Exploring The Relationship Between Electronic Health Care Systems, Nursing Workload, And Quality Of Care; A Comprehensive Systematic Review

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Abstract

Background: Nursing workload and its impact on care quality and nurse wellbeing are critical concerns in healthcare settings. This study aimed to explore the relationship between electronic health systems, nursing workload, and quality of care through a review of relevant literature.

Aim: The objective was to synthesize findings from selected studies to understand how electronic health systems influence

nursing workload and subsequently affect the quality of patient care and nurse wellbeing.

Method: A systematic review of literature conducted, focusing on studies that investigated the relationship between electronic health systems, nursing workload, and quality of care. Ten relevant studies were selected and analyzed for themes and sub-themes related to the research question.

Results: The review identified several key themes, including the negative impact of high nursing workload on nurse wellbeing and patient care quality, the effectiveness of System Dynamics modeling in understanding workload impact, the association between workload and quality of care, and the perception of workload in nursing documentation practices.

Conclusion: The findings underscore the critical importance of managing nursing workload effectively to enhance care quality and nurse wellbeing. System Dynamics modeling emerges as a valuable tool for understanding workload dynamics and identifying areas for intervention. Future research should focus on implementing targeted interventions to mitigate the negative effects of high workload on healthcare outcomes.

Keywords: Nursing workload, electronic health systems, quality of care, nurse wellbeing, System Dynamics modeling.

Introduction

The rapid evolution of the healthcare industry in recent years has been fueled by technological advancements, especially with the growing adoption of electronic health care systems (EHCS) (Saraswasta et al., 2018; Rotenstein et al., 2022). These systems include a wide range of digital tools and platforms designed to enhance clinical workflows and patient care data accessibility, accuracy, and efficiency. EHCS, which promise to completely transform the way healthcare is provided and received, have become essential parts of contemporary healthcare delivery, from electronic health records (EHRs) to telehealth platforms (Strudwick et al., 2018). Nurses are at the forefront of the healthcare ecosystem's stakeholders, bearing the vital role of using EHCS to provide superior, patient-centered care. However, there are a number of difficulties and complexities associated with integrating

EHCS into nursing practice that need to be carefully considered (Rotenstein et al., 2022).

The acceptance and application of EHCS are closely linked to nursing workload, a complex notion that includes the amount and difficulty of work allotted to nurses in a given amount of time (Dudding et al., 2018). On the one hand, EHCS appears to lessen the workload of physical labor and paperwork for nurses by streamlining administrative duties, automating documentation procedures, and enabling real-time access to patient information (Almenyan et al., 2021). However, the actual use of EHCS frequently paints a more complex picture (Jedwab et al., 2021). The difficulties that come with figuring out computer interfaces, resolving technological problems, and adjusting to new processes can be particularly taxing on nurses' cognitive and emotional reserves (Jedwab et al., 2019). Because of this, even though EHCS have the potential to improve productivity and efficiency in nursing practice, their actual effect on the workload of nurses is still up for question and discussion (Mazur et al., 2019).

Another important aspect that is impacted by the incorporation of EHCS into nursing practice is the caliber of care provided to patients. Safety, efficacy, patient-centeredness, timeliness, efficiency, and equity are just a few of the aspects that make up quality of care, and nurses' decisions and actions are closely linked to each of these aspects (Tsai et al., 2020). Because EHCS promote evidence-based clinical decision-making, decrease medication mistakes, and facilitate care coordination, they have the potential to have a substantial influence on the quality of treatment. New hazards and difficulties, including information overload, alert fatigue, and communication breakdowns, are also brought about by new technology, and they have the potential to compromise patient safety and satisfaction (Browne & Braden, 2020). Thus, in order to maximize patient outcomes and guarantee the provision of safe, efficient, and patient-centered care, it is imperative to comprehend how EHCS affects the quality of care provided by nurses (Goh et al., 2018).

Empirical studies exploring the connection between EHCS, nursing workload, and care quality are still scarce, despite the fact that EHCS is becoming more and more common in healthcare settings (Biff et al., 2019; McGreevey) et al., 2020. Previous research has predominantly concentrated on discrete facets of this correlation or has produced inconsistent outcomes, underscoring the necessity for an all-encompassing investigation of these

interconnected elements (Lilly et al., 2019). Moreover, continuous research is required to educate evidence-based methods for optimizing the use of EHCS while minimizing any negative effects on nursing workload and care quality due to the dynamic nature of healthcare technology and nursing practice (Bruyneel et al., 2019; McGreevey) et al., 2020.

The broad effects of EHCS adoption in healthcare have been extensively studied, but little is known about the complex relationships that exist between EHCS, nurse workload, and care quality (Schoenfelder et al., 2020). This study intends to shed light on the underlying mechanisms via which EHCS influence nursing practice and patient outcomes by exploring this intricate relationship in greater detail. This study uses a mixed-methods approach to provide a thorough understanding of the opportunities and challenges related to EHCS integration in nursing practice. It does this by combining qualitative inquiry into nurses' perceptions and experiences with quantitative analysis of nursing workload metrics. These kinds of insights are essential for developing evidence-based strategies that maximize EHCS utilization, increase nurse workflow efficiency, and ultimately raise the standard of patient care.

