

Nursing Documentation Improvement at Post-Acute Care Settings

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Keywords: Clinical Documentation Improvement, Electronic Health Records, Nursing Documentation, Patient Safety, Vital Signs Documentation, Post-Acute Care Settings.

Abstract: Although nursing documentation is very important for patient safety, it forces nurses to spend increasing amounts of their working time completing it. In this study, I evaluated the time lag between patient events to completion of nursing documentation at two Post-Acute Care settings (called as “Care-Mixed Hospital” in Japan, similar to nursing home). The mean time lag at Hospital A, which did not implement an automatic documentation system (ADS) was 197.3 min [progress note regarding vital signs (VS), 208.2 min and the others, 196.1 min. The mean time lag at Hospital B, which had implemented ADS, was 3.2 min (only progress note regarding VS). ADS is effective in improving instantaneity on nursing documentation at post-acute care settings.

1 INTRODUCTION

Nursing documentation is very important for maintaining a good quality of nursing care. Therefore, in previous studies, standardized documentation forms were developed both in paper and electronic formats (Romano, 1982). The documentation framework (e.g., document form) depends on the clinical situation and whether the setting is clinical such as in an acute care facility or community-based such as in a patient home. These factors have an impact on how useful clinical data can be collected (Curran, 1994). Therefore, nursing documentation comprises various kinds of documents that increase workload. Nursing documentation is a significant proportion of the workload that is associated with inpatient nursing care (McCartney, 2013) (Asaro, 2003). It is unfortunate that good documentation improves delivery of care but creates a sub-optimal working environment for clinical nurses at post-acute care settings.

To improve the situation, clinical document improvement (CDI) was created. One of the most popular CDI approaches involves the use of a template. By using the template in the electric medical record (EMR), nurses were able to reduce their workload with respect to completing nursing documentation (Richardson, 2015). The next CDI approach used minimum data sets (MDSs). MDSs

comprised standardized data sets that can cover most patients. In a previous study, MDS maintained the quality of documentation and reduced the nurses’ workloads (Ranegger, 2015). Other CDI approaches involve modifying the system design, which is time consuming; therefore, early implementation is very important (Read-Brown, 2013).

Moreover, secondary methods for nursing documentation have rapidly spread. Needless to say, nursing at post-acute care settings encompasses not only the physical problems of the patient but also psychosocial aspects. However, the patient’s physiological symptoms are not easy to elucidate. One study analyzed the patient’s physiological requirements (Hill, 2015). Nursing documentation is correlated with knowledge management. A study analyzed the integration of narrative documents, database storage, and connectivity with clinical guidelines (Min, 2013). These challenges are critically important to resolve; however, solutions are only being trialed in a limited number of clinical settings (e.g., university hospital and national institutional hospital).

Nursing terminology comprises formal languages and sub-languages (Mead, 1997). Nursing terminology is complex. Furthermore, the quality of nursing documentation may also be affected by clinical governance regulations (Dehghan, 2013). Therefore, CDI in nursing is a very long road.

However, CDI in nursing is one of the hottest topics. Collins (Collins, 2013) noted that nursing documentation patterns had been linked to the patient’s mortality. In particular, vital signs (VS) documentation is important. If the quality of VS documentation is poor (delayed or incorrect), quick responses to the patients’ requirements will be difficult.

Overall, this study aims to elucidate the effectiveness of CDI in nursing using the automatic documentation system (ADS) at post-acute care settings.

2 METHODS

2.1 Research Objectives

This study was performed at two post-acute care settings. Both settings were very similar. The settings (called as “Care-Mixed Hospital” in Japan, but called as “Nursing Home” in the United States and Europe) have 100–199 beds (this range of bed numbers in the hospital represents the median of all hospitals in Japan), including community care unit (plans and implements follow-up care after discharge).

Hospital A implemented EMR but did not implement ADS. Hospital B implemented both EMR and ADS. ADS acts as a sub-system for the automatic recording of VS, including body temperature (BT), blood pressure (BP), and pulse/SpO2, from an integrated VS recording device, which includes a hemomanometer, thermometer, and pulse oximeter. The devices flow data to EMR (Fig. 1).

