Standardised nursing language in intelligent electronic healthcare documentation

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Standardised nursing language provides a means to document the nursing process. But standards for implementing enduring change and standards for meaningful nursing process SNL implementation and evaluation into electronic healthcare records are missing. A criterion-based measurement needs to be developed to evaluate the accuracy of nursing documentation.

In nursing practice, documenting the patient record is part of a nurse's daily routine. Documentation is essential for adequate, safe and efficient care[1,2,5]. Inaccurate nursing documentation can cause misinterpretations, and can lead to unsafe patient care[4]. To identify potential areas for improvement the World Alliance for Patient Safety recommends further research toward medical and nursing documentation[5]. This will enable best practices to be established to develop strategies for improving patient safety[1,5]. High quality nursing documentation promotes effective communication in the healthcare team, which

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facilitates continuity and individuality of care[7]. As one medical diagnosis can lead to the detection of several nursing diagnoses, derived by nurses based on an assessment interview or later during hospital stay, there is a need for clear documentation and communication between healthcare professionals (table 1)[7].

Standardised nursing language (SNL) provides a means to document the nursing process by clearly naming nursing diagnoses, interventions and outcomes[8]. As stated by the World Alliance for Patient Safety (2009)[1,5],

the lack of standardised language hampers good written documentation[6,9]. SNL is also a prerequisite for electronic healthcare records (EHRs). The implementation of SNL into practice and into EHRs is one of today's most critical implementation and research topics[10].

But standards for implementing enduring change and for meaningful nursing process SNL implementation and evaluation into EHRs are missing. Criteria are needed to foster quality enhancements in EHRs[9], and a criterion-based measurement needs to be developed to evaluate the accuracy of nursing documentation[11,21,22]. Such an instrument can serve benchmarking on patient safety related to nursing documentation quality between hospitals, settings and at the international level[9,24]. Such criteria are needed to foster further quality enhancements in EHRs[9]. EHRs containing standardised

Table 1
Example of potential related diagnostic labels in SNL

Medical diagnosis: diabetes.
Nursing diagnoses:
- fatigue
- impaired tissue or skin integrity
- inactive self-health management
- [risk for] unstable blood glucose

Medical diagnosis: COPD
Nursing diagnosis:
- activity intolerance
- anxiety [death anxiety] or fear
- deficient fluid volume
- disturbed sleep pattern
- impaired gas exchange

Diagnostic labels as published in:

Nursing diagnosis, application to clinical practice,

Edition 13, Carpenito-Moyet (2010), Lippincott Williams & Wilkins.

nursing diagnoses, interventions and outcomes as provided by NANDA-I diagnoses, by the Nursing Interventions Classification (NIC) and by the Nursing Outcomes Classification (NOC) (NANDA-I, NIC & NOC = SNL) are of high priority as these classifications meet the international standards of the nursing profession and are translated in over ten languages[2,6-8].

The need for SNL implementation strategies

The use of evidence-based implementation strategies addressing SNL in the EHR at the ward level is suggested. Effective implementation includes new strategies for innovations and systems change[10]. Implementing SNL into practice means bringing nursing knowledge into EHRs, and SNL is a means to make nursing visible and measurable. Implementing SNL into EHRs supports knowledge transfer into practice, but introducing electronic tools alone is not sufficient to enhance care quality[2,24,25,29].

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To implement the knowledge presented in SNLs in fact requires a system change including all organisational levels: changes in the organisational culture — including staff assumptions and beliefs on patient care, on the nursing process, on nursing as a discipline, and on the overall treatment goals the institution has set out. Nurses' accountability to use SNL to state accurate nursing diagnoses, to perform effective interventions and to achieve nursing-sensitive patient outcomes has to be captured in role descriptions. Most nurses know that the unique contribution of nursing is described in SNLs, but other professionals and hospital administrators need to be informed about the potentials of SNL.

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EHRs have to focus on patient-centred care and clinical information systems to support interdisciplinary communication, data exchange and transparency of work processes[27]. Successful EHRs in turn depend on collaboration and understanding of clinical information systems by all persons using the system.

