The Linkage of Nursing Assessment and Nursing Workload

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Abstract. The automated linkage of nursing assessment, nursing interventions, nursing workload measurement, and outcomes supports the user in practice and increases the explanatory power of nursing data, e.g. in DRG systems. Practice relevant data should therefore be available for the different needs for information by policy, management, research and training. To this end, two projects have gradually linked the outcome-oriented nursing assessment instrument AcuteCare (ePA-AC) and the nursing intervention and workload measurement system LEP® Nursing 3 with each other.

Keywords. Nursing Assessment, Nursing Workload, Electronic Patient Record

1. Introduction

The outcome-oriented nursing assessment instrument AcuteCare 1.1 (ergebnisorientiertes Pflege Assessment AcuteCare, ePA-AC 1.1) was designed as a screening instrument. It serves

- as a first step in the diagnostic process of identifying patient abilities or disabilities in acute inpatient settings.
- to quantify relevant aspects of the need for nursing care (see e.g. [1]).
- to provide performance indicators for nursing practice, hospital management and quality management (see e.g. [2]),
- in process and resource steering
- and most of all to make nursing sensitive outcomes visible (see e.g. [3]).

The development and clinical testing of ePA-AC was presented at the ACENDIO Conferences 2005 [4] and also in 2007 [5]. Currently (October 2008), ePA-AC is used in 15 clinics in Germany and Switzerland. A significant use of ePA-AC is that it provides a central data pool which can be used for a wide range of purposes, thus avoiding the need for multiple data collection. For example, information about a patient's mobility can be used to identify risk factors for decubitus, fall, nosocomial pneumonia or post-discharge care deficit. Therefore it removes the need for multiple

mobility assessments using five different and successive instruments. At the same time, the data can be used by physiotherapists as well as nurses, in order to evaluate and represent the success of treatment (here regaining mobility). This also makes it easier to measure quality by using routine data: instead of assessing an indicator such as mortality after hip replacement, which is a commonly-used but relatively meaningless indicator, ePA-AC can be used to make data on regaining mobility – a major success factor after hip replacement surgery – transparent.

The LEP® (Leistungserfassung in der Pflege) Method has been in use for 20 years and is constantly updated. It is used by around 200 organizations in Switzerland, Germany and Austria. LEP shows the direct and indirect patient-care-related nursing activities, according to case, day and ward or unit (cf. [6]). To quantify the time, norm times, defined as approximate time values based on expert opinions [7], are provided when weighting nursing care. LEP does not measure actual times. Instead it provides ideal times, which should then be allocated to the nursing tasks being measured and which do not represent actual times [8]. There are currently only a few references regarding LEP's fulfillment of scientific performance criteria for validity and reliability [9] [10] [11] [12] [13] and existing gaps have been criticized [14]. However, it has already been reported that LEP is practical and feasible [15] [16]. In LEP, non-patient-care-related nursing activities (staff discussions, back-up services, training, unit organization etc) are given a so-called C-value (cf. [17]). LEP has been officially recognized for the calculation of nursing cost weights for the development of the SwissDRGs [18] and for the Swiss Nursing Minimum Data Set [19].

In order to facilitate the collection of nursing data, a new LEP version was developed. LEP® Nursing 3 represents a development in electronic patient record and has been in use since 2006 [7]. Whilst LEP® Nursing 2 deals exclusively with nursing workload measurement, LEP® Nursing 3 also makes it possible to plan nursing interventions and document their implementation [20]. Documenting the interventions carried out allows the corresponding nursing workload to be calculated automatically. The combining of workload measurement with nursing interventions represents a new generation (of instrument). Duplicate measurements are avoided. Ideal and actual comparisons of planned and implemented interventions can be made, for example as evidence of quality of care. Definitions as well as inclusion and exclusion criteria are provided to support users in the documentation process.

The criticism has often been made (see e.g. [[21] [22] [23]) that viewing data on nursing care needs in isolation (e.g. a patient's self-care abilities and/or disabilities) on the one hand and workload data on the other do not lead to the desired aim, i.e. to identify the uses or successes of nursing care. It is still not clear what level of nursing resource (services, i.e. ultimately costs) leads to which outcomes (e.g. regaining self-care abilities; being declared discharge-ready). One of the reasons for this is that condition data and intervention data have generally been analyzed independently from one another.

Automated linkages between nursing assessment, nursing interventions, nursing workload measurement, and outcomes should support users in practice, but also increase the explanatory power of nursing data. To create a foundation for this, the ePA-AC and LEP® Nursing 3 were linked with each other in the framework of two development projects (see e.g. [24]). The aim is that by using the measurements of the care required (ePA-AC), the automated deductions of (ideal) interventions and the confirmation of the interventions actually carried out (actual) (LEP® Nursing 3), it will

be possible to produce an automated evaluation of not only the individualised nursing workload but also the outcome achievement.

