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THE IMPLEMENTATION OF ELECTRONIC MEDICAL RECORD RELATED TO NURSING WORKLOAD IN INTENSIVE CARE UNIT (A LITERATURE REVIEW)

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Abstract
The implementation of electronic medical record has been assessed lately to review its effectiveness in reducing nursing workload. Although many studies showed its efficacy, many healthcare providers especially in Intensive Care Unit (ICU) have not implemented it yet. Studies showed that the mental and physical workload of nurses working in ICU was relatively high. It is important to find the best practice in reducing the workload. This literature review study aims to describe the implementation of electronic medical records in the intensive care unit related to nursing workload in ICU. This study used a literature review method. The databases used was ProQuest and ScienceDirect with three fundamental keywords: electronic medical record, nursing workload, and intensive care unit. Year range filter was activated to only gather journals database from 2020 to 2021. The implementation of electronic medical record can improve the service quality. However, the changing from paper-based to electronic-based medical record should be assessed carefully so it will not be a new burden to nurses.
Keywords: Electronic Medical Record, Nursing Workload, Intensive Care Unit

INTRODUCTION

The nursing workload is defined as the necessary level of core clinical skills required in the performance of daily nursing activities (Tubbs-Cooley in Moghadam et al., 2020). Nurses are mostly busy with the task of writing documentation and medical records for patient. The patient medical record is indeed important to document and track activities between patient and the health care providers. It covers information on diagnoses, procedures, lab tests, and other services.

Increased nursing workload can cause burnout and thereby reduce the well-being of nurses (Waddill-Goad in Moghadam et al, 2020). High workload and effort can be caused by the existing paper-based medical record system, not electronic-based. Even in high and advanced technology place such as the intensive care unit (ICU), mostly still use the paper-based medical records.

One of the examples causing nursing workload is the haemodynamic monitoring and recording. In the ICU, haemodynamic monitoring is conducted using automatic device. However, nurses are still required to document, track, and record the result manually in a paper every one hour. Paper-based documentation creates difficulty to automatically track and gather fast information of the patient, especially in critical condition which requires quick decision making.

Within the hospital setting, the intensive care unit (ICU) is designed as a specialist provision with comprehensive services and complex equipment to provide critical care for patients with life-threatening conditions (Aprilia in Moghadam et al, 2020). Nurses working in the ICU spend more time directly caring for patients and have many responsibilities such as constantly paying attention to patients' needs, interacting with their families and making decisions in critical situations. Therefore, they tolerate a higher workload than nurses on other wards.

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Objective

This literature review aims to describe the implementation of electronic-based medical records related to nursing workload in the intensive care unit.

METHODS

This literature review employed PRISMA to improve the reporting of systematic reviews and meta-analyses in order to describe the implementation of electronic medical records related to nursing workload in the intensive care unit.

1. Eligibility Criteria

Both qualitative and quantitative research methods are utilized to describe the implementation of electronic medical records related to nursing workload in the intensive care unit.

2. Search Strategy

Some search processes were conducted to gain relevant articles about the implementation of electronic medical records related to nursing workload in the intensive care unit. During the search process, there was three fundamental keywords: "electronic medical record", "nursing workload", and "intensive care unit". The search filter in year range was activated to only gather updated journals in database from 2020 to 2021.

3. Study Selection

The journals were sourced from ProQuest and ScienceDirect as the literatures of this study. Some relevant articles published in the English version were investigated. After eliminating several similar studies and irrelevant journals to this scope of study, the authors collected relevant articles.

4. Synthesis of Results

The findings of this review describe and explain the implementation of electronic medical records related to nursing workload in the intensive care unit.

RESULTS

The results of this study were described as following:

Study Description

The source of this study was the database of Proquest and ScienceDirect using the relevant keywords. Some articles are excluded because their title and abstract are not comprehensive, the topics are not related to this study (electronic medical record related to nursing workload in intensive care unit), and they are non-academic journals and not available in full text (abstract only). Therefore, only eight full-text studies are reviewed with due restraint.

