

Implementing Electronic Patient Record and VIPS in medical hospital wards: Evaluating change in quantity and quality of nursing documentation by using the audit instrument Cat-ch-Ing

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ABSTRACT

Aim: The study examines the effectiveness of implementation of electronic nursing documentation and the nursing documentation system VIPS at the Department of Medicine, and also aims to improve our understanding of content and quality in nursing documentation.

Background: After introducing Electronic Patient Record (EPR) and VIPS to medical wards, change in the quantity and quality of nursing documentation was evaluated by using the audit instrument Cat-ch-Ing.

Method: Cat-ch-Ing is adjusted to fit medical wards. 15 patient records are reviewed before and 15 records after introduction of EPR and VIPS in each of the four included wards ($n=120$). The paper records' scores are compared to scores in the EPR's and analyzed by Mann-Whitney test.

Findings: We find more systematic and standardized documentation when using VIPS keywords, and limited use of abbreviations and symbols when the documentation is electronic. Documentation of the nursing process in the VIPS model, especially nursing care plans are inadequate.

Conclusions: Nurses need further education in VIPS to learn how to use it fully. Also the EPR needs enhanced adaptation to fulfil nursing documentation requirements. Cat-ch-Ing was an adequate instrument in this study, but further development is recommended.

KEYWORDS: evaluation, nursing documentation, computerized, VIPS model, Cat-ch-Ing

Introduction

Computerization of nursing documentation is ongoing in large parts of Norwegian health care services. Application of Electronic Patient Record (EPR) will influence how patients experience continuity of care and how nurses can perform safe care (1). Nursing documentation can also be a tool in measuring nursing quality indicators (2) or performance of nursing care (3). Even though nursing documentation has been developed internationally in decades, it is still often found to be inadequate and there is lack of consensus about how it should be implemented (4). Kärkkäinen et.al. (5) suggest that nursing documentation is at a crossroad, where the effort should be made to influence how documentation can be made an essential part of good patient care.

Through 2003–2004 the Department of Medicine in one of Norway's largest university hospitals introduced EPR and the nursing documentation system VIPS (6) to seven medical wards. We found it important to examine the effectiveness of the EPR implementation by evaluating changes in quantity and quality of nursing documentation, and furthermore how well nurses utilize the VIPS model. Several other hospitals in our region is planning implementation of electronic nursing documentation the forthcoming years. We believe EPR can become a mean to increase nursing care quality by supporting nurses in their practice, but only if we have adequate knowledge. This article contributes with knowledge about content and quality in nursing documentation, and proposes how it can be further developed.

The quality of nursing documentation has been questioned by many scholars. A1994 study of five wards in two Norwegian hospitals found that the Norwegian Board of Health recommendations for nursing care documentation were not met (7). In 1996 Norway's five regional hospitals started working together to develop nursing documentation as part of an integrated EPR to improve quality and continuity of patient care, and the VIPS documentation system was chosen as framework (8). After introducing EPR and VIPS to several hospital wards,

Hellesø (9) reported improved understanding of content, quality and accessibility in nursing documentation, but also that it required an effort in teaching nurses about EPR and VIPS.

The VIPS model was scientifically developed in Sweden and published in 1991, with the aim of supporting the systematic documentation of nursing care in patient records and promoting individualized care. VIPS seemed to be accepted and used in many parts of Sweden, and a revised version was published in 1996 (10). The model consists of four key concepts: well-being, integrity, prevention and safety which form the acronym VIPS in Swedish spelling. The model has three levels of keywords and exemplifies the content underlying each keyword. The flowchart of the model starts with the data collection of nursing history and nursing status, next nursing diagnoses are derived from these data, nursing goals and interventions are selected and evaluated, then nursing outcomes are described, and the model ends with the discharge note (11). This is in accordance with the nursing process, which is commonly known among Norwegian nurses. The operationalization of nursing interventions is a new aspect that can contribute to nurses being more aware of their nursing actions (12).

Since 2001 Norwegian nurses have been obliged by law to document their practice in the patient record, and the documentation is to ensure continuity in nursing care, demonstrate independent nursing tasks and deliver administrative data (13). However, implementing new regulations are in themselves not sufficient to ensure improved documentation quality. One key element is implementation of EPR, and examples of improvements are reduction of the level of double registrations and standardising nursing documentation through classifications (14).

