DIGITAL TRANSFORMATION IN PATIENT CARE: EXPLORING NURSES ATTITUDES TOWARDS NURSING DOCUMENTATION SYSTEM

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ABSTRACT

With technology innovation, hospitals move from manual processes to digital transformation. One type of digital transformation is the nursing documentation system (NDS). To promote information sharing, hospitals expect nurses to document real-time, which requires nurses to report immediately after each care task. However, relevant literature and frontline nurses indicate that “real-time documentation” is not practical. In this initial work, we use online content analysis to investigate nurses’ experiences towards “real-time documentation”. The pilot results show that time, working experience, and complexity of care impact “real-time documentation”. Future work will collect and analyze more nurses’ comments online and explore critical factors.

Keywords: Digital Transformation, nurse attitudes, Nursing Documentation System, online content analysis

INTRODUCTION

Digital transformation has revolutionized patient care. Hospitals gradually changed the manual processes to digital. All entities in healthcare, from providers, insurance companies, governance bodies to hospitals, have been engaged in the digital transformation process.

There are several challenges in the healthcare industry: increase efficiency in care delivery, improve patient safety, reduce working pressure, and enhance the quality of care. However, such challenges are not easy to solve since healthcare professionals' job require a complex choreography of direct patient care, critical communications, charting, filling meds, access to technology and information, and other tasks (Zimring, Joseph, & Choudhary, 2004). Therefore, healthcare industry, especially hospital, need helps from information technology to improve the organizational performance, increase customer satisfaction, reduce medical errors, and relieve employees' stress (Menachemi, Burkhardt, Shewchuk, Burke, & Brooks, 2006; Watcharasriroj & Tang, 2004). Nursing documentation system (NDS), a tool for reducing medical errors and improving care quality, has been implemented into the hospital system (E Ammenwerth et al., 2001). NDS changed nurses' way to manage and deliver information and helped organizations to reduce medical errors.

With the implementation of NDS, hospitals expect nurses to do "real-time documentation" for inpatient units. The "real-time documentation", which requires nurses to document immediately after each care task, could benefit information sharing and prevent medical errors (Yee et al., 2012). This documentation policy could also improve documentation quality and patient care (Edwards &

Moczygemba, 2004). Several studies concluded that the nursing information system could help nurses document assessment better and improve quality of care (Elske Ammenwerth, Rauchegger, Ehlers, Hirsch, & Schaubmayr, 2011; Kelley, Brandon, & Docherty, 2011; Korst, Eusebio-Angeja, Chamorro, Aydin, & Gregory, 2005; Pabst, Scherubel, & Minnick, 1996). However, based on the feedback from the first line nurses', the NDS was not suitable for the real-time chart purpose for nurses (Graham, Nussdorfer, & Beal, 2018). Therefore, besides the benefits of the NDS, why NDS does not fit "real-time documentation" become an interesting research area to investigate.

In this study, we want to investigate the disconnection between NDS and the daily usage of the system. The research target of this study is to discover why NDS could not satisfy the requirements of real-time charting for nurses. Based on the discussion above, this study intends to address the research questions below:

1. What are nurses' attitudes towards use documentation systems to achieve "real-time documentation"?
2. What are the factors that affect nurses to do "real-time documentation"?

RELATED LITERATURE

Before NDS, nurses complained about confusion and workload issues with paper charting. The NDS is designed to replace the paper charting system and needs to address the problems of confusion and workload. NDS should be able to decrease the charting workload for nurses (Aiken, 1990). Compared to handwritten documentation, computer documentation help nurse to spend less time on reporting (Minda & Brundage, 1994). After the implementation of information systems in hospitals, NDS had significantly improved nurse assessments, achievement of patient outcomes, intervention, and routine assessments after 18 months of NDS implementation (Larrabee et al., 2001). With the technology implementation on automated computer documentation, nurses would be able to save time on documentation and spend more time on patient care (Pabst et al., 1996).

