The Implementation of Electronic-Based Nursing Care Documentation on Quality of Nursing Care: A Literature Review

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Abstract

In the last two decades, most of the tasks performed by nurses do not directly relate to patient care. Nurses spend more time for writing documentation or medical records of patients. Implementation of electronic medical record can reduce the time used for documentation work, or in another hand, will increase nurses' time to interact with patients. Eventually, nurses can improve the quality of nursing care. This literature review aims to describe the implementation of electronic-based nursing care documentation (EHR) in improving the quality of nursing care. This study employed a literature review method. The databases used are Science Direct, PROQUEST, Scopus, Ebsco, and Scholar Articles with several keywords, such as electronic health record, EHR, documentation in nursing, and quality of nursing care. The implementation of electronic nursing care documentation can improve the service quality. The improvement of the service quality is reviewed by considering efficiency; focus on patient, effectiveness, time discipline, equality, and confidentiality. In the digital era of health workers, the utilization of electronic nursing care documentation requires continuous development to improve the quality of service for patients.

Keyword: electronic health record, nursing care documentation, quality of nursing care

1. Introduction

Nurses belong to health care providers who directly give nursing care to patients. Therefore, they need times to interact with patients (1). However, nurses are still demanded to perform some unrelated clinical skill workloads which result in their time limitation to communicate with patients (2). One of the nurse duties is to show documentation and manage patients health information through nursing care documentation (3). In the past two decades, most health workers especially nurses spend more time on writing documentation or medical records than that for applying therapeutic communication for patients and their families (4).

Documentation of nursing care is considered as significant indicators, which can influence the provision of nursing care, in either written form or electronic form. Some of the weaknesses in using the written form for documenting nursing care are unguaranteed data safety and inability to provide long-term database (5). Previous research was conducted to compare both nursing care documentation methods by using three criteria: content, documentation process, and structure. The result shows that Electronic Health Records (EHR) is better than paper-based nursing care documentation regarding documentation process and structure (3). However, the implementation of EHR has some obstacles, such as vocabulary standard, security, and EHR data quality (6).

The existence of various problems and causal analysis lead to consideration for using electronic-based nursing care documentation or commonly known as Electronic Health Records (EHR). It is expected that by employing EHR, health workers can integrate their data, so they do not need to answer patients' asked questions repeatedly (7). Most hospitals which operate EHR only concern on the benefits of using EHR for hospital administration without paying attention to the direct effects of EHR implementation on the quality of service (8).

Low-level satisfaction regarding nursing care occurs recently. One of its reasons is nurses' time limitation to interact with patients and families. The implementation of EHR is a favorable step for health care providers to solve this problem. Nursing care that focuses more on patients and families will reduce stress or relieve anxiety and increase satisfaction as well as therapeutic relationships between nurses and patients. Furthermore, nurses will be satisfied with their service providing, the confidentiality of their work, and finally able to improve the service quality (9). The recognition for fruitful impacts of EHR implementation on the quality of patient services will influence the continuous development of the following EHR.

Several previous studies show that implementation of electronic nursing care documentation can reduce nurses' workload and improve the quality of service. However, the studies do not review the whole aspects of service quality. This issue becomes one of the fundamental reasons of this research to analyze the implementation of integrated EHR on patient service quality reviewed from aspects of efficiency, effectiveness, focus on patients, equality, confidentiality, and timeline of service.

2. Objective

This literature review aims to describe the implementation of electronic-based nursing care documentation (EHR) in improving the quality of nursing care reviewed from efficiency, focus on patient, effectiveness, time discipline, equality, and confidentiality.

3. Methods

This literature review employed PRISMA to describe the implementation of electronic-based nursing care documentation (EHR) in improving the quality of nursing care.

3.1 Eligibility Criteria

The authors employed various types of research methods including quantitative and qualitative methods to describe the implementation of EHR in improving the quality of nursing care regarding efficiency, focus on the patient, effectiveness, time discipline, equality, and confidence.