Utilization of VIPS is another key element in improving the quality and structure of nursing documentation. Even though our hospital had committed to the VIPS model several years before (8), we found that very few of the nurses working in our wards were familiar with the

model, and that newly graduated nurses had not learned about the model in their education. Focusing on understanding VIPS and how to integrate it into the electronically nursing documentation most efficiently, were our main objectives when introducing the model to the nursing personnel.

Evaluation of nursing documentation based on the VIPS model

Internationally, there has been audit of nursing documentation since the 1970s (15). A 1999 literature review including 56 studies demonstrated that there are many approaches to and varying aims towards auditing records (16). Different approaches can be described as formal structure, process comprehensiveness, knowledge based and concordance with actual care. We found one study (7) evaluating use of the VIPS model in Norwegian hospitals. This study suggested that VIPS had practical and reliable nursing documentation applicability. A Swedish two year comprehensive intervention programme on nursing documentation in accordance with VIPS, concluded that the VIPS structure made the participants more nursing expertise oriented (11). Positive effects on nursing documentation were also found in a Danish VIPS implementation programme, and the model increased the nurses' understanding of the nursing process (17).

A journal audit carried out with a reliable instrument provides an opportunity to compare results between different wards at the hospital. We found it preferable to use a tested instrument because validity of audit studies can be a problem (16). In our study the audit instrument Cat-ch-Ing developed by Björvell (18) was selected, as it has proved to be both valid and reliable when the VIPS model is used as the nursing documentation basis. The instrument consists of 17 questions: 10 reflecting the steps of the nursing process; four about dating, signatures and legibility; one about keywords; and one about the existence of the «patient responsible» nurse. The total score ranges from zero to 80 points. The score rates both quality and quantity in the audited records.

Materials and Method

Through 2003–2004 nurses were given one to two hours individual EPR practical training, and four hours VIPS (6) classroom teaching. The study's purpose is to describe the effectiveness of the EPR implementation by evaluating changes in quantity and quality of nurses documentation. The method chosen is quantitative evaluation research, using the audit instrument Cat-ch-Ing (18). The instrument has as far as we know, not previously been used in our country. Thus the study can give valuable information if it is suitable for audit studies in a Norwegian care context.

Instrument development

Cat-ch-Ing can be modified to measure specific criteria of nursing care quality, and such modification should be described in the user manual (18). The instrument was therefore adjusted to fit to medical wards. The results from a systematic overview over the content of nursing documentation in one ward was used as the basis for the adjustments.

The modified instrument is presented in Table 1. It is expanded from 17 to 19 questions and has a range of score from zero to three points (zero indicates «poor» and three indicates «very good»), except the first question ranging from zero to four points. The new questions are «Is there a nursing discharge summary?» and «Is there a nursing transfer note?». The parameters in the question «Is there a nursing discharge note?» are changed from «Yes»/«No» to evaluation of «Quantity» and «Quality». In the question «Is there a nursing history?» we added «Is there a nursing admission note?». Sum score is max 82 points and only incorporate one of the three types of discharge notes.

Both the instrument and the user manual are translated from Swedish to Norwegian by the two nurses involved in the study. When adjusting the user manual to fit medical wards it became more detailed to ensure that the two auditing nurses were well coordinated. For the paper based documentation an adjustment of Cat-ch-Ing is done regarding assessment of patient data. We find this uncomplicated because

the assessment categories in paper forms are equivalent with the VIPS keywords.

Design and sample

At first 15 paper records and 15 electronic records at one ward were evaluated. In this pre-study we recorded main domains/keywords in the nursing documentation, use of abbreviations and symbols, as well as the number and types of nursing notes. The results became the basis for adjustment of the audit instrument and evaluation criteria in the user manual.

After the adjustment of Cat-ch-Ing, an audit of the selected records at the first ward was carried out. Then three more wards were included and a total of 60 paper patient records (15 from each of the four wards) and 60 EPRs were audited. Two of the seven wards were merged and one ward implemented EPR in 2002, these wards were therefore not included in the study.

The inclusion criteria were admission to the bed ward through a four weeks period in the fall of 2003 (paper) and four weeks in the fall of 2004 (EPR). Exclusion criteria were hospital stays less than three nights or exceeding four weeks. The audited records were drawn from the included patients list through randomized selection.