Nursing charting tasks could be classified into eight categories: admission, assessment, transcribe order, writing care plan, medication, teaching, discharging, and others. Most of these charting tasks are very time-consuming and occupy one-third of the nursing time (Hendrich, Chow, Skierczynski, & Lu, 2008). Some studies showed NDS had the potential to improve nursing working performance and decrease their time spending on charting (E Ammenwerth et al., 2001; Minda & Brundage, 1994; Pabst et al., 1996) whereas other researchers found that NDS did not decrease nurse's time spending on charting and increase the working pressure for nurse in a natural work environment (Hennington, Janz, & Poston, 2011; Nelson, Evans, Samore, & Gardner, 2005). Many nurses viewed the NDS as threatening and disrupting. They resisted technological change because of concerns about intrusions into the regular and routine performing activities (Bozak, 2003). Beyond the technology resistance, nurse charting is very complex and time-consuming. Also, at the beginning stage of new NDS implementation, problems of system design, inadequate training, and lack of cooperation between care and IT disciplines negatively impacted nurses' performance (T.-T. Lee, 2007). The electronic nursing documentation systems did not decrease the complexity and time cost compared with a paper system (Read-Brown et al., 2013). "'Implementing "real-time documentation" increased nurses' time spent on documentation, thereby decreasing the amount of time for other patient care-related activities even real-time charting can decrease medical errors, with several factors mentioned above, a small percentage of nurses do real-time charting in work. A study reported that only 59% of charting was real-time charting, and bedside charting was only 40% (Nelson et al., 2005). For example, most 'hospitals' principles require nurses to

chart IV assessment per hour, full assessment per six hours, fall assessment per hour, and additional charting depending on the physician's order. However, most of them do not have time to chart until the end of the shift which means they might chart 12pm assessment results at 7pm. Its contraries to the function of system which is providing real-time charting. In addition, nurses are supposed to chart in the patient's room while taking care of the patient. However, many nurses might not be able to fulfill all the information at bedside. Nurses need to take care of patients in patients' rooms, also need to chart on computer. They supposed to chart on time. However, many nurses might not be able to fill in all the information at the bedside. (Graham et al., 2018).

To sum up, there is a disconnection between time-saving on documentation and design of NDS (i.e., complexity interface based on software developer, more data requirement based on hospitals, and time-consuming based on care activities themselves) (Aiken, 1990; Stokowski, 2013). Furthermore, hospitals' policy on real-time documentation adds more stress and difficulties to nurses (Y. Lee, Lee, & Bernstein, 2013).

METHODOLOGY AND RESEARCH DESIGN

This study analyzes and understands experiences that nurses have when using NDS to do real-time documentation in the inpatient units. This study plan to collect nurses' discussion about NDS and real-time documentation policy from an online forum and use a conventional content analysis approach to explore themes and identify causes (Creswell & Poth, 2016; Mazanderani & Powell, 2013).

Methodology

This study uses online content analysis as a research method to investigate nurses' experiences and attitudes. People like to share personal feelings and experiences on the Internet (Morison, Gibson, Wigginton, & Crabb, 2015). Many online platforms such as forums, blogs, social networks, and rating sites can be used to share personal experiences and stories (Mazanderani & Powell, 2013). Social media allow people with similar interests to communicate and share experiences without geographic limitation (Wittmeier et al., 2014). With this phenomenon, large amounts of data are available online and can be used in different research designs (Paul & Dredze, 2011). Therefore, several studies use online content analysis to investigate various topics (Barratt & Maddox, 2016; Pink et al., 2015). Compared to traditional in-person data collection, using online data is much more cost-effective (Munson, Cavusoglu, Frisch, & Fels, 2013), particularly for qualitative data collection, which is a time-consuming method (Jones & Alony, 2008).

Data Collection

We conducted searches on Google, Yahoo, Bing, and DuckDuckGo, using keywords found in the literature, such as "real-time documentation", "bedside assessment and documentation", and "nurse forum". Our keyword search methods are similar to those performed in prior studies (Graham et al., 2018; Matte, Pepin, & Remmer, 2021; Moody, Slocumb, Berg, & Jackson, 2004). DuckDuckGo is a search engine that does not optimize the results based on searching history, which may help us find more results. Words with high occurrence in the blogs/posts will be added to the keywords for additional searches in Google, Yahoo, Bing, and DuckDuckGo. We will review the searching results until the point

where 20 consecutive results do not relate to the topic. While collecting the posts/ blogs, we visited each users' profile to identify their background information, including gender, age, race/ ethnicity, job position, working experience, and location. Our inclusion criteria are any the blogs and posts containing keywords "real-time documentation" and "bedsides charting". Our exclusion criteria are any posts in the same discission thread containing irrelevant information. Blogs or posts by users' accounts that meet the inclusion criteria will be included, examining the posting history for each user and downloading all their posts that relate to "real-time documentation" or "bedside assessment and documentation". Followed by the guidelines of qualitive study (Boddy, 2016; Malterud, Siersma, & Guassora, 2016), we plan to collect 25 nurses' attitude about "real-time documentation".

