Journal of Muslim Community Health (JMCH)

ISSN 2774-4590

Published by Postgraduate Program in Public health, Muslim University of Indonesia

Original Research **Open Access**

EFFECTIVENESS OF COMPUTER-BASED NURSING DOCUMENTATION IN NURSING CARE IN HOSPITAL – A LITERATURE REVIEW

Brajakson Siokal

Bagian Keperawatan FKM Universitas Muslim Indonesia

Email: brajaksonsiokal1@gmail.com

Abstract

Background: Nurse Population in hospitals has a greater proportion than other health workers. Nearly 60-70% of the total human resources available, occupied by nurses. In fact, 90% of the health services provided are a form of nursing service. Therefore, nursing service is a form of professional service that is the biggest indicator in realizing the quality of hospital services. One of the duties of nurses in providing nursing services in accordance with standards is to document all nursing care provided. **Objective**: To review journals about documenting computer-based nursing care in hospitals for the effectiveness of the preparation of nursing care. **Methods**: Quantitative, mixed-methods, and qualitative reviews that aim to evaluate the influence of computerized nursing documentation (eg, management, computerized decision support systems and information systems) on nursing care were included. We used the nursing care performance framework as an extraction grid and analytical tool. This model illustrates how the interplay between nursing resources and nursing services can produce changes in patient conditions. The primary outcomes included nurses' practice environment, nursing processes, professional satisfaction, and nursing-sensitive outcomes. The secondary outcomes included satisfaction or dissatisfaction with computerized nursing documentation according to nurses 'and patients' perspectives. Reviews published in English, French, or Spanish from January 1, 2000 to December 15, 2019, were considered. **Results**: A total of 5515 titles or abstracts were assessed for eligibility and full-text papers of 72 articles were retrieved for detailed evaluation. It was found that 22 reviews published between 2002 and 2015 met the eligibility criteria. Many nursing care themes (ie, indicators) were influenced by the use of computerized nursing documentation, including time management; time spent on patient care; documentation time; information quality and access; quality of documentation; knowledge updating and utilization; nurse autonomy; intra and interprofessional collaboration; nurses' competencies and skills; nurse-patient relationship; assessment, care planning, and evaluation; teaching of patients and families; communication and care coordination; perspectives of the quality of care provided; nurses and patients satisfaction or dissatisfaction with computerized nursing documentation; patient comfort and quality of life related to care; empowerment; and functional status.

***Keywords**: Nursing Documentation, Computerized Nursing Documentation, Effectiveness of Nursing Care Documentation*

Introduction

Documentation of nursing care is the act of recording any data obtained by nurses in a systematic document. The process of recording does not only write data in the available formats. Nursing documentation focuses on the process and results of recording [13]. Nurse population in hospitals has a greater proportion than other health workers. Nearly 60-70% of the total human resources available, occupied by nurses. In fact, 90% of the health services provided are a form of nursing service. Therefore, nursing service is a form of professional service that is the biggest indicator in realizing the quality of hospital services. One of the duties of nurses in providing nursing services according to standards is to document all nursing care provided [7]. Nurses have the responsibility of carrying out their duties in accordance with nursing standards regardless of where they work and what their specialization is. At present documentation of nursing actions performed by nurses is still manually [15]. One obstacle that is often the complaint for most nurses when writing nursing actions is their limited time in recording and documenting nursing care. As a result, what nurses have done directly to patients is often not well documented, resulting in less effective evaluation of the progress of care in patients. Furthermore, the long and complex documentation format creates a sense of boredom in nurses. In addition notes in written form are sometimes difficult to read, can be misinterpreted, and can only be used for one person at a time [3]. From the discussion above, it can be concluded that manual nursing care documentation takes a lot of time required in addition to lack of data validity and incomplete documentation of nursing care. In addition it costs more to buy documentation paper that will be recorded in nursing care [9]. The existence of this phenomenon if not treated will be difficult to explain and measure the contribution of nurses. To overcome these problems, one of them is to implement a nursing care information system that can help nurses in documenting nursing care [14]. Utilization of nursing care information systems helps nurses to reduce the time needed in the documentation process so that the time to care for patients becomes more, improve communication, reduce errors in documentation and evaluation of the results of nursing actions and reduce hospital efficiency in terms of paper use thereby increasing effectiveness costs [17]. With the advancement of information and communication technology, it is very possible for nurses to have a more sophisticated documentation system of care by utilizing the development of information technology. Nursing

documentation using a computer is expected to help improve quality nursing documentation [3]. The world of nursing in Indonesia continues to grow, along with the increasing strata of nursing education in Indonesia, in addition to very fast access to information throughout the world [18]. It has an effect on significant progress in nursing, including in the documentation of the nursing process. From the previous manual, shifted towards computerization [8]. Even in its development, computers not only help in the documentation of the nursing process, but their use reaches the interests of hospital management, where treatment activities can be monitored in a hospital database [5]. Thus, the use of nursing care information systems for the implementation of nursing care is an innovative method of documentation that is able to provide time efficiency and improve the quality of nursing care documentation [2].

