

Electronic health records in nursing practice: a concept analysis

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Abstract

This article reports the concept analysis of electronic health records (EHRs) in nursing practice. The concept analysis approach of Walker and Avant was applied. The attributes of EHR in nursing include (1) user-friendly, (2) preserving security, (3) providing good performance, and (4) structured. The antecedent of EHRs in nursing is IT recourses, and the consequences include creating integrated care, improving data completeness and data completeness with time, reducing cost, and decreasing medication errors. Providing good nursing care is a central goal of nursing. EHRs are to provide better nursing care. This analysis provides the nurses a new perspective by helping them to understand all the components within the concept of EHRs in nursing practice.

KEY WORDS: Electronic health records, nursing, EHRs, electronic nursing documentation

INTRODUCTION

Electronic health records (EHRs) have been adopted as a major information technology used in health-care organizations. Physicians, nurses, pharmacists, physical therapist, and case managers have used EHRs for recording and documenting the patient health information. As a result, health-care team members are able to capture the patient information of different disciplines and share them.^[1]

Despite the importance of EHRs in health care, there has not been a standard conceptual definition for EHRs, especially in nursing. The ambiguity still exists in terms of definition of EHRs. Since the first concepts for EHRs in the 1990s, the structure and content or the name that were given to these concepts frequently changed, although the idea to enhance health care remained the same over the time. There has not been enough focus on all the aspects of this complex concept in the nursing discipline. Furthermore, different researchers have provided different definitions. Therefore, the purpose of concept analysis is to clarify and develop understanding the concept of EHR in nursing.

The distinct features of each concept are found by concept analysis, which provides the researchers with an accurate operational definition of that concept. In addition, the concept analysis can refine ambiguous concepts within a theory. Thus, a more fundamental and profound understanding of the underlying attributes of that concept is obtained. In this article, to examine EHRs in nursing concepts, the eight-step-process of Walker and Avant was used, consisting of (1) select a concept, (2) determine the purpose of the analysis, (3) identify all the uses of the concept, (4) determine the defining attributes, (5) construct a model case, borderline case, and contrary case, (6) identify antecedents, (7) identify consequences, and (8) define empirical referents.^[2]

IDENTIFY USES OF THE CONCEPT

There was no result when searching for the quality of EHR and EHR using popular online dictionaries.^[3-5]

The International Organization for Standardization technical report defines a basic generic EHR as a repository of information regarding the health status of a subject of care (patient or consumer) in computer-processable form.^[6]

Literatures on EHR and its associated terms were collected from Science Direct, CINAHL, and EBSCO, in which the articles were extracted from health sciences (nursing and health professions, medicine and dentistry, pharmacology, toxicology and pharmaceutical science, veterinary science, and veterinary medicine) and computer science; those published between 1998 and 2014 were retrieved. The following keywords were used to identify the relevant articles: electronic

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health record*, electronic health record and nursing*, and electronic nursing documentation*, EHR*. As the keyword search screened both the titles of articles and their abstracts, a large volume of irrelevant material was identified. So, consequently, the search was limited to titles only. From these articles, data regarding the attributes, antecedents, and consequences of EHR in nursing were extracted.

DEFINING ATTRIBUTES

According to Walker and Avant, attributes are those features that appear in a concept repetitively and aid researchers in distinguishing the frequency of a particular phenomenon from a similar one. Our literature helped us to identify the characteristics of EHRs in nursing. Those characteristics can be summarized into four defining attributes, namely: (1) user-friendly, (2) preserving security, (3) providing good performance, and (4) structured.

User-friendly

The literature review showed that EHRs should be user-friendly, which is easy to access, use, and understand.^[7-16] Some researchers described that EHRs should have the capacity of accessibility by multiple users^[17-20] and the design of the interface meet the user's needs,^[21] while it should also be convenient for the user when entering the data.^[22]

Preserving security

EHRs include medical history, notes, nursing care, and other information about patient's data including symptoms, diagnoses, medications, laboratory results, vital signs, immunizations, and reports from diagnostic tests such as X-rays. So, it should preserve security, which includes data protection and privacy.^[23-25] Some researchers described security, and it should provide a login procedure requiring at least username and password.^[26,27] It should also enable to view who, why, and under what circumstances the data were accessed,^[28,29] should verify/check the data entered, and should indicate when the data were modified.^[30]

Providing good performances

Literature reviews showed that EHRs should provide good performance, which can be described that EHRs should be fast in accessing data and information; data transmission and retrieval; and export and import data extraction.^[31,32] Some researchers also described EHRs in terms of good performance should be interoperability, which means it can be run by different operators and interact with other computers across local- or wide-area networks to support integrated care,^[33] and it should ensure portability.^[7]

Structured

Literatures indicated that EHRs should be structured, which means arranged in a sequence of elements. It includes the template of EHRs, language in nursing terminology,^[17,34] and the content and all the information in order to avoid ambiguity and inaccurate data.^[31,13,6,28]

CASE DESCRIPTION AND ANALYSIS FOR EHRs IN NURSING PRACTICE

Model case

Walker and Avant (2005) have described a model case that demonstrates "all defining attributes of the concept." The example of this case is provided below:

"R is an experienced nurse in medical ward in one hospital in Indonesia. This ward has been introduced to EHRs for health professions since one week ago. He was little bit worried because he had a few experiences in using computer. One day, when EHRs had been introduced to him during his shift, then he was so interested because he did not feel it difficult. Before he used it, he should log in using his ID number. At that time, he directly used it to his patient using EHR portable, and his patient had no complaint about it, even his patient was so excited to know. During assessing his patient, he did a mistake that he typed a wrong data, but he did not worry because he could modify it and the system simply detected his username. He fulfilled all structured data entry, and felt so convenient and spent less time for documentation approximately 10-15 minutes instead of using paper about 30-60 minutes per patient, and he had much time to do nursing care. The content of nursing documentation had been standardized that using NANDA NIC NOC, and he did not find any ambiguous about the diagnosis and intervention. When he found a problem about care and disease of patient, he could access much information directly to support his decision making, and he was also able to see all data/medical record of his patient in terms of medication from physicians, pharmacists, and nutritionists. His patient, during in hospital, felt wonder that his nurse paid much attention to him, and he felt satisfied with the nursing care."

This model case illustrates the successful achievement of all attributes of EHRs concept, and it supports to better nursing care and impacts to patient outcomes. First, the nurse found the system is user-friendly, felt comfortable, and could find all information about the patient in database. However, on the paper-based system, it was often difficult for him to find the patients' data because physicians always bring the medical record everywhere. Second, EHRs are secured; data privacy of the patients could be protected because no one can access. When nurse wants to modify the data, the system directly detected the username and ID number. Third, it is easy for the nurse to find information in terms of nursing care and disease to support decision-making. It also does not require much time for documentation. Finally, the nurse does not find the ambiguity in the content, and nursing terminology has been standardized using NNN.

Borderline case

In concept analysis, a borderline case is constructed as another example of the concept's use, but several of the defining attributes are purposefully excluded. Borderline case allows readers to begin understanding what the concept is not.^[2]

"J is a head nurse who manages his ward to apply EHRs. All nurses in this ward used to using it in caring their patients

during their shifts. Since EHRs have been applied in this ward, it has been reported that this ward can reduce the cost instead of using paper in nursing documentation. Some nurses also feel confident in their works, they look smart, and can make fast decision-making. They are so fast in entering data, as fast as the access for patient data and the information about nursing care. But, some of nurses find EHRs has no benefit in this ward, because interoperability of EHRs has not been optimized yet. So, the fragmented between nurse and the other disciplines still exists.”

This borderline case illustrates that, although that ward has been applying EHRs, it does not comprehend the integrated care for patient. So, the fragmentation between disciplines is still happening. It may cause overlap between the health professionals or may cause errors in taking care of patients, because it cannot provide good communication in order to collaborate between each other.

Contrary case

The following case does not reflect EHRs in nursing because it contains none of the defining attributes of the concept.

“A medical ward in x hospital introduces their nurses to apply EHRs. All nurses are very excited to use it immediately because they have been trained for using computer since last year. After one week using EHRs, some errors are happening because data in EHRs are not structured, there also has no log in, which everyone can be easy to change, manipulate, or modify without knowing who and for what they change the data. The connection also is very slow, and it spends much time for nurses to do documentation, and it has no time for taking care of patient. So, after that, nurses come back to paper-based documentation.”

ANTECEDENT

Antecedents are those events or incidents that must occur before the occurrence of the concept. A range of factors was considered as the antecedents of EHRs in nursing and was studied extensively. The antecedent in EHRs was IT resource associated with the availability of workstations, printers, Internet connections, training, and technical support.^[35-37]

CONSEQUENCE

Walker and Avant (2005) have defined consequences as those events or incidents that occur as a result of the occurrence of the concept. Some studies reported benefits of EHRs. A literature mentioned that EHRs could make integrated care that patient-centeredness is the core,^[38] because EHRs provide interoperability, which every discipline can see what other disciplines do, and avoid fragmentation. On the other hand, some studies indicated that EHRs improves data completeness,^[39] and completeness improves with time.^[40] A 2006 systematic review of health information technologies (including EHRs) and their effect on quality, efficiency, and costs identified “...decreased medication errors” as a major benefit.^[41]

EMPIRICAL REFERENTS

Empirical referents are classes or categories of actual phenomena that, by their existence or presence, demonstrate the occurrence of the concept itself. The empirical referents in EHRs in nursing are not existing in literature; some of the instruments measure the quality of EHRs,^[42] and the implementation of EHRs.^[43] So, it is needed to develop empirical referents to make the concept measurable. It will be described from attributes of EHRs and include items such as: Likert scale with level of agreement on a 5 point scale (1, strongly disagree; 5, strongly agree).

- a). EHR is user-friendly, easy to use, easy to access, and easy to understand. The design of the interface meets the needs and EHRs are convenient when entering data.
- b). Do EHRs provide security? (Yes/no)
- c). If yes, answer the following questions with Likert scale.
- d). Data are protected, privacy of patient is protected, EHR is possible to see who, why access data; EHRs verify/check the data entered; and EHRs indicate when data are modified.
- e). Template of EHRs is structured; it uses structured-nursing terminology.
- f). EHRs provide good performance, fast in accessing data and information, fast in data transmission and retrieval, and fast in exporting and importing data. EHRs provide interoperability, and EHRs ensure portability.

CONCLUSION

This concept analysis was undertaken to clarify and develop understanding the concept of EHRs in nursing practice. It reveals a unique set of attributes, antecedent, and consequences associated with EHRs in nursing.

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