An Analysis of Narrative Nursing Documentation in an Otherwise Structured Intensive Care Clinical Information System
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Abstract: Most structured nursing documentation systems allow the entry of data in a free text narrative format. Narrative data, while sometimes necessary, cannot easily be analyzed or linked to the structured portion of the record. This study examined the characteristics of free text narrative documentation entered in an otherwise structured record utilized in a cardiovascular intensive care unit. The analysis revealed that nurses documented 31 categories of narrative entries. Approximately 25% of these entries could have been entered into the structured portion of the record through the use of existing documentation codes. Nurses most frequently used the narrative documentation as a means to communicate summarized information for the coordination of healthcare team functioning. The authors discuss these results in the context of developing strategies to increase structured documentation and decrease free text in the patient record.

INTRODUCTION

Nurses spend a great deal of time managing and documenting patient information. Estimations of nursing time related to managing patient information are as high as 50% (1). This is especially disconcerting given the shortage of bedside nurses in practice. The Institute of Medicine report on nursing work and patient safety ‘Keeping Patients Safe: Transforming the work environment of Nurses’ recommends the identification of strategies to reduce nursing documentation burden(2). Structured, computerized documentation systems are one such strategy. Studies of computerized documentation show reductions in nursing documentation time from 2.1% to 45.1%(3). Structuring the entry of data in clinical systems can also increase the accuracy and ease of retrieval of entered information(4). Without structure, data entered in a narrative format results in the creation of a storehouse of data that cannot be easily analyzed or linked to information in the structured portion of the patient record.

Most structured documentation systems allow users to enter narrative information in addition to information that is entered in a structured coded format. Reasons for documenting narrative notes may include: an absence of an applicable coded choice in the system, to summarize trends over time, to provide a record of an unexpected event, or nursing documentation tradition. The use of narrative documentation in information systems enables clinicians to synthesize and summarize complex facts and situations into an understandable manner for other clinicians’ use(5). Understanding the types of information documented in these narrative notes allows us to pinpoint areas of deficiency in the coded system and further clarifies what narrative documentation could be necessary in a structured information system.

In this study we examined the narrative notes entered into an otherwise structured documentation system by nurses during the care of Coronary Artery Bypass (CABG) patients in a Coronary Intensive Care Unit (CICU). Through this examination we categorized the types of information documented and determined if these data could have been documented in the structured portion of the record.

METHODS

The research method utilized in this study was a variation of inductive content analysis. Content analysis involves the use of two interrelated processes: identifying specific characteristics of concepts to be measured, and employing explicit
rules for identification, coding, and recording of concept characteristics (6).

**Universe of Content**

For the purposes of this study the universe of content was defined as all narrative nursing documentation entered into an otherwise structured documentation system used in the care of CABG patients in a CICU. Although data in the structured portion of the system were coded, no standardized nursing terminologies were used to build documentation templates. The study data represent narrative documentation on a total of 244 patients with a mean length of stay in the CICU of 2.32 days. There were 1595 separate documentation notes, the number of entries per patient ranged from one to 38, with a mean of 6.5 entries per patient. Decomposition of the 1595 narrative entries yielded a total of 3222 decomposed phrases, each of which could be related to one purpose.

**Characterization Scheme**

The categorization scheme used to code these data was developed inductively by the researchers. Three researchers familiar with nursing care and clinical notes reviewed the documentation and separated the entries into distinct phrases that described one action or purpose. Next, the researchers' independently created broad categories to describe each documentation phrase. The researchers' then collaboratively reviewed all phrase descriptors and developed a standardized set of 29 categories needed to label the narrative documentation entries. Each researcher then used the 29 standardized categories to code a sample set of approximately 500 phrases. We found that an additional two categories were needed to code all documentation phrases, resulting in the final set of 31 standardized categories.

**Establishing Reliability of Coding**

The categorization scheme was reviewed by an expert in cardiovascular intensive care nursing who agreed with the coding scheme. All three raters coded the entire data set and measures of interrater reliability (Cohen’s Kappa and percentage agreement) were calculated.

**Data Analysis**

Narrative documentation was decomposed and delimited into separate phrases and transferred into the statistical software package SPSS for coding and analysis. Frequencies of category codes were calculated. Also, categories of data were compared with the documentation codes available in the structured portion of the documentation system for incidences of possible duplication of documentation.

**Protection of Human Subjects**

Patient identifiers were removed from the database to protect the identity of subjects prior to any review by the researchers. No attempt was made to identify any subjects, and no information concerning a particular subject could be revealed. Data were secured during and after the study conclusion. Permission to use the database and conduct the proposed study was obtained from the hospital in which the unit resides and Institutional Review Board.

**FINDINGS**

All three raters coded the documentation phrases in the same manner 81.7% of the time. Comparing coding across two raters showed a 97.8% agreement. There was no agreement on coding between the three raters on 2.2% of the documentation phrases. Measures of Cohen’s Kappa(7) were calculated between all raters individually and showed a high rate of agreement on coding documentation entries. The calculated statistics are shown below in Table 1.