Objectives

We conducted an overview of systematic reviews to systematically summarize the evidence that comes from qualitative, quantitative, and mixed-method systematic reviews regarding the effects of computerized nursing documentation on nursing care.

Nursing Care Performance Framework

In order to illustrate how computerized nursing documentation interventions influence nursing care and impact health outcomes, an organizational model was used. The nursing care performance framework represents a synthesis of the most recent developments in the field and is part of leading initiatives aiming to conceptualize nursing care performance[6]. Conceptualization of nursing care performance is based on a system perspective that builds on system theory, Donabedian's earlier works on health care organization, and Parsons' theory of social action. 1) This model, illustrated is composed of 14 dimensions and 51 indicators and shows how the interplay of three nursing subsystems (resources, processes or services, and patients' outcomes) can operate to achieve three key functions: acquiring, deploying, and maintaining nursing resources; 2) transforming nursing resources into nursing services; and 3) producing changes in patients' conditions in response to the nursing services provided ("nursing-sensitive outcomes").

The first function refers to the human and material resources needed to provide effective nursing care, such as nursing staff supply, working conditions, staff maintenance, and economic sustainability. The second function encompasses nurses' practice environments (eg, nurse autonomy; collaboration), nursing processes (eg, assessment, care planning, and evaluation; problems and symptom management), nurses' professional satisfaction, and patient experience. The desirable end result of the interactions between nursing staff and nursing

processes is to improve patients' conditions. The third function is then described as the positive changes that can be detected among patients (also called "nursing-sensitive outcomes").

Methods

Overview and Eligibility Criteria

Quantitative, mixed-methods, and qualitative reviews that aim to evaluate the influence of computerized nursing documentation (eg, management, computerized decision support systems and information systems) on nursing care were included. We used the nursing care performance framework as an extraction grid and analytical tool. This model illustrates how the interplay between nursing resources and nursing services can produce changes in patient conditions. The primary outcomes included nurses' practice environment, nursing processes, professional satisfaction, and nursing-sensitive outcomes. The secondary outcomes included satisfaction or dissatisfaction with computerized nursing documentation according to nurses 'and patients' perspectives. Reviews published in English, French, or Spanish from January 1, 2000 to December 15, 2019, were considered.

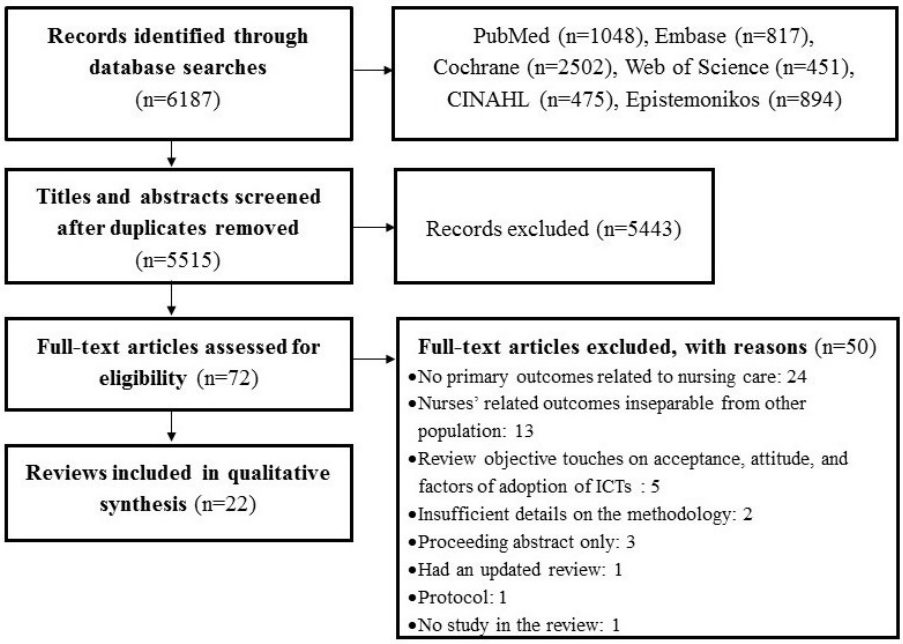
The scope was formulated using PICOS (participants, interventions, comparisons, outcomes, study design). All types of qualitative, mixed-method, and quantitative reviews, published from January 1, 2010 and that aimed to evaluate the influence of computerized nursing documentation used by nurses on nursing care were eligible. The inclusion of reviews using multiple methodological approaches is justified by the possibility of broadening the understanding of the impact of computerized nursing documentation on nursing care. The interventions targeted were the use of computerized nursing documentation by Mair et al: (1) management systems; (2) communication systems; (3) CDSSs; and (4) information systems. The following ICTs were excluded: (1) nurse management systems, which are purely administrative and designed for the management of human resources and working conditions (eg, scheduling) and nursing staff maintenance (such as retention); (2) educational systems,for example, e-learning initiatives used for the training of nursing students, unless they are applied to direct patient care; and (3) telephone systems, because according to most definitions of ICTs, they are not digital technologies and cannot support the electronic capture, storage, processing, and exchange of information. Further details of the inclusion criteria for the selection of systematic reviews are described in:

Criteria	Description of inclusion criteria
Type of reviews	All types of qualitative, mixed-method, and quantitative reviews that aimed to evaluate the influence of ICTsa(four eHealth domains) used by nurses on nursing care, which stated a methodology (a "Methods" section) with explicit eligibility criteria, had systematic researchstrategies to identify selected reviews and provided a systematic presentation and summary of the characteristics and outcomes of the included reviews
Publication type	Reviews published in French, English, or Spanish from January 1, 2015.
Population	RN, nurses in training, nursing students, or patients receiving care from qualified RN through the medium of ICTs.
Intervention: ICTs covered by four eHealth domains	Four eHealth domains were considered in the overview: management systems, communication systems, computerized decision support systems, and information systems. ICTs embody all digital technologies that support the electronic capture, storage, processing, and exchange of information, in order to promote health, prevent illness, treat disease, manage chronic illness, and so on
Management systems	Management systems are computer-based systems used for acquiring, storing, transmitting, and displaying patient administrative or health information from different sources. They can support administrative or clinical activities. Electronic health records (EHRs) and personal health records (PHRs) are examples of management systems.
Computerized decision support systems	Refer to an automated computer-based system that aims to support health professionals in practicing within clinical guidelines and care pathways. These systems are usually operated in real-time and involve decision support that comes from artificial intelligence

	(eg, a software program).
Outcomes	The primary outcomes included nursing resources, nurses' practice environment, nursing processes or scope of practice, professional satisfaction, and nursing-sensitive outcomes (eg, patient outcomes, such as risk outcomes and safety, patient comfort, and quality of life related to care). The secondary outcomes included nurses' and patients' satisfaction or dissatisfaction with ICTs.

Search Strategy

A medical librarian developed and conducted the search strategies, drawing on other reviews of similar topics and using well-established search filters where appropriate. We searched publications in English, French, or Spanish in the following electronic databases from January 1, 2000: Cochrane Database of Systematic Reviews (until January 15, 2015); Epistemonikos (until December 25, 2014); PubMed (until December 8, 2014); Embase (until January 7, 2015); Web of Science (until January 9, 2015); and Cumulative Index to Nursing and Allied Health Literature (CINAHL) (until December 14, 2019). The preferred reporting items for systematic reviews and meta-analyses (PRISMA) study flow diagram. ICT: information and communication technology



Result

The results of this study indicate that nurses agree on the ease of computer programs to document nursing care (Perceived Ease of Use). They agreed because they believed that a computer program to document nursing care was easy to learn, easy to control, easy to use, clearer to understand, and made it easier for nurses to do nursing care. In addition, nurses also agree that the achievement of nursing performance can increase if using a computer program to document nursing care (Perceived Usefulness). The statement became their belief that using a computer program would speed things up, performance would be better, productivity would increase, it would be more effective to document nursing care, and work would be easier. The computer-based nursing care documentation system that was built including nursing assessment, nursing diagnosis, and nursing planning can be used to draw up a nursing care plan. There is a difference in the length of time, cost and quality of the preparation of documentation of nursing care that is prepared using a computer-based nursing care documentation system with that manually.

References

1. Aktan, N. M., Tracy, J., & Bareford, C. (2011). Computerized documentation and community health nursing students. *Journal of Nursing Education and Practice*, *1*(1), 25–31. https://doi.org/10.5430/jnep.v1n1p25

2. Baysari, M. T., Gigante, J. Del, Moran, M., Sandaradura, I., Li, L., Richardson, K. L., … Day, R. O. (2017). Redesign of computerized decision support to improve antimicrobial prescribing. *Applied Clinical Informatics*, *8*(3), 949–963. https://doi.org/10.4338/ACI2017040069

3. Bennett, P., & Hardiker, N. R. (2017). The use of computerized clinical decision support systems in emergency care: A substantive review of the literature. *Journal of the American Medical Informatics Association*, *24*(3), 655–668. https://doi.org/10.1093/jamia/ocw151

4. Clínica, D. E. L. a E., Resultados, I. Y., Teresinha, G., Dal, M., Couto, D., Barra, C., … Debétio, M. G. (2013). *Computerized nursing process : 47*(1), 238–245.