3.2 Search Strategy

The authors conducted some search process to gain relevant articles about the implementation of EHR. During the search process, the authors used some keywords, such as; “electronic health record," "documentation in nursing," and “quality of nursing care."

3.3 Study Selection

Five databases consisting of Science Direct, PROQUEST, Scopus, Ebsco, and Scholar Articles were included in this study. The authors investigated some relevant articles published in the English version. After eliminating several similar studies, the authors collected relevant articles.

3.4 Synthesis of Results

The findings of this review describe and explain the implementation of EHR in improving the quality of nursing care.

4 Results

The results of this review were described as following:

4.1 Study Description

Figure 1 illustrates the process of study selection. Five electronic databases provide 2900 references related to the topic. On the other hand, some articles are excluded because their title and abstract are not comprehensive, the topics are unrelated to this study (electronic-based nursing care documentation), and they are non-academic journals (letter to the editor and, short communication and not full text (only abstract). Therefore, only twenty full-text studies are reasonably reviewed.

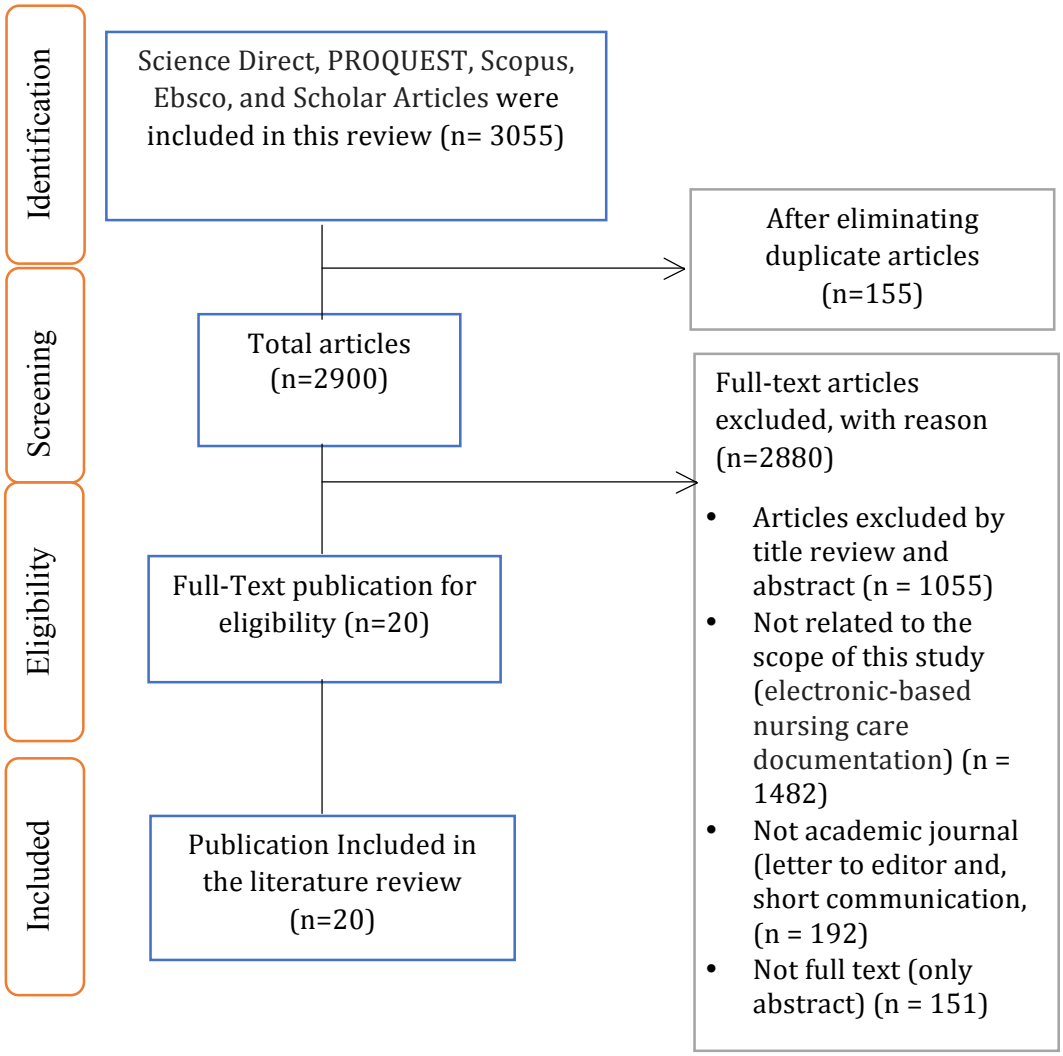

Figure 1. The study selection process of literature adapted from PRISMA (2009).

4.2 The Development of Electronic-Based Nursing Care Documentation

The implementation of EHR in the health care provider began in industrial health workers 3.0 era and continued to develop in 4.0 era. 4.0 industry development integrates information systems into a digital ecosystem, by using cloud systems, internet of thing (IoT), and value-based systems. The implementation of EHR facilitates health workers to easily analyze patient health data and provide quick decisions according to patient needs. The growing development of EHR is expected to increase productivity and improve the effectiveness of communication occurred. This is an effort to enhance the quality of nursing care documentation (10).

The implementation of EHR in America increased from 29.8% in 2010 to 95.3% in 2016 (11). EHR implementation which follows the standard will lead to more effective and efficient results. Sentana Healthcare reports that its investment returns for 53.7 million dollars, in which 29% of the total (15.5 million dollars) comes from the reduction of LOS as well as

the success of hospitals in preventing drug side effects, while 18% of the total (9.4 million dollars) comes from unit efficiency due to the adoption of EHR (8) .

4.3 Electronic-Based Nursing Care Documentation for Improving the Quality of Care