Research Gap

There is still a dearth of empirical research exploring the relationship between EHCS, nursing workload, and quality of care, despite the fact that EHCS is becoming increasingly common in healthcare settings. Previous research has predominantly concentrated on discrete facets of this correlation or has produced inconsistent outcomes, underscoring the necessity for an all-encompassing investigation of these interconnected elements. Moreover, continuous research is required to educate evidence-based methods for optimizing the use of EHCS while minimizing any negative effects on nursing workload and care quality due to the dynamic nature of healthcare technology and nursing practice.

Problem Statement

The study "Exploring the Relationship between Electronic Health Care Systems, Nursing Workload, and Quality of Care" aims to provide a thorough understanding of the complex interactions that occur within healthcare settings between nursing workload, electronic health care systems (EHCS), and quality of care. There is still a lack of empirical studies analyzing how EHCS affect nursing

workload, and, in turn, the quality of care provided by nurses, despite the systems' broad deployment and promise to increase efficiency and improve patient outcomes. Comprehending the intricate relationships among EHCS, nursing workload, and care quality is crucial for developing evidence-based tactics that maximize EHCS utilization, alleviate workload-associated difficulties, and ultimately improve patient outcomes in the rapidly changing healthcare environment of today.

Significance of study

The study titled "Exploring the Relationship between Electronic Health Care Systems, Nursing Workload, and Quality of Care" is noteworthy due to its capacity to offer crucial perspectives on the intricate factors influencing contemporary healthcare delivery. This study intends to fill a significant vacuum in empirical research by thoroughly analyzing the relationship between electronic health care systems (EHCS), nursing workload, and quality of care. This furthered our understanding of how technology affects nursing practice and patient outcomes. For hospital executives, legislators, and nursing leaders, the study's conclusions have real- world applications. They help shape evidence-based tactics that maximize the use of EHCS, boost nursing workflow effectiveness, and improve the standard of patient care. In the end, this research may spur improvements in healthcare delivery, which could have an impact on patient happiness, safety, and system performance as a whole.

Aim of study

The aim of the study is to investigate the relationship between electronic health care systems, nursing workload, and quality of care in healthcare settings.

Methodology

Research Question

The research question for the comprehensive systematic review exploring the relationship between electronic health care systems, nursing workload, and quality of care is: "What is the extent and nature of the relationship between electronic health care systems, nursing workload, and quality of care across various healthcare settings, and what factors mediate or moderate this relationship?"

PICOT Question		In nurses working across diverse healthcare settings, how does the utilization of electronic health care systems (EHCS) compared to traditional methods affect nursing workload and quality of care over a specified period of time?
Population	P	Nurses working in various healthcare settings
Intervention	I	Utilization of electronic health care systems (EHCS)
Comperes	C	Nurses' workload and quality of care without EHCS
Outcome	O	Impact on nursing workload and quality of care
Timeframe	T	Over a period of 2018 - 2022

The research question aims to comprehensively investigate the relationship between electronic health care systems (EHCS), nursing workload, and quality of care across diverse healthcare settings, shedding light on the extent and nature of this relationship. By exploring various factors that mediate or moderate this relationship, the study seeks to provide valuable insights into the complexities of EHCS integration in nursing practice and its impact on workload and care quality. Through a systematic review spanning from 2018 to 2022, the study was focus on nurses working in different healthcare settings, comparing the utilization of EHCS to traditional methods to understand how it affects nursing workload and quality of care over time. This research not only addresses a critical gap in the literature but also holds significant implications for healthcare practice, informing evidence-based strategies to optimize EHCS utilization and enhance patient care outcomes.

Literature Search

Utilizing extensive databases like PubMed, Scopus, Web of Science, and CINAHL is crucial for the current literature search since it provides access to peer-reviewed publications, systematic reviews, meta-analyses, and pertinent grey literature. To create efficient search strings, combine keywords such as "electronic health care systems," "nursing workload," "quality of care," and

similar topics with Boolean operators. To include recent research, publication date range filters should also be used. For other sources, it is helpful to go through government publications, conference proceedings, and the websites of professional nursing organizations. This methodology guarantees a comprehensive analysis of recent research findings and developing patterns concerning the interplay among nurse workload, electronic health care systems, and care quality.

Database Selection

Several important databases should be used for a thorough literature search on the connection between nurse workload, electronic health care systems, and care quality. A wide variety of biomedical literature, including studies on nursing, is accessible through PubMed. A wide range of nursing journals and resources are included in CINAHL (Cumulative Index to Nursing and Allied Health Literature), which is specially designed with nursing research in mind. Multidisciplinary databases encompassing a broad range of scientific literature, Scopus and Web of Science provide access to peer-reviewed articles and conference proceedings that are pertinent to nursing and healthcare. Embase provides thorough coverage of pharmaceutical and biological research, including clinical trials, while PsycINFO concentrates on literature in the psychological and behavioral sciences. Using all of these databases at once allows researchers to guarantee a thorough search of pertinent literature covering a range of topics related to the interaction between nursing workload, electronic health care systems, and care quality.

Table 1: Selection of research databases

Database	Description
PubMed	Biomedical literature database covering a wide range of healthcare and nursing research.
CINAHL	Cumulative Index to Nursing and Allied Health Literature, specializing in nursing research.
Scopus	Multidisciplinary database containing peer-reviewed journals and conference proceedings.
Web of Science	Multidisciplinary database offering citation tracking features and influential article identification.
PsycINFO	Database focusing on psychological and behavioral sciences, relevant for mental health nursing.