Data collection and analysis

The audit is done by two nurses working closely together. Points were given on a paper copy of Cat-ch-Ing for each patient record, later data were plotted into a computer. The statistics includes all 120 records for every question expect for «Is there a nursing discharge note?» (102 records), «Is there a nursing transfer note?» (18 records), and «Is there a nursing discharge summary?» (25 records), because these notes were irrelevant in many patient cases. Each question is analyzed separately in order to understand how different parts of nursing documentation can be developed further. The scores are treated as ordinal data and a non-parametric test analyzing differences for two unrelated samples is selected. Median values for each question in the paper records are compared to Median values in the EPR's, and analyzed by Mann-Whitney test using SPSS 13.0. The level of significance is set to $P < 0.0016$ after Bonferroni-correction to avoid multiple testing errors. The P-values are justified for influence for each of the four wards through an analysis in StatXact. Hence the P-values should reflect the overall study results in the Department of Medicine, and not just random differences achieved by one ward.

Ethical considerations

The project is approved and registered by the Privacy Ombudsman for Research, NSD (Norwegian Social Science Data Services). NSD recommended that the project was conducted as part of the development of nursing care at the Department of Medicine.

Results

The pre-study demonstrates that the nursing documentation is more systematic and standardized when using VIPS keywords, and the changeover to electronic documentation limits the use of abbreviations and symbols. There are less «meaningless» statements like «no remarks» or «seemingly sleeping», which results in lesser notes being made, especially at night shifts. However, we can not find that the nurses changed the content or composition of their documentation. Only the Nursing status domain is documented, and just about half of the underlying keywords are used. The nurses also tend to group their documentation under the wrong keywords (19).

Cat-ch-Ing results are presented in Table 1. There are significant differences both positive and negative between the two audit periods. Mean sum score for paper records is 33 points (variation 14–58) and EPR Mean sum score is 29,7 points (variation 17–52). These results are not analyzed further.

Fourteen parameters (45%) have not changed significantly. Both quantity and quality are above average in paper based documentation and slightly less in EPR. The nurses are found to be good at updating the nursing status during hospital stays both in paper and EPR, but

Table 1 Results from Cat-ch-Ing (Mean, Median and justified P-values). Differences in Median values between paper records and EPRs were analyzed by Mann-Witney Test

		Paper	EPR	Mann-Witney P-value	
		Mean (Median)	Mean (Median)		
Is there a primary nurse indicated?	Quantity	1,73 (2)	1,67 (0)*-	<0.0001	
Is there a nursing admission note/nursing history?	Quantity	1,77 (2)	0,97 (0)*-	<0.0001	
	Quality	1,57 (2)	1,10 (1)	0.0056	
Is there a nursing status:	On arrival?	Quantity	1,57 (2)	1,38 (1)	0.2056
		Quality	1,57 (2)	1,67 (1,5)	0.6171
	Updated during hospital stay?	Quantity	2,10 (2)	2,22 (2)	0.2883
		Quality	1,82 (2)	1,98 (2)	0.9111
	Updated at discharge?	Quantity	0,67 (0)	0,63 (0)	0.6573
		Quality	0,72 (0)	0,82 (0)	0.4763
Is there a nursing care plan:	Nursing diagnosis?	Quantity	0,65 (0)	0,10 (0)*-	<0.0001
		Quality	0,50 (0)	0,10 (0)*-	<0.0001
	Expected outcome?	Quantity	0,60 (0)	0,10 (0)*-	<0.0001
		Quality	0,42 (0)	0,08 (0)*-	0.0002
	Interventions: Planned?	Quantity	0,60 (0)	0,08 (0)	0.0109
		Quality	0,60 (0)	0,08 (0)*-	<0.0001
	Implemented/deviation?	Quantity	0,43 (0)	0,00 (0)*-	<0.0001
Is the underlying information for the nursing diagnosis described in nursing history/status?	Quantity	0,80 (0)	0,07 (0)*-	<0.0001	
Is nursing outcome described?	Quantity	0,40 (0)	0,00 (0)*-	<0.0001	
	Quality	0,32 (0)	0,00 (0)*-	0.0001	
Is there a nursing discharge note?	Quantity	0,27 (0)	0,96 (1)*+	<0.0001	
	Quality	0,27 (0)	0,69 (1)*+	<0.0001	
Is there a nursing transfer note?	Quantity	2,00 (2)	1,57 (1)	0.5022	
	Quality	1,71 (2)	1,71 (2)	0.9026	
Is there a nursing discharge summary?	Quantity	1,82 (2)	2,00 (2)	0.3798	
	Quality	2,36 (2)	2,00 (2)	0.4276	
Are the VIPS keywords used?	Quantity	2,28 (2)	2,03 (2)	0.0266	
	Quality	1,90 (2)	1,93 (2)	0.6652	
Are all entries dated (watch, date, year)?	Quantity	1,97 (2)	2,87 (3)*+	<0.0001	
Are all entries signed?	Quantity	2,55 (3)	2,98 (3)*+	<0.0001	
Is there a clarification of signature?	Quantity	1,67 (2)	3,00 (3)*+	<0.0001	
Is the record legible?	Quality	1,97 (2)	3,00 (3)*+	<0.0001	