Studies conducted in Jordan describe nurses' perception in using EHR. The result of these studies shows that the ease from using EHR is influenced by nursing experience and ability to operate computers. This research gives addition perspectives on issues related to technology accepted in health care provider focusing on nurses acceptance of EHR (12). Considering usability requirements in the design of nursing information systems will lead to the efficient and effective use of these systems (13). The ease received by nurses in carrying out technology, in this case, electronic-based nursing care documentation, will increase nurse satisfaction of work which will affect the quality of service to patients.

EHR implementation in hospitals or health care institutions influences nurses' time to interact with patients and families. Based on research conducted in a hospital in the United States, before applying the EHR, nurses spend 50.5% of their time in the nurse room to complete medical records and do administrative matters. However, after asking her, nurses only pay 35% of their time in a nurse station. It indicates that after applying EHR, they spend more time intervening and interacting with patients and their families (14).

Implementing nursing information systems to document and improve nurse's education will improve the quality of documentation (15). According to Biron et al., the existence of indicators in quality assessment is beneficial to develop quality measurements, answer demands of the community regarding transparency, and trigger quality improvement during the existence of input from the community (16). According to Kelley (2016), the quality of EHR use can be viewed from six aspects, such as efficiency, focus on the patient, effectiveness, timeliness, equality, and confidentiality & security (17).

4.3.1 Efficiency

The implementation of EHR can reduce patient care costs by around $ 731 per patient hospitalized (18). By using EHR, patient data becomes completed and accurate, and thus, it speeds up decision making. Furthermore, the data stored in the EHR are possibly accessed for a long time.

4.3.2 Focus on patients

Patients are unique individuals, and thus nurses must be able to provide holistic care according to patient needs. The use of EHR increases the focus of nurses on interacting with patients and families (14). Communication to patients and families is essential to maintain a trusting relationship between patients and health workers. Keeping transparency in service to patients will prevent the rise of negative prejudices to health workers who focus more on computers (19). When nurses communicate with patients, they must maintain eye contact with the patients. Therefore, the patients feel cared for and valued (20).

4.3.3 Effectiveness

Effectiveness integrates evidence-based practice in providing health services. One of the effects of implementing the EHR is an improvement in diagnosing, treatment and results of patient care because health care providers can access medical records

from anywhere and anytime through the EHR system (21). Ability to access EHR data will facilitate the development of evidence-based practice, especially in nursing services.