Figure 1 below shows the steps of study selection based on PRISMA flow diagram on the flow of information through the different phases of systematic review.
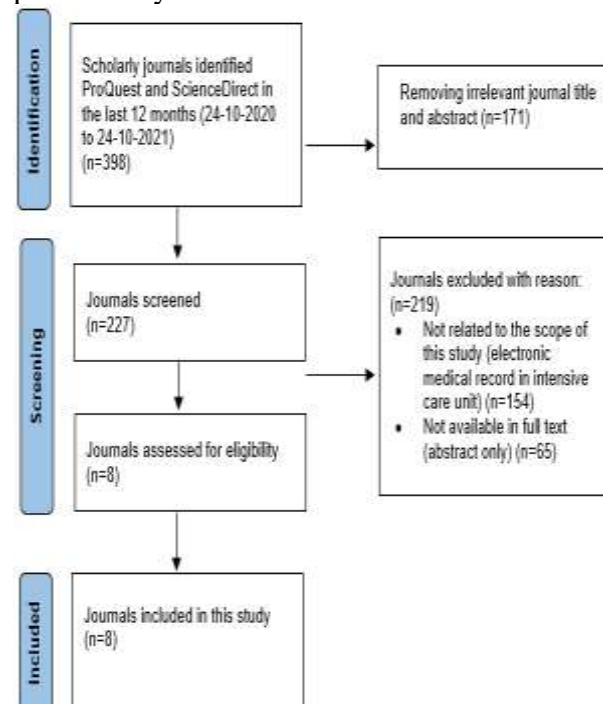

Figure 1. The study selection process based on PRISMA flow diagram (2020)
Taken from http://www.prisma-statement.org/

DISCUSSION

Paper-Based VS Electronic-Based Medical Record

Sado (1999) stated that the paper-based medical record is inadequate to meet the needs of health care providers. One study found that 5% to 20% of the charts at several hospitals had information missing, and most often these

were laboratory results or radiologic reports. Twenty-five percent of the missing data were lost or incomplete narratives. As much as 30% of the patients were seen without medical record.

Some of the weaknesses in using the written form for documenting nursing care are unguaranteed data safety and inability to provide long-term database (Saraswasta et al, 2018). The records are often illegible, often misfiled or easily lost, not easily accessible to the provider, and can be inaccurate. Despite its disadvantages, paper-based is not expensive. It is very portable and can be directly and flexibly transported to each health care delivery spot.

On the other hand, Casey et al (2020) showed that there is sufficient evidence that the implementation of the EMR-based customized rounding report and standardized sign-out had a positive effect on workflow efficiency and satisfaction.

Leigh et al (2020) stated that historically, many hospitals have relied on handwritten notes and dictation to prepare transfer and discharge documents for inclusion in the medical record–an approach that is often inefficient and prone to error. Optimizing completeness and timely availability of ICU transfer information is critical for maintaining the continuance of care between healthcare teams without interruption or loss of information.

Sado (1999) showed a study which found that before installation of a computerized record system in a coronary and medical ICU, nurses spent 17.4% of their time charting and 6.7% of their time gathering patient data. After installation of the EMR, there was a decrease to 10% and 4% for charting time and for data gathering, respectively.

Previous studies showed that the implementation of electronic medical record can reduce the time used for documentation work and nurses' workload (Saraswasta et al, 2018). Thongprayoon et al (2014) in their study concluded that electronic checklist significantly reduces ICU provider workload and checklist errors without any measurable difference in the amount of time required for checklist completion. Thus, implementation of an electronic checklist in the ICU setting is feasible and has the potential to improve patient care.

Is Electronic Medical Record Always Good?

Many recent studies showed that electronic medical record has some obstacles and even creates new workload if it is not conducted effectively. Walker (2020) stated evidence about the effectiveness of electronic health records in improving nursing workload efficiency is uncertain.

Calzoni (2020) stated that electronic medical records presenting large amounts of data create risks of cognitive overload. It is good to identify and then highlight the most relevant data for each patient, with non-highlighted data remain accessible.