The use of expert systems for electronic nursing documentation that are based on SNL is a crucial step in supporting nurses to perform evidence-based intervention decisions[16,17,20]. Expert systems using SNL have been developed as clinical decision-support tools. There are systems that automatically generate hypothetical nursing diagnoses, suggest effective interventions and link these with high quality outcomes by providing suggestions based on SNL[16,17].

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Providing evidence-based content and conceptual specifications is one thing, but there is a great need to feed nursing knowledge — including relationships among concepts — into decision-support systems. Implementing an expert system requires expertise in SNLs, and meaningful use of SNL in interactive IT systems relies on knowledge about linkages, interactions, as well as on software development skills. Successful, sustainable implementation depends on collaborative system developments performed in teams of nursing SNL experts, nursing informaticians and IT developers, clinicians and hospital management[10]. Applying systems and organisational learning theories is crucial for successful SNL-implementation[11,12].

The relationships (or linkages) between nursing diagnoses, nursing-sensitive patient outcomes and intervention effectiveness are key topics for successful implementation of SNLs into the EHR. The thinking and decision-making processes that nurses use when choosing effective nursing interventions should be addressed in the EHR implementation plan. Nurses need education about SNL (such as NNN) and its use in intelligent EHRs. For successful implementation and real systems change, new training techniques have to be developed[11,13,29].

Output data for accreditation and benchmarking

In hospital audits, usually documentation procedures, processes, instructions, and protocols are evaluated by a variety of indicators. However, accreditation reflects the origins of systematic assessment of hospitals against explicit standards[23]. Adopting quality indicators based on nursing documentation standards for international accreditation programmes is highly recommended. In this manner, the procedures and the quality of documentation content should be measurable and scientifically

audited. Using incomplete or incorrect accreditation criteria in nursing (without evidence-based diagnoses, interventions and outcome indicators) might put forth a counterfeit image on documentation accuracy, which can result in the perpetuation of low documentation accuracy. Accreditation based on uniform, standardised criteria provides hospital managers exact directions for improvement. SNL-based accreditation criteria will make a real difference between safe and unsafe patient care, and therefore research-based implementation of SNL into accreditation criteria is needed[23, 24, 26].

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SNL offers opportunities to establish nationwide or state-wide databases to incorporate medical and nursing data. These data can be used for retrospective quality analyses, for safety assurance strategies and for financial controlling. Since healthcare expenditures vary greatly because of different healthcare settings, populations, diseases and conditions, there may be cost-controlling reasons from a political perspective to implement SNL. SNL-related research opens up possibilities to explore the nature of costs of nursing care by scientific benchmarking of hospital expenditures. Thus, the development of SNL-based, uniform accreditation criteria to assess nursing documentation provides hospital management and nursing staff a tool for identically measuring nursing documentation quality across hospitals, and opportunities to do hospital benchmark research[27, 28]. This might stimulate hospitals to improve documentation procedures as well as documentation content. Hospital benchmark research positively influences quality of care and patient safety[24].

Research on the use of SNL in electronic healthcare records

Further research on meaningful use of SNL in the EHR is also needed to provide guidelines for software developers[14, 15, 16], and decision-support tools fostering documentation accuracy need to be developed. Documentation accuracy is based on related factors and defining characteristics of nursing diagnoses, and software bears high potential to support and evaluate diagnostic accuracy[11, 16, 17]. Decision-support tools can guide nurses in stating accurate nursing diagnoses, however 'intelligent software systems' including SNL need to be tested. Such systems contain pre-defined, correct linkages between diagnoses, interventions and outcomes and can guide nurses in diagnostic reasoning, in choosing and evaluating evidence-based interventions and outcome indicators[17, 18, 19].

Research topics to be addressed on SNL in the EHR include testing user orientation and friendliness of applications, information clustering, data storage and retrieval, interdisciplinary and cross-disciplinary data exchange among settings and sites, use of clinical terms communicating critical information, patients' access to their own healthcare record and means to track critical incidence and patient safety issues[6]. Interdisciplinary research performed by nursing classification specialists, nursing and medical informaticians, closing the gaps between nursing, computer science and engineering, provide great opportunities for collaboration and research[18]. Research towards technologies that foster the improvement of implementation of SNL into practice, such as useful applications of SNL in the EHR at shift-turns and/or 'hand-over' effectiveness, and on the benefits of nursing SNL in the EHR on efficiency of multi-professional co-operation, is needed in the near future as well.