<table>
<thead>
<tr>
<th></th>
<th>Rater 1</th>
<th>Rater 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rater 2</td>
<td>.841</td>
<td>****</td>
</tr>
<tr>
<td>Rater 3</td>
<td>.860</td>
<td>.859</td>
</tr>
</tbody>
</table>

The category of documentation most frequently entered in a narrative format was ‘patient status summary’ (25.2%) followed by the categories ‘report received’ (15.4%), ‘refer to flow sheet’ (9.6%), and ‘intervention’ (5.9%). The vast majority of the documentation phrases (74.7%) did not have a corresponding code in the structured portion of the documentation system. Approximately 42% (13) of the documentation categories corresponded to an existing code in the structured portion of the information system; however the entries that mapped to these categories accounted for only about 25% of the narrative entries examined in this study. Table 2 itemizes the frequency of documentation phrases that mapped to each category and indicates whether these phrases had a corresponding code in the structured portion of the documentation system.
Table 2. Category frequencies & presence of duplicate system code

<table>
<thead>
<tr>
<th>Category</th>
<th>Frequency %</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient Status Summary</td>
<td>25.2%</td>
<td>No</td>
</tr>
<tr>
<td>Report Received</td>
<td>15.4%</td>
<td>No</td>
</tr>
<tr>
<td>Refer to Flow Sheet</td>
<td>9.6%</td>
<td>No</td>
</tr>
<tr>
<td>Intervention</td>
<td>5.9%</td>
<td>Yes</td>
</tr>
<tr>
<td>Patient From OR</td>
<td>3.2%</td>
<td>No</td>
</tr>
<tr>
<td>New Order</td>
<td>2.9%</td>
<td>No</td>
</tr>
<tr>
<td>Event Report</td>
<td>2.9%</td>
<td>No</td>
</tr>
<tr>
<td>Physician Notified</td>
<td>2.8%</td>
<td>No</td>
</tr>
<tr>
<td>Report to Family</td>
<td>2.7%</td>
<td>Yes</td>
</tr>
<tr>
<td>Admission</td>
<td>2.6%</td>
<td>No</td>
</tr>
<tr>
<td>Physician Visit</td>
<td>2.5%</td>
<td>No</td>
</tr>
<tr>
<td>Nurse Procedure</td>
<td>2.5%</td>
<td>Yes</td>
</tr>
<tr>
<td>Physician Procedure</td>
<td>2.5%</td>
<td>Yes</td>
</tr>
<tr>
<td>Family Visit</td>
<td>2.4%</td>
<td>Yes</td>
</tr>
<tr>
<td>PRN Medication</td>
<td>2.3%</td>
<td>Yes</td>
</tr>
<tr>
<td>Patient to OR</td>
<td>1.8%</td>
<td>No</td>
</tr>
<tr>
<td>Patient Transfer</td>
<td>1.6%</td>
<td>Yes</td>
</tr>
<tr>
<td>Assessment Completed</td>
<td>1.3%</td>
<td>Yes</td>
</tr>
<tr>
<td>Specialist Notified</td>
<td>1.3%</td>
<td>Yes</td>
</tr>
<tr>
<td>Patient/Family Teaching</td>
<td>1.1%</td>
<td>Yes</td>
</tr>
<tr>
<td>Travel for Procedure</td>
<td>0.9%</td>
<td>No</td>
</tr>
<tr>
<td>Documentation Error</td>
<td>0.7%</td>
<td>No</td>
</tr>
<tr>
<td>Prep for Surgery</td>
<td>0.6%</td>
<td>No</td>
</tr>
<tr>
<td>Equipment Malfunction</td>
<td>0.5%</td>
<td>Yes</td>
</tr>
<tr>
<td>Patient Outcome</td>
<td>0.4%</td>
<td>Yes</td>
</tr>
<tr>
<td>Informed Consent</td>
<td>0.4%</td>
<td>No</td>
</tr>
<tr>
<td>Report From Family</td>
<td>0.2%</td>
<td>No</td>
</tr>
<tr>
<td>Post-Procedure X-Ray</td>
<td>0.1%</td>
<td>No</td>
</tr>
<tr>
<td>Cardio/ Pulm Arrest</td>
<td>0.1%</td>
<td>Yes</td>
</tr>
<tr>
<td>Patient Re-admit</td>
<td>0.1%</td>
<td>No</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
<td>No (74.7%)</td>
</tr>
</tbody>
</table>

DISCUSSION

Documentation Categories

The number and type of categories needed to code the narrative phrases in this study had some similarities and differences with those identified in a previous examination (8) of narrative text in a structured information system. Porcella examined narrative notes entered by nurses into an otherwise structured documentation system across 34 inpatient nursing units. In the present study 31 categories of data were identified, whereas Porcella used just 13 categories to describe documentation entries in her study. The only categories used in the Porcella study that we did not use were: care plan, miscellaneous, and extraneous. This study was different from Porcella’s work in that we examined narrative documentation from a very narrow source, post-operative CABG patients within 24 hours of surgery. All of these patients resided in an intensive care unit during this documentation period, whereas the patient documentation examined in Porcella’s study was derived from patient records across hospital units and specialties. These factors may help explain the differences between these results and the work completed by Porcella.