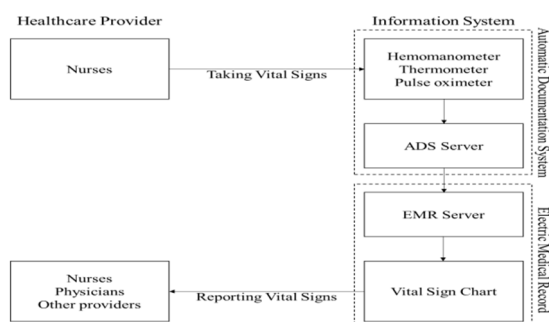


Figure 1: Relation with EMR and ADS.

2.2 Data Collection

The research period was 5–6 months from July 2015 to September 2015.

At Hospital A, all nursing progress records of 24,355 patient–days were extracted from EMR. Hospital A was selected for the “focus charting method” using one of the nursing documentation forms (e.g., SOAP). The charting method comprised data collection on patient status and condition, actions (interventions) by the nurse or other healthcare provider, and responses of the patient (Lampe, 1985) (Table 1). All progress notes were distinguished from VS documentation or other documentation using the text-mining methods.

Table 1: Overview of Documentation at Hospital A.

	Focus	Data	Action	Response
Lines (per patient–day)	3.9	3.7	1.6	0.5
Characters (per patient–day)	18.6	124.8	29.6	10.6

At Hospital B, data records of VS of 21,268 patient–day were extracted from the ADS server. On an average, BP was recorded at 1.2 times/patient–day, BT was 1.6 times/patient– day, and pulse/SpO2 was 1.4 times/patients–day.

2.3 Data Analysis

At both Hospitals A and B, the time lag between patient events, nurses taking VS, and documentation reaching EMR was calculated from the EMR system log and/or ADS server (Fig. 2). Because previous studies noted that CDI must create a considerably busy working situation for nurses (Lees, 2010), time lag was separated by time zone.

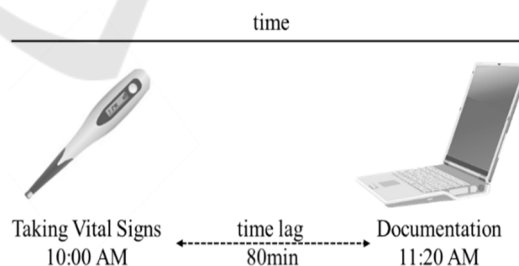


Figure 2: Example of Time Lag of Nursing Documentation.

2.4 Ethical Consideration

This study was performed under national ethical guidelines for epidemiological studies. All data of nursing documentation was anonymized.

At Hospitals A and B, this study was approved under the protocol for each hospital (CEO and/or Management Board approved).

3 RESULTS

3.1 Frequency of Taking Vital Signs by Time Zone

The frequency of taking VS is shown by time zone at each hospital (Fig. 3). Each hospital has three peaks taking VS. The peaks at Hospital A occurred at 6 AM (13.1%), 10 AM (21.5%), and 7 PM (16.8%). The peaks at Hospital B were at 6 AM (21.1%), 1 PM (12.1%), and 5 PM (12.2%). Taking all of the documentation into account across all three peak times at both the hospitals, 51.5% of all documentation was completed at Hospital A and 45.4% was completed at Hospital B.

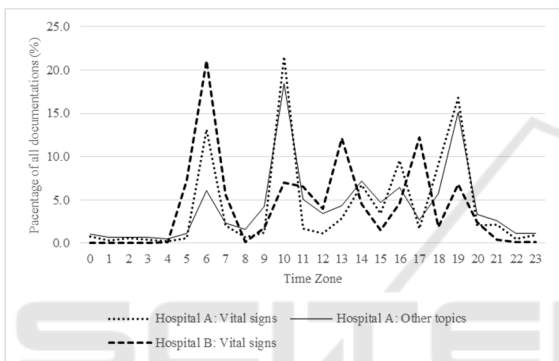


Figure 3: Frequency of Taking Vital Signs by Time Zone.