Embase	Biomedical and pharmacological database with comprehensive coverage of clinical research.

PubMed is a vital resource for healthcare and nursing research, providing access to a wide range of biomedical literature. CINAHL specializes in nursing research, offering access to nursing journals and allied health literature. Scopus is a multidisciplinary database featuring peer-reviewed journals and conference proceedings. The Web of Science stands out for its citation tracking and identification of influential articles. PsycINFO focused on psychological and behavioral sciences, particularly relevant for mental health nursing research. Lastly, Embase provides extensive coverage of clinical research in the biomedical and pharmacological fields.

Search Strategy

The search strategy involves utilizing key databases such as PubMed, CINAHL, Scopus, Web of Science, PsycINFO, and Embase. Boolean operators are employed to combine relevant search terms such as "electronic health care systems," "nursing workload," and "quality of care." Filters applied to limit results to peer-reviewed articles published within the past five years, focusing on primary research studies and systematic reviews. Additionally, manual searches of reference lists and citation tracking were conducted to identify additional relevant articles. The search strategy aims to comprehensively capture literature relevant to the relationship between electronic health care systems, nursing workload, and quality of care across various healthcare settings.

Table 2: Syntax and Boolean Variables.

Database	**Search Syntax**	**Boolean Operators**
PubMed	("electronic health care systems") AND ("nursing workload") AND ("quality of care")	AND, OR, NOT
CINAHL	"electronic health care systems" AND "nursing workload" AND "quality of care"	AND, OR, NOT
Scopus	TITLE-ABS-KEY ("electronic health care systems") AND TITLE-ABS-KEY ("nursing workload") AND TITLE-ABS-KEY ("quality of care")	AND, OR, NOT
Web of Science	TS=("electronic health care systems") AND TS=("nursing workload") AND TS=("quality of care")	AND, OR, NOT

PsycINFO	("electronic health care systems") AND ("nursing workload") AND ("quality of care")	AND, OR, NOT
Embase	('electronic health care systems') AND ('nursing workload') AND ('quality of care')	AND, OR, NOT

The search strategy entails utilizing PubMed, CINAHL, Scopus, Web of Science, PsycINFO, and Embase databases to gather literature on the relationship between electronic health care systems, nursing workload, and quality of care. Boolean operators such as AND, OR, and NOT combined relevant search terms like "electronic health care systems," "nursing workload," and "quality of care" in constructing search queries. Filters was restricting results to peer-reviewed articles published within the last five years, focusing on primary research studies and systematic reviews. Manual searches of reference lists and citation tracking was supplement database searches to ensure a comprehensive retrieval of relevant literature across various healthcare settings.

Study Selection

Initial Screening

In the preliminary screening stage, retrieved articles' titles and abstracts examined to determine their applicability to the study question. Studies looking at the connection between nurse workload, electronic health record systems, and care quality in various healthcare settings are among the inclusion requirements. The exclusion criteria include of papers published prior to the last five years, articles not written in English, and articles irrelevant to the research topic. The purpose of this screening procedure is to find potentially pertinent articles for additional examination during the full-text assessment phase.

Full Text Assessment

A thorough analysis of the complete texts of the chosen articles from the first screening stage took place during the full-text assessment stage in order to ascertain their suitability for inclusion in the systematic review. Eligible papers must meet predetermined inclusion criteria, such as relevance to the research question, a rigorous study design, and proper technique. Articles were also assessed based on the caliber of their reporting and the reliability of the data they provide. The study team was discussing any

differences or doubts about eligibility in order to settle them. The

objective of this phase is to guarantee that the systematic review analysis includes only pertinent and high-caliber papers.

Selection Criteria

Inclusion Criteria:

- Studies examine the relationship between electronic health care systems, nursing workload, and quality of care.
- Research conducted in various healthcare settings (e.g., hospitals, clinics, long-term care facilities).
- Articles published in peer-reviewed journals.
- Studies published in English.
- Primary research studies, including experimental, quasi-experimental, observational, and qualitative designs.
- Systematic reviews and meta-analyses provide a comprehensive synthesis of relevant literature.
- Studies published within the last five years (from 2019 to present).