Categories of narrative documentation entries found in this analysis were also very different than those identified in a previous study examining the structured documentation entered into the same information system (9). The structured documentation in this system was almost entirely related to the monitoring (81.34%) and assessment (17%) of the patient’s physiological status. In the corresponding narrative documentation reviewed for the present study, only 15% of the documentation entries were related to direct nursing care or the patient’s response to care.

Much of what was recorded in the narrative notes was related to the actions of others such as family members, physicians, dialysis nurses, anesthetists, pharmacists, and respiratory therapists. Nurses in intensive care practice have traditionally coordinated healthcare team members and maintained a record that reflects all members’ involvement in the patient’s trajectory. This study demonstrates the need for the addition of codes within the structured record to document the coordination of healthcare team members and interventional tasks needed for the care of the patient.

In a related study (10), observations of nurses in this unit, revealed that approximately 50% of nursing information tasks were related to patient physiological data while the remaining 50% were related to team management (21.7%), task management (11%), equipment management (10.9%), and instruction of support staff (6.3%). These data show that there are discrepancies between what is recorded in the information system documentation and observations of practice in this intensive care unit. Further research is needed to empirically determine the extent that the medical record reflects practice before we can confidently use these records to determine patient outcomes and responses to care.
Creation of Structured Fields

In this study, approximately 25% of the free text documentation could have been recorded with corresponding codes in the structured record. Porcella reported 61% of the narrative content examined in her study could have been documented using existing structured fields(8). The majority of the free text narrative examined in this study could be documented in a structured format if appropriate fields were created. Much of the documentation consisted of short, acknowledgments of routine events such as: ‘report received’, ‘patient from OR’, ‘physician notified’, ‘admission’, and ‘patient to OR’. These types of entries could be adequately recorded in a structured format through the use of a pick list or drop-down menu.

Provision of Summary Reports

Although some of the information contained in the documentation phrases mapped to the category ‘patient status summary’ could be located within the structured portion of the system, the way these data were recorded in the narrative notes was very different from their documentation in the structured record. In this narrative documentation, nurses summarized the patient’s condition at a point in time (generally at the end of their shift), giving an overview of neurological, cardiovascular, respiratory, and medication status. An example of this type of entry is, ‘Pt slept on and off all night. VSS ~2000 changed Pt to OF mask 60% then 80%, ~2200 changed Pt to CF Mask at 80%, pt C/O air hunger, ~2300 changed to 100% non-rebreather. Pt was then able to rest comfortably. ~0300 Pt ABGs indicate the need to increase Pt C&DB, can hear slight noise from Pt with every breath, C&DB and scheduled breathing tx improved ABGs. ~0600 tried changing Pt back to CF mask 80%, Pt C/O air hunger again with a decrease in pulse OX sats from 100% to 90%. Rhonchus BLBS throughout the night”. While on the one hand this may be a function of nursing documentation tradition, it serves an important purpose; filtering and condensing vast amounts of information for others’ use(11).

Another example of documentation in this study that encapsulated information was the ‘event report’. As in the ‘patient status summary’, the ‘event report’ provided nurses with a way to present an overview of an unexpected patient event. An example of this type of entry was: “CVVHD clotted at this time. Dialysis nurse called and informed. CVVHD disconnected, VASCATH heparinized as per protocol. Blood flow noted in VASCATH when checked”. Some of the information included in both the ‘patient status summary’ and the ‘event report’ could be found in the structured portion of the record, but it would be extremely difficult and time consuming for anyone to put these data together into a coherent trajectory of events.

The vast amount of information represented in electronic patient records may actually hinder the ability of healthcare team members from finding and compiling the data they need in a reasonable period of time(11) Pertinent patient data could be extracted from the structured portion of the record and compiled into summary reports, allowing healthcare team members to get an ‘at a glance’ overview of the patient’s condition or unexpected events. These data would need to be entered into the record in a structured format preferably using standardized nursing and healthcare terminologies.

SUMMARY

In this study we used inductive content analysis to examine the narrative documentation entered in an otherwise structured nursing information system during the care of cardiovascular intensive care patients. Very little of these narrative entries were related to nursing care. The majority of the entries were to provide other healthcare team members with an overview for care coordination. Much of the documentation were entered either to provide other healthcare team members with an ‘at a glance’ overview of the patient’s status or an unexpected event. Other entries provided a record of team member involvement in the care of the patient. Using this method to assess narrative documentation proved useful in revealing the adequacy of code coverage, identifying specific fields for inclusion in the patient record, areas for reinforcement of nursing documentation education, and the need for summary tools for healthcare team communication and coordination.

ACKNOWLEDGMENTS

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REFERENCES