3.2 Time Lag between Taking VS and Documentation

The time lag between taking VS and the nursing documentation reaching EMR was 197.3 min at Hospital A. VS documentation takes a significantly longer time ($p < 0.0001$, Wilcoxon's test) of 208.2 min to reach EMR than other documentations, which only takes 196.1 min. The time lag at Hospital B

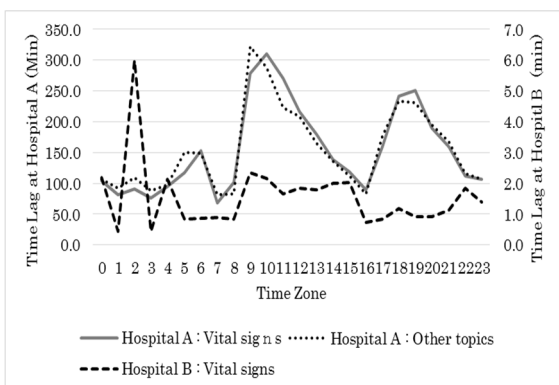


Figure 4: Time Lag between taking VS and ocumentation.

was just 3.2 min. The time lag by time zone is as shown in Fig. 4.

The peak of time lag at Hospital A is shown at 6 AM (152.5 min), 10 AM (309.7 min), and 7 PM (251.1 min); this peak is the same as the frequency peak of taking VS. The peak of time lag at Hospital B is shown at 2 AM (6.0 min) ; the peak differs from the frequency peak of taking VS.

3.3 Content of Nursing Documentation

At Hospital A, all process records were analyzed; which category does belong each lines of process records. Of all process records, 2.6% were regarding BP, 3.5% were regarding BT, 2.2% were SpO₂, 1.9% were combined multiple source VS data (e.g., both BP and BT), and 89.8% were other parameters (Fig. 5).

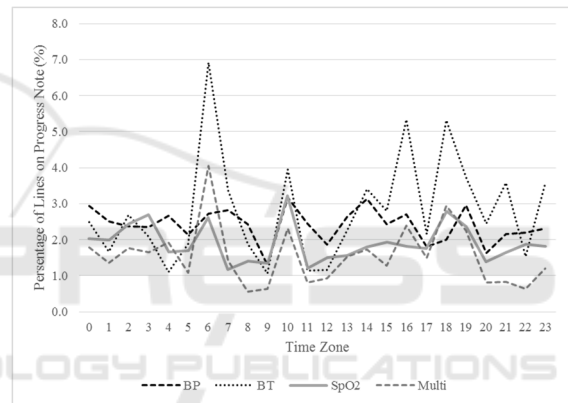


Figure 5: Contents of Nursing Documentation at Hospital A.

For BP documentation, no peak of documentation was observed. For BT documentation, four peaks were observed at 6 AM (6.9% of all documentation), 10 AM (3.9%), 4 PM (5.3%), and 6 PM (5.3%). For SpO₂, two peaks were observed at 10 AM (3.2%) and 6 PM (2.8%).

4 DISCUSSION

4.1 Good Clinical Practice for Collection of Vital Signs and Accurate Completion of Documentation

This study shows similar trends on taking VS at Hospitals A and B because the frequency peak when VS was taken at each hospital was the same. This

trend may depend on the nurses' working shifts: day, 8 AM–5 PM; evening, 4 PM–1 AM; and night, 0 AM–9 AM. Therefore, most nurses take VS as part of their routine work schedule, i.e., twice during the day and once in the evening and at night.

The importance of VS documentation has been well discussed over the last 30 years (McCall, 1982). In addition, precision in taking VS is very important for maintaining the nursing quality of care. Missing VS is a very serious omission; however, it occurs from time to time (Grave, 2006). Therefore, to avoid missing VS, we must discuss two issues (1) what is the appropriate frequency for taking VS and (2) how long does it take for this documentation to reach EMR.

Issue (1) is not easy because the evidence for proper frequency of taking VS is insufficient. In a previous study, the frequency interval for measuring VS was discussed at an emergency department (ED), and BP documentation in ED was completed every 2.3 h for all patients (Miltner, 2014). Other studies suggested that, complete VS documentation (BP, BT, SpO₂, and respirator rate) during every shift was only completed for 17% of the recommended intervals in 3 post-operative day (POD) and only for 5.6% in 7 POD (McGain, 2008).

In our study, VS was recorded every 4–9 h during the day and 9–11 h during the night in Hospitals A and B. This frequency of taking VS may be sufficient, because the hospitals is post-acute care settings.

Although Hospital A frequently measures VS, the hospital has a huge risk of missing VS because Hospital A has very long time lag (>3 h) between taking VS and documentation reaching EMR. Therefore, if a nurse at Hospital A takes VS in the morning, other care staff will have VS of the patient by afternoon. With respect to missing VS, it is recommended not to clog the system with frequent measuring of VS but to focus on improving the time lag between measuring VS and documentation reaching EMR at post-acute care settings.