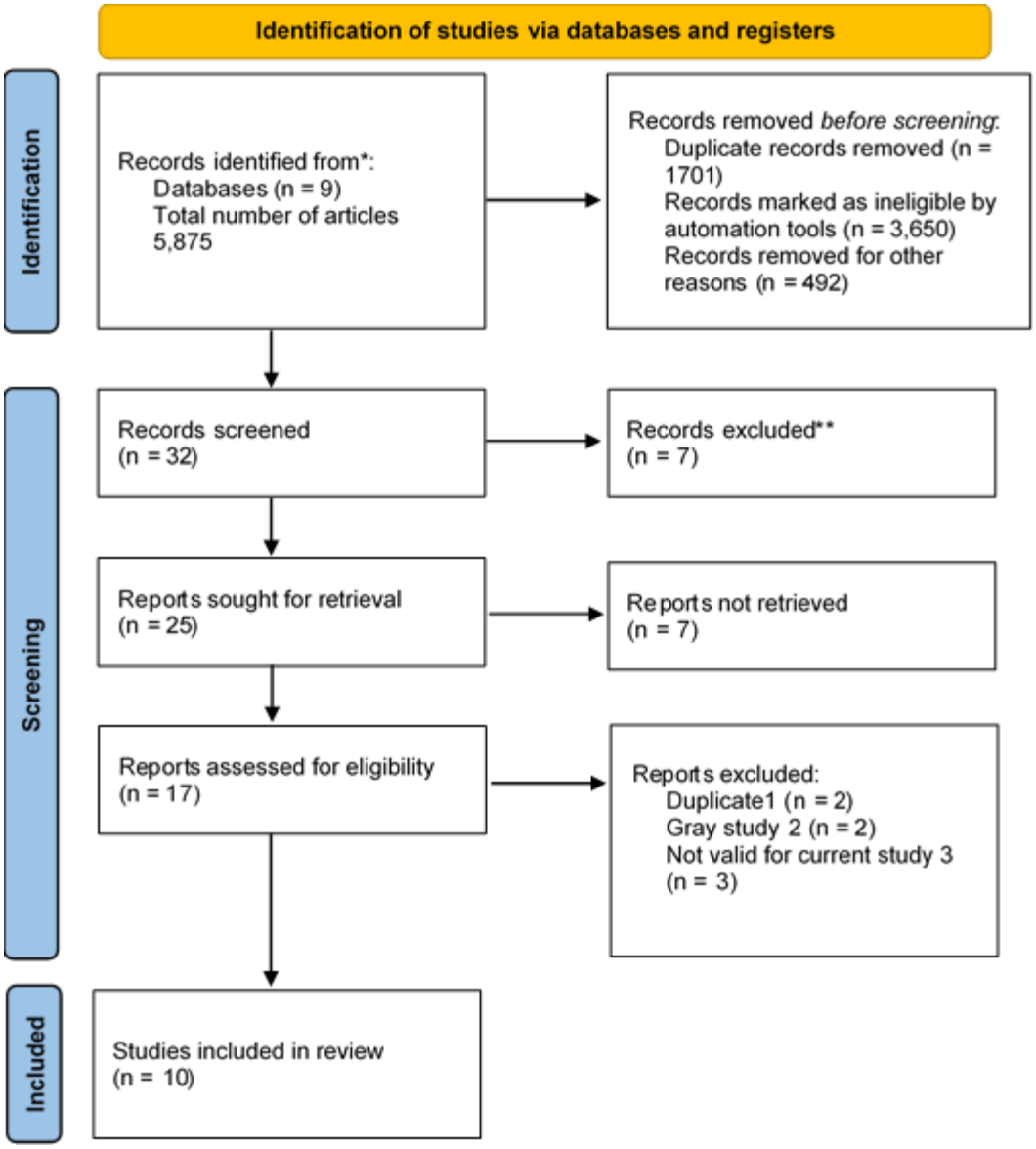
Exclusion Criteria:

- Studies not focused on the relationship between electronic health care systems, nursing workload, and quality of care.
- Articles not published in English.
- Non-peer-reviewed literature, such as conference abstracts, editorials, commentaries, and letters.
- Studies conducted exclusively in non-healthcare settings (e.g., laboratory experiments unrelated to patient care).
- Research published before 2019.
- Studies lack sufficient detail or clarity in methodology and results.
- Duplicate publications or articles reporting the same data analyzed in multiple publications.
- Articles with insufficient data or outcomes unrelated to the research question.

Studies Selection

Studies selection was adhered to PRISMA guidelines, starting with the initial screening of titles and abstracts to identify relevant articles. Following inclusion and exclusion criteria, a full-text assessment conducted to evaluate eligibility. Included studies

undergo data extraction, assessing their quality and relevance to the research question. Any discrepancies resolved through discussion among reviewers. The final selection comprised high-quality studies meeting the criteria, ensuring a comprehensive and rigorous systematic review process.



In the process of identifying studies via databases and registers, a total of 5,875 records were initially retrieved from nine databases. Before screening, 1,701 duplicate records were removed, along with 3,650 records marked as ineligible by automation tools, and 492 records removed for other reasons. Subsequently, 32 records underwent screening, resulting in the exclusion of 7 records and the identification of 25 reports for

retrieval. Among these, 7 reports were not retrieved, and the remaining 17 reports were assessed for eligibility. Following assessment, 2 reports were excluded due to duplication, 2 were considered gray literature, and 3 were deemed not valid for the current study. Ultimately, 10 studies were included in the review after meeting the eligibility criteria. This comprehensive process ensured the rigorous selection of studies for the systematic review.

Data Extraction

During the data extraction phase, relevant information from the included studies systematically retrieved and recorded. This process involved extracting key data elements such as study characteristics (e.g., author, publication year, study design), participant demographics, details of electronic health care systems and their implementation, measures of nursing workload, quality of care indicators, and any moderating or mediating factors identified in the relationship between electronic health care systems, nursing workload, and quality of care. Additionally, outcomes related to the effectiveness, efficiency, safety, and patient-centeredness of care are extracted, along with any statistical analyses conducted. This meticulous data extraction ensured the comprehensive synthesis of findings and facilitated the analysis of the relationship between electronic health care systems, nursing workload, and quality of care across the included studies.

