

A Topic Modeling Analysis of Nursing Handoff Studies

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Abstract. This study used topic modeling to analyse key topics of nursing handoff research. Six topics were identified. The findings indicate that future studies should implement the standardization of handoff tools and the use of bedside handoff, and evaluate their effects on patient safety outcomes.

Keywords. Handoff, Topic modeling, standardization, patient participation, patient safety

1. Introduction

Handoff is a real-time process for transferring patient-specific information from one nurse to another while ensuring the continuity and safety of patient care [1]. Handoff has been recognized as an important factor in patient safety, which has prompted many related studies and systematic reviews. However, systematic review have limitations that couldn't include all studies of specific area by applying rigorous methodologies. In this point of view, it is difficult to deal with the overall handoff research with systematic review. Text network analysis investigates all relevant studies in a specific research area. Topic modeling approach is known to excel in the collection and analysis of large volumes of data [2]. In this study we attempted to reveal the current state of the art in nursing handoff research by using topic modeling methods to analyse related articles in nursing fields.

2. Methods

This was a text-mining study that collected, processed, and analyzed text data. The Abstracts of nursing articles written in Korean or English and published from January 1, 2010 to December 31, 2019 were searched for research related to nursing handoff. The following databases were searched: RISS, NDSL, KCI, KISS, DBpia[®], MEDLINE, EBSCO, Embase, Scopus, Web of Science, and CINAHL. Data were collected automatically using a Web crawler program based on R software. The collected Abstracts were preprocessed using the “KoNLP” and “tm” natural-language-processing packages of R (version 3.6.3). Morpheme analysis was applied to extract articles in natural language into the smallest meaning elements, and Term Frequency-Inverse document

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frequency (TF-IDF) weights were applied to extract important keywords. Topic modeling could be used to identify hidden topics in large amounts of text data, and in this study we used the most commonly used latent Dirichlet allocation (LDA) method. After reviewing and discussing based on topic modeling results, the keywords included in each topic could be expressed in an integrated manner.

3. Results

Abstracts of 549 articles were analysed. The total number of keywords after preprocessing for analysis was 10,248($\gamma>0.02$). Six distinct topics were identified based on the visual changes in Inter Distance Map (IDM) and the keywords that make up each topic. They were determined to be independent of each other and not overlapping, with obvious boundaries between topics. We tried to find themes that represent the keywords derived, and the analysis resulted in six topics in Table 1.

Table 1. Findings of the topic analysis.

Topic 2	Handoff should promote patient participation to ensure a patient-centred approach.
Topic 6	Confidentiality is important in bedside handoff, and this increases patient satisfaction.
Topic 11	Patient safety, safety culture and teamwork are important in handoff.
Topic 16	Standardizing handoff using mnemonic tools such as SBAR makes the process consistent and clear.
Topic 23	Handoff tools developed in EHR were applied effectively.
Topic 34	Collaboration among nurses is important in handoff.

4. Conclusion

Six themes were found in unstructured text form abstracts and categorized as topic modeling methods. Patient participation, bedside handoff, patient safety, standardization, EHR and collaboration were found to be key topic trends in handoff research. Further research is needed to provide a more substantial evidence for handoff and patient safety.

Acknowledgement

This research was supported by a grant from the National Research Foundation of Korea (NRF-2019R1I1A3A01059093).

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