* Significant differences, positive+ and negative-. Level of significance $P < 0.0016$

very few nurses update nursing status at discharge. There is little difference in the nurses' writing of transfer notes and nursing discharge summaries.

The significantly positive differences (19%) are related to effects of computerization, such as legible text and signature. There is one exception, and that is the improvement of the nursing discharge notes. When examining paper records we found that nurses most often did not write a discharge note, and when they wrote a note the content was arbitrary. The last nursing note in the paper record often gave little information, and there were days without any notes leaving us to wonder what happened to the patient. The nursing discharge notes improved both in quantity and quality when shifting to EPR.

Eleven (36%) of the parameter differences are significantly negative. Primary nurse or nurse group are given on most of the admission forms in paper records, but not so often by full name which would give a full score. The negative change is profound as very few admission notes in EPR document primary nurse. The nursing history is included in the nursing admission note, which is organized as a paper

record form and a particular scheme in EPR. In paper records we find that most patients have an admission form filled out, but that this in many cases do not include a nursing history. In EPRs the number of admission notes are fewer, but the quality is not so different from paper records. The use of nursing care plans and nursing outcomes changed negatively, and here we find essential differences between the four wards. Two wards wrote several paper based care plans (8 and 10 records) with various nursing diagnoses, while the two other wards only did this occasionally and mostly for patients with wounds (1 and 4 records). In EPR all wards show a decrease in nursing care plans to between 0 and 2 records.

Discussion

Although we accomplished obligatory class room teaching in how to use VIPS integrated in EPR for all nurses, apparently the effect of this teaching is poor when so few of the VIPS keywords are used or used incorrectly. This was however important for the nurses' understanding of why the model was implemented. Perhaps the main concern with the VIPS model is its basis on the nursing process, which has been found to be a great challenge (7, 20). Dahl (12) suggests that nurses struggle to find their place in the patient record because hospitals are organized according to a medical natural science model (emphasizing diagnosis and cure), while the nursing process is based on an hermeneutic/phenomenological model (emphasizing understanding and care).

Two Norwegian articles (13, 21) focus on nursing documentation as a «problematic» task that nurses find difficult to make use of to support their work. More structure is suggested

to improve the documentation and to overcome some of the perceived problems (13). The VIPS model represents an improved structure and the model has been found to facilitate documentation of nursing care (11). VIPS keywords are implemented in templates made for each document type. However, many nurses in our wards find templates difficult to master due to insufficient computer skills. Use of templates can improve usage of a wider range of VIPS keywords (1), thus increased training in use of templates may improve VIPS utilization.

Changes in use of nursing status can be due to difficulties in transition from well established paper forms when admitting patients, to nurses learning how to use the electronic admission note based on VIPS. We find that updates of nursing status are satisfactory, which can be seen as a consequence of our long tradition of shift reports. The nursing service has no tradition of writing discharge notes in paper based documentation, and this can be seen reflected in the lack of updating of nursing status at discharge. We believe the fairly good quality of transfer notes and nursing discharge summaries are related

to well established routines regarding when and how these notes are to be written.

We expected the legibility of text, dating and signatures to be improved by computerization (20). What was unexpected to find was the low legibility of some of the nurses handwritten documentation, and also that most signatures in paper records were difficult to interpret. The improvement of nursing discharge notes was encouraging to discover. The nurses are taught to use a particular EPR nursing discharge note template, and also the content of the note is described. Our suggestion is that these two factors led to the improvement (1). The standard of paper based documentation is however poor. Hence the quality of nurses' discharge notes need to be improved further.