4.3.4 Time discipline

Patient data in EHR can be accessed by health workers simultaneously; thus it can increase the speed of service to patients. The time service to patients affects the quality of services provided for patients. According to Baumann et al., (2018), EHR use at the initial stage of socialization requires a longer time. However, after health workers frequently use EHR, the documentation time will speed up (4).

4.3.5 Equality

The implementation of EHR will affect nurses in providing services provided for patients. The demographic data available in the EHR are coded data. Therefore, nurses will professionally offer services to anyone disregarding race, religion, or ethnicity of the patient. According to the research of Ryu & Kim (2018), to improve nursing care quality to patients, nurses must be able to assure patients. Assurance refers to sincerity, professional knowledge, and trust given by nurses to patients. Consequently, nurses' professionalism in providing services will increase (22).

4.3.6 Confidentiality and Security

Writing manual nursing care documentation often causes problems, such as mistakes in rewriting patient's development record in the medical history, which certainly endangers the patient. Research of Kranz et al., indicates that the use of health information technology can coordinate care and improve patient safety. The application of electronic-based nursing care documentation can prevent mistakes in reading medical records. The protection of medical record data using electronic nursing care documentation is also better than manual nursing care documentation in the medical record (11). There are several data security systems in implementing EHR including cloud systems and FOG systems (10,23).

5 Discussion

According to research by Haryati (2017), most HER systems applied in Indonesia have not integrated yet with nursing care documentation though combining nursing care documentation using EHR can optimize technology usage and affect nursing care quality to patients. Standards of implementing EHR integrated with nursing care documentation are also required to ensure the quality of electronic-based nursing care. SIMPRO is an electronic-based nursing care documentation system that uses NANDA-I standards, Nursing Intervention Classification, and Nursing Outcome Classification as sources in making nursing care documentation. Also, to use standardization in electronic-based nursing care documentation, SIMPRO provides functions and roles in planning, organizing, actuating, staffing, and controlling (POSAC) management (24).

A study conducted by Balestra (2017) explains that many factors influence the use of EHR to provide optimal benefits to patients and health workers. However, EHR can

increase the workload of nurses because of a lack of understanding in using it (20). The nurse's ability to optimize the implementation of electronic-based nursing care documentation will affect the job satisfaction of nurses. Besides, nurses will have more time to interact with patients and increase patients' satisfaction with the services provided. This is following the studies conducted by Adler-Milstein et al., who posit that the level of patients' satisfaction with the implementation of EHR is closely related to the success of health workers to optimize the EHR functions (25). EHR program is aimed for certain priorities, such as improving quality, safety, efficiency, health disparity reduce, care coordination population, and public health while maintaining privacy and security of patient health information (26). Consequently, nurses' satisfaction in using EHR will improve the quality of services provided for patients.

Indicators of improving the quality of care provided for patients are possibly viewed from six aspects, such as efficiency, focus on the patient, effectiveness, timeliness, equality, and confidentiality & security. By using electronic-based nursing care documentation, patient data will be integrated with the hospital information system. This makes the necessary information easily accessible to health workers. The ease of accessing data by using integrated EHR accelerates decision making in providing care to patients, and thus, patients get efficient service. Patients are unique individuals, where providing holistic care to them, nurses must be able to empathize the patient's condition — the nurses' time to interact with patients influences their success on emphasizing patients. The use of EHR with appropriate strategies assists nurses to have more time to communicate with patients and families. As a result, the services provided can focus on patients.

Nursing interventions available in electronic-based nursing care documentation are indeed in line with evidence-based practice. This helps nurses choose appropriate nursing interventions according to the patient's condition. Providing appropriate interventions will improve services that always prioritize the patient's safety and ultimately help reduce hospital costs. The purpose of implementing electronic-based nursing documentation is to shorten the time needed by nurses in carrying out nursing care documentation. At the beginning of the implementation, the use of EHR ultimately requires a relatively long time. However, learning and the use of appropriate strategies encourage the nurses' time to write documentation to become shorter. Consequently, they have more time to interact with their patients.