SNL research should focus on the practical use of SNL in the EHR in the every-day clinical practice of nurses. Implementation of nursing SNL into practice also requires further development and testing by using new and high quality research methods such as outcome and effectiveness studies. Moreover, future research in multiple (digital) resources is needed to show how the use of documentation

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standards affects length of stay, quality of care, or the prevalence of adverse events[20, 21, 22].

SNL facilitates the collection and use of data for measuring and monitoring quality of care. The use of a variety of data sources can help researchers to provide valid evaluation reports for evidence-based recommendations, such as for nursing education and management[21, 22]. Research and development of software tools for SNL education will serve educators for teaching care planning and evaluation. Decision-support tools in the EHR can be researched and used in SNL education sessions, and handhelds and web-based solutions — such as apps — provide opportunities to develop, test and disseminate SNL knowledge. Further online tools using SNL and/or software applications need to be developed and tested. Research-based software applications can foster students' SNL competencies and reflection, for instance

in care planning sessions, during clinical assessment trainings, and in examination situations.

Current measurement problems addressing nurses' contributions to care

Why is it so difficult to measure nurses' contribution to the health of patients? Why are nursing-sensitive patient outcomes hard to describe and measure? Important reasons are:

1) the nature of nurses' documentation in the patient record is currently narrative, unstructured, full of redundancies and not representing which nursing-sensitive outcomes are obtained in a present patient situation;

2) a standardised nursing language (SNL) with possibilities to code nursing diagnoses, interventions and outcomes for all kinds of analyses is not yet entirely implemented into practice, nor into EHRs;

3) nurses lack training and education to work with a standardised language in actual patient situations. One of the difficulties for nurses is how to make the transfer from their own reasoning process related to the assessment of the patient in nomenclature of SNL; and

4) nurses don't have regular access to a (computer-based) tool that enables them to document the nursing process, assessment findings, interventions and outcomes in a structured way; and still the majority of nursing documentation is hand written.

A new instrument is needed

Prevalence information and information addressing patient evaluations, individually and for groups, must be available. By this means, hospital audits addressing professional standards, and hospital benchmarking possibilities will be available in the near future. By investing in educated and well trained nurses using SNL in a computerised tool, feasible, reliable and valid data will be available. These data will provide new possibilities regarding hospital cost and efficiency management.

Nevertheless, studies aiming to explore the effects of using SNL in an EHR including decision support are lacking. Such studies must also address nurses' training on applying computerised tools for reliable nursing outcome documentation and measurement[9].

Knowledge about the accuracy of nursing documentation in patient records would be helpful for improving the structure and quality of the content of electronic patient records [17, 25].

Accuracy measurements about nursing documentation were carried out in nationwide measurements by using psychometrically tested instruments[20,21,31,32]. However, multi-centre and multi-country studies based on criteria as presented in the NANDA-I, NIC and NOC classifications are missing. No information is available about the accuracy of nursing documentations based on international measurements with a consented, single, reliable and valid instrument representing SNL internationally.

EHR decision-making tools have to guide nurses through all steps of the nursing decision-making process. The system can support the nurse, by providing evidence-based intervention options, suggestions and possible choices helping nurses to create meaningful care plans/nursing process documentations. To perform the above-mentioned studies, an instrument is needed to evaluate the quality of nurses' documentation in the EHR using high quality support systems.

To achieve high quality patient outcomes and to support nurses' decision making by using SNL in the EHR these system-related items are suggested as important criteria: SNL in the nursing process including linkages, comprehensiveness of nursing care plans and documentation, decision support for nursing assessments, nursing problems/diagnoses, nursing goals/targets/desired patient outcomes, nursing actions/interventions, nursing outcome evaluation, statistical evaluation /data retrieval for evaluations.

Conclusion

Enhancements in nursing documentation are important. Improvements can be made by implementing SNL in the EHR complemented by decision-support software. However it is unknown what are the effects of the implementation of such a system on the accuracy of the nursing documentation itself in the long-term, and on quality of care, patient safety, and costs-efficiency in general. Measurement instruments for scientific assessment of the effect of such content and system innovations are missing and need to be developed.

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