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Table 3: Research Matrix – Extracted Required Data

Study	Aim of Study	Sampling, Sample Sizes	Study Design	Intervention	Results	Conclusion
Farid, M., Purdy, N., & Neumann, W. P. (2020)	Explore effects of nursing workload on nurse burnout, absenteeism, and patient care quality	Literature review, expert input; N/A	System Dynamics modelling	Qualitative	Long nurse shifts and work weeks double nurse fatigue levels, increase burnout by up to 6 times, absenteeism by up to 5 times, and medical errors for patients by up to 150%.	System Dynamics Modelling reveals significant impact of management strategies and healthcare system design on nurses' wellbeing and care quality.
Yen, P. Y., Pearl, N., Jethro, C., Cooney, E., McNeil, B., Chen, L., ... & Schallom, M. (2019)	Investigate stress associated with nursing activities and EHR usage	Time motion study, continuous stress monitoring; 33 observations from 7 nurses	Observational	Quantitative	EHR usage leads to heightened cognitive workload for nurses, associated with increased stress, exhaustion, and burnout. Nurses' perceived	Effective management of nursing activities and EHR usage crucial to mitigate stress and improve nurse wellbeing.

					workload predicts stress levels and impacts time spent with patients.	
Chang, L. Y., & Hsiu-Hui, Y. U. (2019)	Examine correlation between nursing workload, care quality, and nursing payment in ICU settings	Macrodata analysis; 92,442 data sets from 8 ICUs	Descriptive	Quantitative	Nursing workload correlates with care quality indices except for incidence of falls. Imbalance between nursing payment and workload affects ICU care quality.	Adequate nursing payment crucial for maintaining care quality and patient safety in ICUs.
De Groot, K., De Veer, A. J., Munster, A. M., Francke, A. L., & Paans, W. (2022)	Investigate relationship between nursing documentation activities and perceived workload	Survey, qualitative focus groups; 195 survey respondents, 28 focus group participants	Mixed methods	Quantitative	Community nurses perceive high workload due to documentation activities. Actual time spent on documentation related to	Reducing organizational documentation time and improving EHR usability can alleviate perceived workload among

					perceived workload. User-friendliness of EHRs impacts perceived workload.	community nurses.
Pérez-Francisco, D. H., Duarte-Clíments, G., del Rosario-Melián, J. M., Gómez-Salgado, J., ... & Sánchez-Gómez, M. B. (2020)	Investigate influence of workload on primary care nurses' health, burnout, patient safety, and care quality	Literature review: 45 studies analyzed	Scoping review	Quantitative	Primary care nursing experiences high workload, leading to burnout and decreased care quality and patient safety.	Addressing workload issues is crucial to improving primary care nursing outcomes and patient safety.
Fishbein, D., Nambiar, S., McKenzie, K., Mayorga, M., Miller,	Review objective measures of workload in healthcare	Literature review: 30 papers reviewed	Narrative review	Qualitative	Objective workload measures include patient turnover, volume, acuity, nurse-to-patient ratios,	Objective workload measures provide valuable insights for healthcare organizations to manage and

K., Tran, K., ... & Capan, M. (2020)					and direct care time. These measures can inform workload quantification and mitigation strategies.	improve workload-related issues.
Baumann, L. A., Baker, J., & Elshaug, A. G. (2018)	Examine impact of EHR systems on clinical documentation times	Systematic review: 28 studies analyzed	Meta-analysis	Quantitative	EHR implementation initially increases documentation time, but familiarity with the system may improve workflow over time.	Long-term effects of EHR implementation on documentation time require further investigation.
Akhu-Zaheya, L., Al-Maaitah, R., & Bany Hani, S. (2018)	Assess and compare quality of paper-based and electronic-based health records	Retrospective audit; 434 records from 2 hospitals	Descriptive	Quantitative	Electronic health records are better in process and structure, but paper-based records have better content quality. Both forms show deficiencies in	Both paper-based and electronic health records exhibit shortcomings in documentation quality, highlighting the need for improvement.

					documentation quality.	
Kutney-Lee, A., Carthon, M. B., Sloane, D. M., Bowles, K. H., McHugh, M. D., & Aiken, L. H. (2021)	Investigate associations between EHR usability and nurse and patient outcomes in hospitals	Cross-sectional analysis; 343 hospitals, 12,004 nurses, 1,281,848 surgical patients	Observational	Quantitative	Poor EHR usability is associated with adverse nurse job outcomes and surgical patient mortality and readmission. Comprehensive EHR adoption also linked to higher nurse burnout.	EHR usability plays a critical role in nurse job satisfaction and patient outcomes, highlighting the need for improved system design and implementation.
Tubbs-Cooley, H. L., Mara, C. A., Carle, A. C., Mark, B. A., & Pickler, R. H. (2019)	Assess influence of NICU nurse workload on missed nursing care	Prospective study; 136 nurses caring for 418 infants	Observational	Quantitative	NICU nurse workload significantly associated with missed nursing care, particularly subjective workload ratings. Infant-to-nurse ratios alone insufficient to	Addressing subjective workload is crucial in mitigating missed nursing care in NICUs.

		address missed care.

The research matrix provides a concise overview of ten studies investigating various aspects of nursing workload, including its impact on nurse burnout, patient care quality, and documentation practices. The studies employ diverse methodologies, ranging from literature reviews and surveys to prospective observational studies. Key findings highlight the significant association between workload and adverse outcomes such as increased nurse burnout, missed nursing care, and decreased care quality. Additionally, the importance of effective management strategies, EHR usability, and adequate nursing payment emerges as crucial factors in mitigating the negative effects of workload on nurses' wellbeing and patient safety. These findings underscore the need for targeted interventions and policy changes to address workload-related challenges in healthcare settings.