In carrying out professional nursing practices, nurses have several essential values, one of which is equality. The use of EHR enables patient data to be converted into a code. Therefore, nurses will provide services to patients disregarding their religion, race, ethnic. Besides, confidentiality and security are frequently rising problems when using manual nursing care documentation that can save patients' safety. Integrated EHR has a sophisticated security system, such as using a cloud system. With this system, the patient's medical record data can be accessed anywhere and, of course, with a sophisticated security system. Besides, there are developments in data security by using FOG system. The system addresses problems that frequently occur in the cloud system. The growing security system will maintain the confidentiality and security of patient data.

6. Strength and Limitations

This study reviews many previous studies to explore the implementation of EHR. The result provides valuable information to improve the quality of nursing care. However, some of the limitations discussed in the application of the electronic-based nursing care documentation (EHR) do not describe the software design of EHR applied. Therefore, it is difficult to compare factors influencing the implementation of electronic-based nursing care documentation (EHR). Other limitations show that the results of previous research are described in narrative form rather than a meta-analysis because the variability of study design and different software EHR design do not allow to pool the data to define the effect size of each study. Some related studies to implementation of electronic-based nursing care documentation (EHR) are possibly unidentified even though the researchers create this review by hand tracking.

7. Conclusion

The use of technology in nursing care documentation process is one alternative to solve several problems, and it particularly improves the quality of nursing care documentation affecting the quality of services provided for patients. The quality of services offered to patients in this article is viewed from several aspects such as efficiency, focus on patients, effectiveness, equality, security, and timeliness. Optimizing the benefits of the implementation of electronic-based nursing care documentation nurses requires precise strategy.

8. Acknowledgments

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9. Conflicts of Interest

The authors declare no conflict of interest in this manuscript. The funding sponsors also have no role in the writing of the manuscript or the decision to publish this manuscript.

Table 1. The Implementation of HER

No	Author	Method	Setting	Objective	Finding
1	Biron et al., (2017) (16)	Cross-sectional study	French	To evaluate the impacts of EHR use on the quality of care management in acute care hospitals	The study provides empirical proof of EHR benefits on the quality of care management. Hospitals that adopt EHRs have better results in quality indicators
2	Kazley et al., (2014) (18)	Cross-sectional study	US	To find out whether advanced EHR use in hospitals is associated with a lower cost of providing inpatient care.	Hospitals that use advanced EHRs have lower cost-per-patient admission than those that apply similar case mix.
3	Schenk et al., (2018) (14)	Observational study	US	To measure differences between nursing work and caring efficacy on three units in one hospital, before and after of adopting a comprehensive her for a year	Nurses spend significantly more time in patient rooms, on documentation, and medication administration after implementing EHR.
4	Alkureishi et al., (2018) (19)	Systematic review and pilot-testing	US	To validate the present tool to assess EHR communication skills	e-CEX is a reliable and valid tool to assess medical student's patient-centered EHR communication skills.
5	Ugorji & Morand-reid, (2014) (21)	Qualitative study	Texas	To explore strategies possibly used by IT leaders in hospitals to apply EHR to achieve a cost saving benefit	Five themes regarding the strategies IT leaders are used to applying EHR effectively to achieve cost savings. They are: a) Training staff, b) Accurate and punctual documentation, c) Protecting patient health information, d) Adapting to external policy changes, and e) Enforcing organizational best practice policies to maximize reimbursement and cost savings. Leaders of other health organizations possibly use the strategies that emerged from this study to implement and apply EHR systems effectively.
6	Ryu & Kim (2018) (22)	Cross-sectional	Korea	To investigate differences between work satisfaction and	Nursing care integration service nurses have a higher score than general unit nurses on some

