods to generate diverse scientific evidence of the consequences of EHR usability associated with Burnout Syndrome with other professional categories.

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Conflicts of Interest

There are no conflicts of interest.

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