We understand that the VIPS model (6) is constructed to embrace nursing care in all types of practice settings. A full nursing history is not relevant for all types of patients admitted to medical wards, and we find it most appropriate for patients with a long history of illness and for patients already receiving primary health care services. This can be a reason for the weak documentation of nursing history in the admission note. Another issue that changed negatively was documentation of primary nurse or group. Our suggestion is that the nurses find it more confronting to give up their full name as primary nurse in the EPR. We also know that in most of our wards it is difficult to live up to the «patient responsible» nurse principle.

Nursing care plans

The main area that changed negatively was use of nursing care plans and nursing outcome. Nursing outcome is considered difficult to document as the nurses are unfamiliar with describing results of nursing care. Documentation of nursing outcome became more difficult in EPR because of the lack of nursing care plans, as it is easier to describe outcome as a result of an existing nursing care plan. When examining the care plans included in the study, we find that the plans rarely are up-dated and that they mostly lack information on efficacy of the listed nursing interventions. Flaws similar to these are also found in other studies (22), and one question asked is if nursing care plans are redundant?

The question of whether the use of individualized care planning contributes significantly to high care quality was not answered by 2001 (16), and are probably still not answered as Lee (23) in 2006 proposes that using a computerized care plan system can introduce nurses to new skills and knowledge that may improve care quality. Although we realize that care plans can contribute to improved quality of care, we are doubtful that this is applicable in all patient cases in medical wards. The medical patients whom we suppose will benefit from nursing care plans are patients with long hospital stays and patients requiring complex and advanced nursing. Moreover, we find it necessary that EPR templates are better adapted to nurses' documentation needs, if nursing care plans are to become a practical instrument for supporting good patient care in our hospital.

Computerization challenges

Information and Communication Technology (ICT) should support health care services in the best way possible for both patients and personnel, and electronic nursing documentation tools must be functional and adapted to nursing practice (24). In this study we find that the nurses did not change the content or composition of their documentation. It is found that EPR systems pursue paperbased practices and routines rather than utilize ICT's potential (25). Nurses must therefore enhance their knowledge and capacity to participate in EPR system design (26).

Computers allow new possibilities for presentation of patient information and improve the data accessibility (14). EPR can be a tool to support nursing practice and nurse leaders, and can also contribute to develop the nursing field. There will, however, be no advancement if implementing EPR is only about electronics (27). Thus we must increase the focus on practical organisation and EPR adjustments to ensure reasonable documentation conditions for health care personnel. What we look for in our hospital organization is enhanced documentation

knowledge and continuous support from both wards and hospital management, which is found to be crucial in order to improve the quality of nursing documentation (9,17)

Cat-ch-Ing remarks

Nilsson and Willman concluded that Cat-ch-Ing is preferable compared to other instruments since it gives feedback regarding the content as well as the structure of the documentation (28). The instrument gives an impression of the quality of documentation, but lacks the finer nuances especially regarding nursing care plans (29). Leith et al. (30) recommend that Cat-ch-Ing needs further development before being used to audit records in Denmark.

In our study we consider the 0–3 points scale not to be sensitive enough to detect differences in quality. We therefore approve an expansion to a five-point scale as described by Darmer et al. (29). We find Cat-ch-Ing to be an adequate instrument when investigating changes between two audit periods in wards at the same department. However, we agree with others that the instrument should be developed further before it can be used nationwide for comparative purposes.

Limitations

This study has most value for hospitals using EPR and VIPS. Using Cat-ch-Ing is based upon professional assessment together with the manual. Because two persons are involved in the audit, this may reduce the study's reliability. Another study found that inter-observer variation can be extensive (30). We used Cat-ch-Ing to compare paper records and assessment categories with EPR and VIPS, this may have affected the study's validity.

Conclusions

To improve quality of nursing documentation, nurses need to be further educated in VIPS to learn how to use it fully. There is also need of enhanced adaptation to nursing documentation requirements in the EPR-systems, particularly concerning nursing care plan functionality. Further research is required in order to integrate VIPS into EPR templates. When these conditions are met, electronic nursing documentation can become an essential part of good patient care. Cat-ch-Ing is an adequate instrument in this study, but further developments is recommended before it can be used nationwide.

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