		study		quality of nursing services performed by nurses from the nursing care integration service and general	aspects of work satisfaction and quality of nursing services.
7	Kranz et al., (2018) (11)	Cross-sectional study	US	To examine factors associated with the use of HIT capabilities and the association of these capabilities and quality of care	The method of health information technology (HIT) for such activities as arranging or enabling services and an engaging patient is underleveraged tools for care coordination.
8	French-Baidoo et al., (2018) (23)	Experimental research	Ghana	To investigate new encryption mechanism to enhance security and improve confidentiality in cloud-based her	The ECP-ABE yields of high cryptographic performance create simple Access Structures, eliminates the need for private keys, and presents an implementation of the architecture that makes cloud-based EHR system secure and confidential.
9	Kumari et al., (2018) (10)	Case Study	India	To provide an analysis of roles of fog computing, cloud computing, and the internet of things to offer uninterrupted context-aware services to the end users as and when required	Various challenges of 4.0 healthcare environment by using fog computing technology such as data management, security and privacy, scalability, human interfaces, and interoperability have been covered in this paper
10	Baumann et al., (2018) (4)	Systematic Review	Germany	To compare time spent on documentation tasks by hospital staff (physicians, nurses, and interns) before and after EHR implementation	Initial adjustment to EHR appears to increase documentation time, but there is evidence indicates that as staff become more familiar with the system, it may ultimately improve workflow
11	Adler-Milstein etal., (2015) (25)	Cohort Study	USA	To assess a consistent relationship between EHR adoption and hospital outcomes across three critical dimensions of hospital performance	The study aims to determine whether the substantial national investment in EHRs over the past five years is associated with higher quality, provides more efficient hospital care, and in particular, focuses on time-related effects.
12	Tubaishat, (2017) (12)	Exploratory study	Jordan	To explore nurses' perceptions of usefulness and ease of using EHRs	Nurses in this study demonstrate a positive understanding of the value and ease-of-use of EHRs and subsequently accept the technology.

13	Hariyati et al., (2018) (15)	Cross-Sectional Study	Indonesia	To compare satisfaction before and after applying a computer-based information system	Implementing nursing information systems for documentation and improving nurse education will enhance the quality of documentation.
14	Hariyati et al., (2015) (24)	Designs Incremental and Quasi-Experimental Design	Indonesia	To develop and test the effectiveness and efficiency of the SIMPRO (Electronic based nursing documentation)	SIMPRO increases the quality, completeness, relevance, and sustainability, and functions of the decision, which supports system in delivering nursing care as well as in nursing management. SIMPRO also provides services and roles in planning, organizing, actuating, staffing, and controlling (POSAC) management.
15	Qazi et al., (2018) (26)	Cross-Sectional Study	Pakistan	To evaluate the availability and use of EHR in hospitals	The primary goal of EHR is to provide an improvement in the quality of patient care, patient safety, and efficiency.
16	Nguyen, Bellucci, & Nguyen, (2014) (5)	Systematic Review	Australia	To report research findings including benefits and issues associated with EHR implementation	The potential of technology aids patient care and clinical documentation; for example, in improved documentation quality, increased administration efficiency, as well as better quality, safety, and coordination of care.
17	Akhu-Zaheya, (2017) (3)	A Retrospective, Comparative Design	Jordan	To assess and compare the quality of paper-based and electronic-based health records.	EHRs are better than paper-based health records regarding process and structure. Regarding quantity and quality of content, paper-based records are better than EHRs.
18	Wilbanks et al., (2018) (2)	Exploratory Study	USA	To identify the most beneficial data entry methods to use in future documentation interface design	Computer-assisted data entry is superior to paper-based documentation concerning perceived workload and superior to auto-filling regarding documentation accuracy.
19	Kamil, Rachmah, & Wardani, (2018) (1)	Qualitative Study	Indonesia	To identify the problems faced by nurses that lead to inadequate documentation in nursing	Nurses need continuous support and educational intervention to ensure adherence to the nursing documentation procedure.
20	Moghaddasi et al., (2017) (13)	Cross-Sectional Study	Iran	To evaluate the usability of nursing information systems	Considering usability requirements in the design of nursing information systems will lead to the efficient and effective use of these systems.

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