4.2 Effectivity of Reducing Time Lag using ADS

The solution for reducing missing VS has been investigated in many studies. The basic approach is to improve work flow on taking VS. In a previous qualitative study, EMR was observed to be timelier than paper-based documentation (Yeung, 2012). In another study, user interface improvement on EMR significantly reduced VS documentation but not completely (Gerdtz, 2013). Whether VS

documentation is paper based or computerized and PC based or tablet based, time lags will occur if documentation is completed by people as opposed to integrated data collection devices.

The second approach is role sharing. In a previous study, routine observation and documentation was performed by technicians (not registered nurses) with tablet-PC (Wager, 2010). Although effectiveness is limited, other benefits could be considered because nurses at post-acute care settings observe not only VS but other patient parameters as well.

The third approach is integrating EMR and VS recording devices. This approach was reported 10 years ago in the US, reducing nursing documentation time (Arora, 2005). However, it is very hard to use a VS monitor in all post-acute patients. This policy of "automatic documentation" is very realistic but an easier method is required in the post-acute care setting as opposed to that required for an ED.

In this study, it was found that ADS can reduce time lag from 208.2 min to 3.2 min (98.5%). This has a very clear and effective impact not only on time lag but also on patient safety. Therefore, ADS is strongly recommended to be implemented for post-acute care settings as well as for EDs and acute hospitals.

4.3 Maintaining Quality of Nursing Documentation at Post-Acute Care Settings

Reducing time lag is very important. Thus, we should consider other types of documentation.

Our results demonstrated that the percentage of VS documentation of all nursing documentation at Hospital A was 10.2%. However, this rate varies with time zone; nevertheless, the rate is part of the routine workload schedule and is not affected by the current patient conditions. Therefore, an ADS system will not reduce the quality of documentation on other aspects of patient care. Rather, currently, many nurses cannot access patient information in a timely manner because of the long time lag. Although many nurses are forced to complete the documentation, it may not be useful because it may arrive in the system too late. This situation is known as "death by data entry" and affects employees' satisfaction (O'Brien, 2015).

VS are so fundamental that it should be standardized. But other topics in post-acute care is on progress in standardization. For example, in oncology nursing at home, observation points were

well discussed and standardized. A database system that can improve nursing documentation has been reported (Turner, 2015). Because standardization in nursing is rapidly progressing, if technology could be improved to measure other parameters associated with patient subjective symptoms (e.g., nausea and pain), ADS for post-acute care settings could be utilized for a broader range of nursing documentation that is designed in part with the nurses' input to maintain the quality of documentation (Fig. 6).

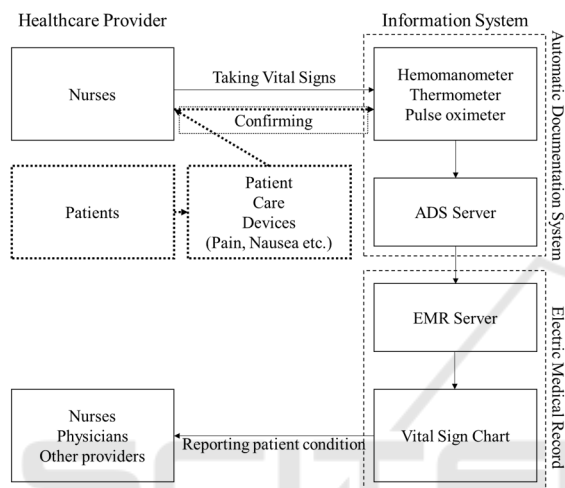


Figure 6: ADS Scheme of the Future (For Post-Acute Care Settings).

5 CONCLUSIONS

Nursing documentation without ADS has a very long lag of over 3 h between the collection of VS and reaching EMR. The current frequency intervals of collecting VS are sufficient in the acute and post-acute hospitals. Moreover, >10% of progress notes contained information on VS.

As a means to improve patient safety in elderly care, ADS is very effective and implementing it is recommended even for use in post-acute care facilities such as “Care-Mixed Hospital”, nursing home and skilled care facility.

ACKNOWLEDGEMENTS

This study was supported by a research grant of The Health Care Science Institute, Japan.

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