2.   Purpose/Objective

The linkage of ePA-AC with LEP® Nursing 3 leads to the following uses:
*   Suggestions/guides for users (condition/status and outcome; interventions) during documentation
*   Process-oriented, "work-flow"-oriented and research and evidence-based support during documentation
*   Scaled statements on patient abilities and disabilities
*   Justification for interventions and nursing workload
*   Prediction of expected nursing workload
*   Test of effectiveness or efficacy of interventions
*   Formation of standard care plans/critical pathways ("implicit quality")
*   Quality measurement through routine data
*   Developing nursing indicators which can be used to explain inhomogenous DRGs [18] [25]
*   Evaluating and improving linkages

3.   Methods

In the first stage, the linkages were developed based on experience and the literature. The development teams of both instruments, working independently from each other, then created the linkages. In this process, LEP's direct patient care interventions [17] were linked to ePA-AC. Subsequently, a consensus process took place in which both teams compared their linkage tables. Of the theoretically possible linkages (n=105,228), n=2,273 were set. Results which had not been rated consensually (n=31) had to be discussed until the experts agreed, for example, the linkage for the intervention "putting on compression stockings" for patients with limited motion. In addition, the linked interventions were tested for any redundancy, e.g. the redundancy of linked interventions necessitated by impaired mobility or personal hygiene. This allowed the linkages to be reduced to a final figure of n=1,304. Following this, the linkages were incorporated into the software and tested in practice by nursing experts in a multi-center project (Cantonal Hospital Uri [24]; Aarberg Hospital). The feedback was then in turn tested for plausibility (e.g. possible coding/comprehension errors) and then finalized in a revised linkage table. It emerged that from the user perspective, the linkages did not display any factual errors. At the same time it became clear that in terms of concrete practical use in situ, the range of the linkages was still too wide. The nursing experts at Uri Hospital reduced the linkages to n=739. As a by-product, internal gaps in LEP® Nursing 3 could also be improved (n=3).

4.   Results

In addition to tests on the applicability of the linkage in practice, a first study examined the data from the linkage in terms of its ability to predict nursing workload [2]. The study concludes that *the results show a very good model adaptation and discriminatory power on the variable level for models from groups whose interventions are based on impaired patient abilities. Less good results were established for models from the groups of medically ("ärztlich") induced interventions and delivered care minutes.* With a chi-square value of 338,716 (p < 0.0001), a Pearson value of 0.981 and deviance of 0.980, the logistic regression model "Pflege" ("Care") was revealed to have a very good model adaptation, with a clear dependency of characteristics. The Nagelkerke test yielded an explanatory power of 55.6%. The study indicates that it is possible, to a high degree of probability, to predict which LEP minute group a patient will be allocated to, when the SelbstPflegeIndex SPI (Self Care Index, an extraction of 10 items of the ePA-AC) is used to measure the degree of independence or dependence of the patient. As SPI produces a sum score, the findings of the study can be taken as a further indication that nursing requirement data can be used to explain variations in nursing workload. Further research found indications that it could be possible to achieve an even better (more precise) prediction of nursing workload (measured in LEP minutes) for patient groups with a homogenous distribution of markers of ability, formed by hierarchical cluster analyses.

5.   Discussion

The linkage of the outcome-oriented nursing assessment instrument ePA-AC and the nursing workload measurement system LEP® Nursing 3 is understandable and viable for documentation users. To increase the explanatory power of nursing data, the practice-oriented project created a foundation which needs further development and currently still has a number of limitations which require clarification. In addition, the quality of the data collection could not be systematically tested.

In terms of a comprehensive assessment of nursing workload using LEP, it should be noted that non-patient-care-related nursing activities also need to be taken into account [17]. In addition to the causes of nursing workload and outcome achievement, organizational form, workflow, quality standards, nurses' understanding of their role, the skill mix and other factors also have an influence on nursing workload [17] [26] [27].

ePA-AC only covers one area of possible patient conditions necessitating treatment. This narrowed scope limits itself to patient conditions which can be measured relatively easily, as well as in a standardized, valid and reliable way. Other important conditions which resist measurement with a general nursing screening process, such as depression or anxiety, are not taken into account with these evaluations. Such phenomena will continue to be unconsidered until an instrument has been developed which for example can measure anxiety using one or two questions to determine not only the type and degree of the anxiety, but also help distinguish it from depression. A general screening process like that of ePA-AC will admittedly never be able to provide such a differentiation, but does indicate problem areas.

6. Conclusion

The overall observation of conditions/abilities and interventions is increasing the explanatory power for nursing workload and the uses of nursing care. These data may be used as a basis to support transparent resource allocation, and also for a range of applications from individual care planning, hospital-wide quality assurance to the provision of urgently needed epidemiological data on the need for care, care requirements, and nursing workload in acute inpatient settings. The ePA-AC – LEP® Nursing 3 linkage project provides nursing with a standardized databank which can be expanded and linked with other systems.

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