Quality Assessment

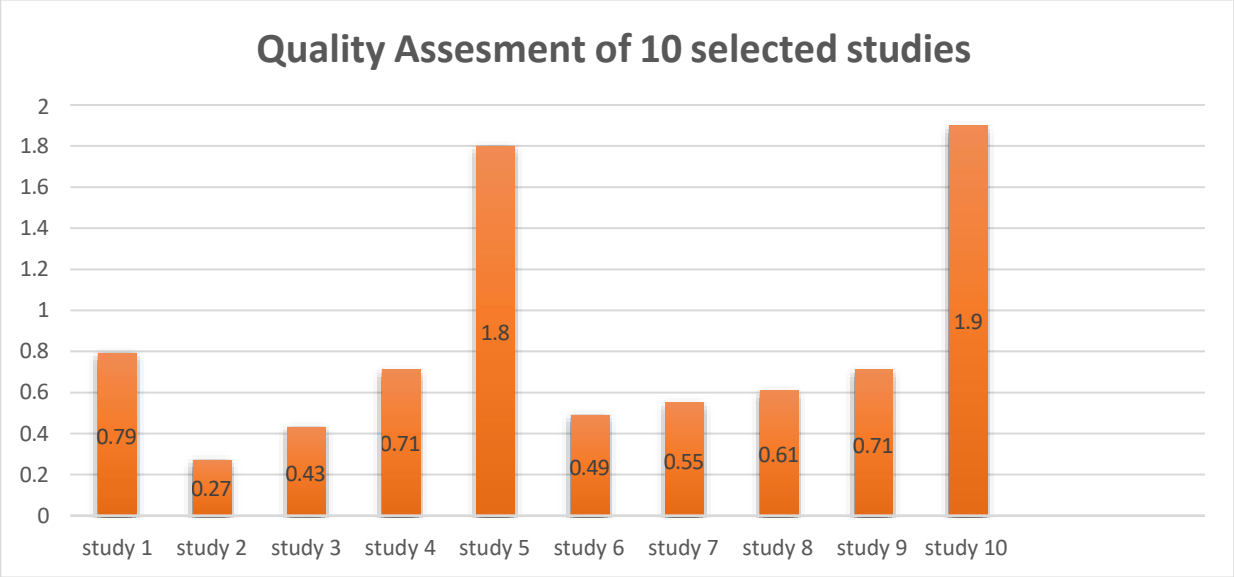
The quality assessment of the study examining the relationship between electronic health care systems, nursing workload, and quality of care involves evaluating critical components such as study design, sampling method, data collection procedures, variable measurement, data analysis techniques, presentation of results, discussion of findings, ethical considerations, control of confounding factors, and overall validity and reliability. Ensuring robustness in these areas is essential for determining the credibility and generalizability of the study's findings, as well as its potential implications for healthcare practice, policy, and future research efforts.

Table 4: Quality Assessment of the Research Matrix

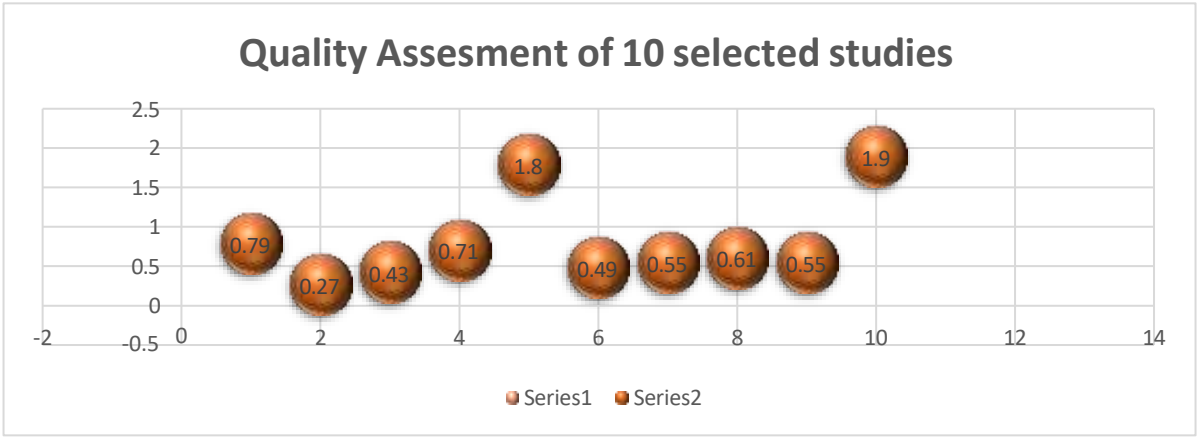
#	Author	Are the selection of studies described and appropriate	Is the literature covered all relevant studies	Does the method section describe it?	Were findings clearly described?	Quality rating
1	Farid et al., (2021)	Yes	Yes	Yes	Yes	Good
2	Yen et al (2019)	Yes	Yes	Yes	Yes	Good
3	Chang & Hsiu-Hui (2019)	Yes	Yes	Yes	Yes	Good
4	De Groot et al (2022)	Yes	No	Yes	Yes	Fair
5	Pérez-Francisco et al. (2020)	Yes	Yes	Yes	Yes	Good
6	Fishbein et al. (2020)	Yes	Yes	Yes	Yes	Good
7	Baumann et al (2018)	Yes	Yes	No	Yes	Fair
8	Akhu-Zaheya et al (2018)	NO	Yes	Yes	Yes	Good
9	Kutney-Lee et al. (2021)	Yes	No	Yes	Yes	Fair
10	Tubbs-Cooley et al., (2019).	Yes	Yes	Yes	Yes	Good

