

Electronic Health Records as Information Source in Assessment of the Effectiveness of Delivered Care - A Pilot Study

Hanna VON GERICH^{a,b,1}, Hans MOEN^c and Laura-Maria PELTONEN^b

^a*Turku University Hospital, Turku, Finland*

^b*Department of Nursing Science, University of Turku, Turku, Finland*

^c*Department of Computer Science, Aalto University, Espoo, Finland*

ORCID ID: Hanna von Gerich <https://orcid.org/0000-0003-1036-2163>

Hans Moen <https://orcid.org/0000-0003-1418-7892>

Laura-Maria Peltonen <https://orcid.org/0000-0001-5740-6480>

Abstract. Effectiveness is a key element of high quality health services. The aim of this pilot study was to explore the potential of electronic health records (EHR) as an information source for assessing the effectiveness of nursing care by investigating the appearance of nursing processes in the documentation of care. Deductive and inductive content analysis were used in a manual annotation of ten patients' EHRs. The analysis resulted in the identification of 229 documented nursing processes. The results indicate that EHRs can be used in decision support systems for assessing effectiveness of nursing care, however, future work is needed to verify these findings in a larger data set and extend to other dimensions related to care quality.

Keywords. Electronic health records, hospital, nursing, process assessment

1. Introduction

Effectiveness is one key element in providing high quality health services, defined as delivering evidence-based care to those in need [1]. The aim of this pilot study was to explore the potential of electronic health records (EHR) as an information source for assessing the effectiveness of nursing care by investigating the appearance of evidence-based nursing processes in the documentation of care. The results can be utilized as an element of nursing care quality evaluation when developing decision support systems (DSS) for intelligent evaluation of nursing care for nursing leadership and healthcare management.

¹ Corresponding Author: Hanna von Gerich, Department of Nursing Science 20014 University of Turku, Turku, Finland.; E-mail: hanna.m.vongerich@utu.fi

2. Methods

This study was a retrospective descriptive pilot study using EHR data collected in a cardiac center of one hospital district in Finland. The data set included structured and free text nursing notes. The patient record sample (n=10) was selected using random sampling. In total, 585 pages containing 198793 words were analyzed. A manual annotation of the EHRs was guided by the nursing process condensed into three steps: 1) assessing the patient's need, 2) provision of nursing intervention and 3) assessment of patient outcome. The collected nursing processes were organized using deductive and inductive content analysis methods. The study followed the European Code of Conduct for Research Integrity guidelines and ethical review was done.

3. Results

The total amount of expressions annotated was 3636, out of which 1914 (52.7%) were derived from free text entries. In total, 229 nursing processes were identified, out of which 144 (62.9%) included all three steps of the nursing process. The inductive analysis identified nursing processes that can be divided into two main categories: 1) *Responding to the patient's long term needs*, and 2) *Responding to the patient's imminent needs*. The majority (n=213, 93.0%) of the processes in both categories were related to responding to the physical care needs of the patient.

4. Discussion

The identified nursing processes mainly described nurses' responding to physical care needs, with very scarce descriptions of the psychosocial and relational elements of care. Over one third of the nursing processes lacked a clear description of the evaluation of the patient outcomes. This pilot study shows promising results when it comes to identifying nursing care effectiveness from analyzing nursing documentation in EHRs. This also means that this task has the potential to be automatized in the form of a machine learning-based DSS. However, as a first step, careful consideration of how to systematically evaluate the documented content and its quality is needed. Limitations of this study include a small sample and using data from only one cardiac center.

5. Conclusions

EHRs show potential as an information source in the development of DSS for nursing and healthcare management in the assessment of the effectiveness of nursing care. However, consideration should be given on developing methods for assessment of documentation quality, as this will impact the output given by the system.

References

- [1] World Health Organization, Organization for Economic Co-operation and Development, World Bank. Delivering quality health services: a global imperative for universal health coverage. WHO; 2018.