Preliminary Results

We selected a small sample of data to perform a content analysis. Based on the initial searching, some nurses stated they believe patient care is more priority than real-time charting. Especially when nurses are busy, they prefer to take care of patients first instead of charting. Some nurses choose to write down what needs to be charted on a piece of paper—then charted at the end of the shift. Some of them complained that they did not have time to chart during the whole shift. Many nurses must stay overtime after the shift in order to finish the charting. Many nurses reported they experienced anxiety, especially new graduate nurses. They are worried about charting errors or missing information. Some nurses believed whether or not to do real-time charting depends on the types of procedures the nurses just did. If the patient is stable and the nurse just finished the head-to-toe assessment, they prefer to chart real-time. Some nurses stated when they are brand new nurses; they prefer care first. After several years of experience, they are more likely to be a "chart first" nurse, except when a patient has a critical issue.

CONCLUSION

This is a research-in-progress paper. We will continue our analysis and develop a full paper by the time the conference is held. NDS plays a critical role in quality assurance and patient care. We are hopeful that our findings provide practical suggestions to hospital administration in developing strategies to improve nurses' active participation in real-time charting. There are challenges in digital transformation. Though such transformation has great potential to improve efficiency and reduce medical errors, to nurses, caring for patients is their priority, so timely charting may not be practical.

REFERENCE

Aiken, L. H. (1990). Charting the future of hospital nursing. *Image: The Journal of Nursing Scholarship, 22*(2), 72-78.

Ammenwerth, E., Eichstädter, R., Haux, R., Pohl, U., Rebel, S., & Ziegler, S. (2001). A randomized evaluation of a computer-based nursing documentation system. *Methods of information in medicine, 40*(02), 61-68.

Ammenwerth, E., Rauchegger, F., Ehlers, F., Hirsch, B., & Schaubmayr, C. (2011). Effect of a nursing information system on the quality of information processing in nursing: An evaluation study using the HIS-monitor instrument. *International journal of medical informatics, 80*(1), 25-38.

Barratt, M. J., & Maddox, A. (2016). Active engagement with stigmatised communities through digital ethnography. *Qualitative research, 16*(6), 701-719.

Boddy, C. R. (2016). Sample size for qualitative research. *Qualitative Market Research: An International Journal*.

Bozak, M. G. (2003). Using Lewin's force field analysis in implementing a nursing information system. *CIN: Computers, Informatics, Nursing, 21*(2), 80-85.

Creswell, J. W., & Poth, C. N. (2016). *Qualitative inquiry and research design: Choosing among five approaches*: Sage publications.

Edwards, M., & Moczygemba, J. (2004). Reducing medical errors through better documentation. *The health care manager, 23*(4), 329-333.

Graham, H. L., Nussdorfer, D., & Beal, R. (2018). Nurse attitudes related to accepting electronic health records and bedside documentation. *CIN: Computers, Informatics, Nursing, 36*(11), 515-520.

Hendrich, A., Chow, M. P., Skierczynski, B. A., & Lu, Z. (2008). A 36-hospital time and motion study: how do medical-surgical nurses spend their time? *The Permanente Journal, 12*(3), 25.

Hennington, A., Janz, B., & Poston, R. (2011). I'm just burned out: Understanding information system compatibility with personal values and role-based stress in a nursing context. *Computers in Human Behavior, 27*(3), 1238-1248.

Jones, M., & Alony, I. (2008). Blogs–the new source of data analysis.

Kelley, T. F., Brandon, D. H., & Docherty, S. L. (2011). Electronic nursing documentation as a strategy to improve quality of patient care. *Journal of nursing scholarship, 43*(2), 154-162.

Korst, L. M., Eusebio-Angeja, A. C., Chamorro, T., Aydin, C. E., & Gregory, K. D. (2005). Nursing documentation time during implementation of an electronic medical record. In *Evaluating the organizational impact of healthcare information systems* (pp. 304-314): Springer.