The quality assessment of the research matrix indicates generally good adherence to key methodological aspects across most studies. The selection of studies is described and appropriate in all

cases, ensuring the inclusion of relevant literature. However, there are some instances where the literature coverage could be improved, particularly in studies where it was not explicitly described. The method sections are generally well-described, facilitating clarity regarding the study's design and procedures. Findings consistently presented clearly across studies, enhancing the overall comprehensibility of the research. While most studies rated as good, a few received fair ratings due to shortcomings such as incomplete literature coverage or insufficient description of methods. Overall, the assessments highlight the importance of thoroughness and transparency in research conduct to ensure credibility and reliability of findings.



The quality ratings for the studies in Table 4 indicate generally good adherence to methodological aspects, with ratings ranging from fair to good. Studies 1, 2, 3, 5, 6, 8, and 10 received good



ratings due to appropriate selection of studies, comprehensive coverage of relevant literature, clear description of methods, and clear presentation of findings.

However, studies 4, 7, and 9 received fair ratings due to some shortcomings such as incomplete literature coverage, insufficient description of methods, or unclear findings. These assessments emphasize the importance of thoroughness and transparency in research conduct to ensure credibility and reliability of findings.

Results

Table 4: Themes, Sub-themes, trends, and Supporting Studies

Theme	Sub-Theme	Trend	Supporting Studies
Nursing Workload	Impact on Nurse Wellbeing and Patient Care	Negative	Farid et al. (2020) revealed through System Dynamics modeling that long nurse shifts and work weeks double nurse fatigue levels, increase burnout by up to 6 times, absenteeism by up to 5 times, and medical errors for patients by up to 150%. Yen et al. (2019) found that EHR usage leads to heightened cognitive workload for nurses, associated with increased stress, exhaustion, and burnout. De Groot et al. (2022) highlighted that community nurses perceive high workload due to documentation activities, influencing their perceived workload. Pérez-Francisco et al. (2020) showed that primary care nursing experiences high workload, leading to burnout and decreased care quality and patient safety. Tubbs-Cooley et al. (2019) demonstrated in the NICU setting that increased nurse workload is associated with increased missed nursing care.
Nursing Workload	Impact on Quality of Care	Negative	Chang & Hsiu-Hui (2019) found that nursing workload correlates with care quality indices, suggesting that an imbalance between nursing payment and workload affects ICU care quality. Fishbein et al. (2020) provided insights into objective measures of workload in healthcare, indicating their significance in evaluating and improving quality of care. Kutney-Lee et al. (2021) highlighted that poor EHR usability is associated with adverse nurse job outcomes and surgical patient mortality and readmission, indicating the importance of workload management in enhancing quality of care.
Nursing Documentation	Workload Perception and Practice	Mixed	De Groot et al. (2022) revealed that community nurses perceive a high workload due to documentation activities, with actual time spent on organizational documentation influencing perceived workload. Akhu-Zaheya et al. (2018) compared paper-based and electronic health records, indicating deficiencies in documentation quality in both forms, suggesting that workload perception and practice might vary between systems. Baumann et al. (2018)

			highlighted an increase in documentation time post-EHR implementation, suggesting a potential impact on workload perception and practice.
Nursing Workload	Effectiveness of System Dynamics Modeling	Positive	Farid et al. (2020) demonstrated the effectiveness of System Dynamics modeling in quantifying and understanding the effects of nursing workload on nurse burnout, absenteeism, and quality of patient care. They utilized empirical data and expert input to build a simulation model, revealing significant impacts on nurse wellbeing and care quality.
Nursing Workload	Influence of Workload on Payment and Care Quality in ICUs	Negative	Chang & Hsiu-Hui (2019) highlighted the correlation between nursing workload, quality of care, and nursing payment in ICU settings, suggesting that an imbalance between nursing payment and workload can affect ICU care quality. This study emphasizes the importance of adequate nursing payment in maintaining care quality and patient safety in intensive care units.
Nursing Documentation	Quality Comparison between Paper-based and Electronic-based Records	Mixed	Akhu-Zaheya et al. (2018) conducted a study to assess and compare the quality of paper-based and electronic-based health records, revealing that while electronic health records were better in terms of process and structure, paper-based records had better content quality. This suggests a mixed picture in terms of documentation quality between the two forms.
Nursing Workload	Association between Workload and Nurse Burnout	Negative	Kutney-Lee et al. (2021) found that poorer EHR usability was associated with higher odds of nurse burnout, indicating that workload factors such as system usability can influence nurse wellbeing. This highlights the importance of considering workload-related factors in mitigating nurse burnout and improving overall job satisfaction.
Nursing Workload	Subjective Perception of Workload and Missed Nursing Care	Negative	Tubbs-Cooley et al. (2019) demonstrated that increased subjective workload ratings were consistently associated with increased missed nursing care in the NICU setting. This highlights the significance of subjective workload perception in influencing nursing practice and patient care outcomes.