5. Donsa, K., Beck, P., Höll, B., Mader, J. K., Schaupp, L., Plank, J., … Pieber, T. R. (2016). Impact of errors in paper-based and computerized diabetes management with decision support for hospitalized patients with type 2 diabetes. A post-hoc analysis of a before and after study. *International Journal of Medical Informatics*, *90*, 58–67. https://doi.org/10.1016/j.ijmedinf.2016.03.007

6. E, B. K., Fletcher, L., Frederickson, J., Barbara, J., & Funk, M. (2015). *Ocumentation in. 24*(2).

7. Georgiou, A., Prgomet, M., Paoloni, R., Creswick, N., Hordern, A., Walter, S., & Westbrook, J. (2013). The effect of computerized provider order entry systems on clinical care and work processes in emergency departments: A systematic review of the quantitative literature. *Annals of Emergency Medicine*, *61*(6), 644-653.e16. https://doi.org/10.1016/j.annemergmed.2013.01.028

8. Gunawan, G. (2016). Faktor-Faktor Yang Memengaruhi Penerimaan Perawat Melaksanakan Pendokumentasian Asuhan Keperawatan Berbasis Komputer. *Jurnal Pendidikan - Teori, Penelitian, dan Pengembangan*, *1*(10), 1926–1934. https://doi.org/10.17977/jp.v1i10.6967

9. Hariyati, R. T. S. (2014). Sistem Informasi Manajemen Berbasis Komputer di Indonesia, Sudah Perlukah? *Jurnal Keperawatan Indonesia*, *6*(1), 35–40. https://doi.org/10.7454/jki.v6i1.118

10. Häyrinen, K., Lammintakanen, J., & Saranto, K. (2010). Evaluation of electronic nursing documentation-Nursing process model and standardized terminologies as keys to visible and transparent nursing. *International Journal of Medical Informatics*, *79*(8), 554–564. https://doi.org/10.1016/j.ijmedinf.2010.05.002

11. Heermann, J. A., Starkey, A., & Thompson, C. B. (2005). Effect of Computerized Nursing Documentation on Clinical Care Activities in a Neonatal Intensive Care Unit (NICU). *AMIA ... Annual Symposium proceedings / AMIA Symposium. AMIA Symposium*, 977.

12. Jones, N. T., & Seckman, C. (2018). Facilitating Adoption of an Electronic Documentation System. *CIN - Computers Informatics Nursing*, *36*(5), 225–231. https://doi.org/10.1097/CIN.0000000000000410

13. Khammarnia, M., Sharifian, R., Zand, F., Keshtkaran, A., & Barati, O. (2016). Designing computerized provider order entry software in Iran: The Nurses' and Physicians' viewpoints. *CIN - Computers Informatics Nursing*, *34*(9), 413–420. https://doi.org/10.1097/CIN.0000000000000250

14. Mahler, C., Ammenwerth, E., Wagner, A., Tautz, A., Happek, T., Hoppe, B., & Eichstädter, R. (2007). Effects of a computer-based nursing documentation system on the quality of nursing documentation. *Journal of Medical Systems*, *31*(4), 274–282. https://doi.org/10.1007/s10916-007-9065-0

15. Menke, J. A., Broner, C. W., Campbell, D. Y., McKissick, M. Y., & Edwards-Beckett, J. A. (2001). Computerized clinical documentation system in the pediatric intensive care unit. *BMC Medical Informatics and Decision*

Making, *1*, 1–7. https://doi.org/10.1186/1472-6947-1-1

16. Oliver, J. (2013). 済無 No Title No Title. *Journal of Chemical Information and Modeling*, *53*(9), 1689–1699. https://doi.org/10.1017/CBO9781107415324.004

17. Olson, D. W. M., Rogers, M. S., & Stutzman, S. E. (2015). Electronic medical record validation: Exploring the reliability of intracranial pressure data abstracted from the electronic medical record-pilot. *Journal of Nursing Measurement*, *23*(3), 532–540. https://doi.org/10.1891/1061-3749.23.3.532

18. Smith, K., Smith, V., Krugman, M., & Oman, K. (2005). Evaluating the impact of computerized clinical documentation. *CIN - Computers Informatics Nursing*, *23*(3), 132–138. https://doi.org/10.1097/00024665-200505000-00008

19. Walker-Czyz, A. (2016). The impact of an integrated electronic health record adoption on nursing care quality. *Journal of Nursing Administration*, *46*(7–8), 366–372. https://doi.org/10.1097/NNA.0000000000000360