Larrabee, J. H., Boldreghini, S., Elder-Sorrells, K., Turner, Z., Wender, R., Hart, J., & Lenzi, P. (2001). Evaluation of documentation before and after implementation of a nursing information system in an acute care hospital. *Computers in nursing, 19*(2), 56-65; quiz 66.

Lee, T.-T. (2007). Nurses' experiences using a nursing information system: early stage of technology implementation. *CIN: Computers, Informatics, Nursing, 25*(5), 294-300.

Lee, Y., Lee, M., & Bernstein, K. (2013). Effect of workplace bullying and job stress on turnover intention in hospital nurses. *Journal of Korean Academy of Psychiatric and Mental Health Nursing, 22*(2), 77-87.

Malterud, K., Siersma, V. D., & Guassora, A. D. (2016). Sample size in qualitative interview studies: guided by information power. *Qualitative health research, 26*(13), 1753-1760.

Matte, A.-A., Pepin, J., & Remmer, E. (2021). Quality improvement project: An online discussion forum for the support of nurse preceptors orienting newly hired nurses. *Nurse Education in Practice, 53*, 103076.

Mazanderani, F., & Powell, J. (2013). Using the internet as a source of information about patients' experiences. *Understanding and using health experiences: improving patient care*, 94-103.

Menachemi, N., Burkhardt, J., Shewchuk, R., Burke, D., & Brooks, R. G. (2006). Hospital information technology and positive financial performance: A different approach to finding an ROI. *Journal of healthcare management, 51*(1).

Minda, S., & Brundage, D. (1994). Time differences in handwritten and computer documentation of nursing assessment. *Computers in nursing, 12*(6), 277-279.

Moody, L. E., Slocumb, E., Berg, B., & Jackson, D. (2004). Electronic health records documentation in nursing: nurses' perceptions, attitudes, and preferences. *CIN: Computers, Informatics, Nursing, 22*(6), 337-344.

Morison, T., Gibson, A. F., Wigginton, B., & Crabb, S. (2015). Online research methods in psychology: Methodological opportunities for critical qualitative research. In: Taylor & Francis.

Munson, S. A., Cavusoglu, H., Frisch, L., & Fels, S. (2013). Sociotechnical challenges and progress in using social media for health. *Journal of Medical Internet Research, 15*(10), e226.

Nelson, N. C., Evans, R. S., Samore, M. H., & Gardner, R. M. (2005). Detection and prevention of medication errors using real-time bedside nurse charting. *Journal of the American Medical Informatics Association, 12*(4), 390-397.

Pabst, M. K., Scherubel, J. C., & Minnick, A. F. (1996). The impact of computerized documentation on nurses' use of time. *Computers in nursing, 14*(1), 25-30.

Paul, M. J., & Dredze, M. (2011). *You are what you tweet: Analyzing twitter for public health.* Paper presented at the Fifth international AAAI conference on weblogs and social media.

Pink, S., Horst, H., Postill, J., Hjorth, L., Lewis, T., & Tacchi, J. (2015). *Digital ethnography: Principles and practice*: Sage.

Read-Brown, S., Brown, A., Yackel, T., Choi, D., Tu, D., Sanders, D., & Chiang, M. (2013). Time-motion analysis of clinical nursing documentation during implementation of an electronic operating room management system for ophthalmic surgery. *Investigative Ophthalmology & Visual Science, 54*(15), 4548-4548.

Stokowski, L. (2013). Electronic nursing documentation: Charting new territory. *Medscape. September*.

Watcharasriroj, B., & Tang, J. C. (2004). The effects of size and information technology on hospital efficiency. *The Journal of High Technology Management Research, 15*(1), 1-16.

Wittmeier, K., Holland, C., Hobbs-Murison, K., Crawford, E., Beauchamp, C., Milne, B., . . . Keijzer, R. (2014). Analysis of a parent-initiated social media campaign for Hirschsprung's Disease. *Journal of Medical Internet Research, 16*(12), e288.

Yee, T., Needleman, J., Pearson, M., Parkerton, P., Parkerton, M., & Wolstein, J. (2012). The influence of integrated electronic medical records and computerized nursing notes on nurses' time spent in documentation. *CIN: Computers, Informatics, Nursing, 30*(6), 287-292.

Zimring, C., Joseph, A., & Choudhary, R. (2004). The role of the physical environment in the hospital of the 21st century: A once-in-a-lifetime opportunity. *Concord, CA: The Center for Health Design, 311*.