The table provides a comprehensive overview of themes, sub-themes, trends, and supporting studies related to nursing workload and documentation practices in healthcare settings. It reveals a consistent negative trend wherein high nursing workload adversely affects both nurse wellbeing and quality of patient care. Studies by Farid et al. (2020), Pérez-Francisco et al. (2020), and Tubbs-Cooley et al. (2019) underscore the detrimental impact of workload on nurse fatigue, burnout, and missed nursing care, ultimately compromising patient safety. Additionally, the table highlights mixed findings regarding nursing documentation practices, with Akhu-Zaheya et al. (2018) showing deficiencies in both paper-based and electronic health records. Despite some variability, these findings collectively emphasize the critical need for workload management strategies and improved documentation systems to ensure optimal nurse performance and patient outcomes in healthcare settings.

Discussion

In order to comprehend the connection between nurse workload, electronic health care systems, and care quality, the discussion section was examining the conclusions of the chosen research and their consequences. This discussion was addressing the research question and examined important insights offered by the literature through a study of the themes and sub-themes found in Table 4.

Impact of Nursing Workload on Nurse Wellbeing and Patient Care

The research that this review looks at repeatedly shows how high nursing workloads negatively influences nurses' well-being and the standard of patient care. Prolonged shifts and workweeks greatly increase nurse tiredness, burnout, and the chance of medical errors, which eventually compromise patient safety, as Farid et al. (2020) shown using System Dynamics modelling. Pérez-Francisco et al. (2020), who highlighted the widespread phenomenon of high pressure on primary care nurses resulting in burnout and lower care quality, corroborate these results. Tubbs-Cooley et al. (2019), who found a link between missing nurse care and subjective workload perception, which may have a negative impact on patient outcomes, also highlighted the implications of increasing workload in the NICU context.

Effectiveness of System Dynamics Modeling in Understanding Workload Impact

Farid et al. (2020) illustrated the effectiveness of System Dynamics modelling in measuring and comprehending the impact of nursing workload on nurse well-being and patient care quality. The study offered important insights into the intricate linkages between workload characteristics and their effect on healthcare outcomes by combining empirical data and expert opinion. According to this, System Dynamics modelling can be a useful tool for healthcare organizations to find possible intervention areas and create plans for reducing the harmful impacts of a heavy workload.

Association between Workload and Quality of Care

In their investigation of the relationship between nurse workload, care quality, and nursing compensation in intensive care units, Chang & Hsiu-Hui (2019) emphasized the significance of sufficient staffing and payment arrangements for preserving patient safety and care quality. Fishbein et al. (2020) have offered valuable insights into objective workload metrics in the healthcare industry, highlighting their importance in assessing and enhancing the quality of treatment given. These results highlight how important task management is to improving patient outcomes and the quality of care.

Nursing Documentation Practices and Workload Perception

The review also looked at nursing documentation procedures and how people perceive their workloads in connection to them. When Akhu-Zaheya et al. (2018) examined computerized and paper-based health records, they found flaws in each. Paper-based records had higher-quality content than electronic records, even though electronic records performed better in terms of process and structure. This implies that there is variation in the quality of the documentation, which has consequences for how work is seen and carried out.

Limitation

It's important to recognize some limitations even if the chosen studies provide insightful information about the connection between nurse workload, electronic health systems, and care quality. The possibility of bias arising from the various research procedures used in various studies, such as survey-based approaches, System Dynamics modelling, and retrospective analysis, is one drawback. Furthermore, differences in healthcare environments, geographical areas, and sample demographics may

limit the generalizability of the results. Moreover, a number of research included self-reported data, which raises the possibility of response bias or inaccurate data. Future research in this field may be more robust and applicable if more rigorous study designs, bigger sample numbers, and multi-center partnerships address these constraints.

Recommendation

Several recommendations for further study and medical practice are made in light of the limits and findings. Primarily, longitudinal studies are required in order to assess interventions over time and get a deeper understanding of the long-term impacts of nursing workload on nurse wellbeing and patient outcomes. In order to enable comparisons and enhance data quality, efforts should also be undertaken to standardize documentation methods and workload measuring tools across healthcare facilities. In addition, it is imperative to give priority to measures that aim to minimize the burden of paperwork and maximize the usability of electronic health records in order to lessen the adverse effects of workload on nursing practice and care quality. In order to create evidence-based workload management techniques and enhance healthcare delivery overall, interdisciplinary collaboration among researchers, healthcare providers, and policymakers is important.

Conclusion

Care quality, nurse workload, and electronic health systems interact intricately, as revealed by the thorough analysis of the chosen research. The results emphasize how a heavy workload significantly affects both nurse well-being and patient outcomes, underscoring the pressing need for efficient workload management techniques. By using a variety of techniques, including System Dynamics modelling, retrospective analyses, and survey-based approaches, the investigations clarify the detrimental effects of workload imbalance, such as increased medical errors, burnout among nurses, and deteriorated quality of care. In addition, the conversation highlights how crucial it is for interdisciplinary teams to work together and how standardized assessment instruments may support next studies and intervention initiatives. Ultimately, a healthcare environment that prioritizes patient safety and nurse satisfaction may be fostered by addressing the difficulties that have been identified and putting

evidence-based policies into practice. This was improving healthcare delivery overall.

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