Electronic medical record is better than paper-based nursing care documentation regarding documentation process and structure. However, the implementation of it has some obstacles, such as vocabulary standard, security, and data quality (Yip in Saraswatsa et al, 2018)

Pfaff et al (2021) conducted a study and showed several clinicians explained that the electronic health record provides little support for coordination, so most often they resort to phone calls between the relevant clinical staff to clarify what the plans are and who is designated to take action.

The electronic medical record in the ICU has the utility of providing the necessary information to make sound clinical decisions for critically ill patients. For it to be optimized, the electronic medical record must be more than just what is being replicated in the written record or merely a documentation tool. it must add value that supports and enhances clinical decision support. The electronic medical record is too expensive a tool just to be a computer designed to ease documentation and retrieve data faster.

New technology adoption is common in health care, but it may elicit frustration if end users are not sufficiently considered in their design or trained in their use (Tawfik et al, 2021). The frustration may contribute to higher workload and burnout.

The study by Tawfik et al (2021) found that frustration with technology varies with health care worker role and among individuals within work settings. Frustration with technology is independently associated with emotional exhaustion. Although frustration with technology was higher among direct clinical providers, similar relationships with emotional exhaustion were apparent for respondents engaged in direct patient care compared to those engaged in indirect patient care.

Furthermore, Tawfik et al (2021) in their study stated that participating hospital indicates that graduate clinicians adapt easily to the electronic medical record but require training on how to use paper-based assessment tools and orders during digital downtimes. Carayon in Leigh et al (2020) stated efforts to integrate system-based improvements in medical software have the potential to achieve intended outcomes more effectively than person-focused training.

CONCLUSION

The use of electronic medical record in intensive care unit is found to be beneficial. However, there should be regular training required to make sure that nurses are mastering the use of it. Optimizing the benefits of the implementation of electronic based nursing care documentation nurses requires precise strategy.

Conflicts of Interest

The authors declare that there is no conflict of interest and no funding in this study.

Table 1. The Implementation of Electronic Medical Records in ICU

No	Author	Objective	Finding
1	Calzoni et al. (2020)	To inform the design of an EMR display capable of highlighting relevant information	Participating physicians expressed support for the Learning EMR system
2	Pfaff et al. (2021)	To understand the cognitive requirements of clinicians' EHR use in different clinical environments and roles.	Several clinicians explained that the EHR provides little support for coordination, so most often they resort to phone calls between the relevant clinical staff to clarify what the plans are and who is designated to take action.
3	Sutton et al. (2020)	To review the benefits, risks, and strategies of computerized Clinical Decision Support System (CDSS) for success.	CDSS have been shown to augment healthcare providers in a variety of decisions and patient care tasks, and support delivery of quality care.
4	Sinha et al. (2021)	To validate audit-log based EHR times using observed EHR-times extracted from screen recordings of EHR usage in the inpatient setting.	Inpatient EHR audit-log based EHR times to correlate strongly with observed total and active EHR times among pediatric critical care providers.
5	Walker et al (2020)	To measure, compare and describe nurse time spent on patient care prior to, and following implementation of an integrated electronic health record roll-out using a standardised approach.	There was a clear and consistent trend of increased documentation time and activities following implementation of the electronic health record. This knowledge may assist nurse leaders when implementing electronic health records.
6	Leigh et al (2020)	To develop an evidence-informed electronic ICU-specific communication tool (eTransfer tool) and evaluate it in a pilot test against current dictation-based communication documents	An evidence informed eTransfer Tool has been developed and shown promise towards standardizing textual information exchanges between clinicians during ICU to hospital ward transitions in care. This is an important step in improving inter-provider communication, during high risk transitions.
7	Moghadam et al (2021)	To investigate the simultaneous physical and mental workload and any relationships between these concepts on nurses working in intensive care units.	The mental and physical workload of nurses working in ICUs was relatively high and that there was a significant relationship between them.
8	Jeddah et al (2021)	To establish the validity of an automated system for tagging respiratory and hemodynamic deterioration by comparing automatic tags to tagging by expert reviewers.	A simple rule-based tagging system could provide a rapid and accurate tool for mass tagging of a compound database.

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