Nursing Summary: designing a nursing section in the Electronic Health Record

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Summary. The introduction of new information technologies in healthcare led to major changes in the field of tools for managing and evaluating the assistance. In Italy, an example of applying new technologies to the healthcare context is the realization of Fascicolo Sanitario Elettronico (FSE). The FSE is a tool that collects online data and health and socio-health information that make up the patient's clinical history. The aim of this review is to analyze which components are needed to organize and structure the information and data within the "Nursing Summary". Literature searches were conducted using the following available online Databases: CINAHL, PubMed and Cochrane Library. The searches were conducted by analyzing publications from the last five years (2012-2016). The process of selection of articles led to the choice of 14 research studies. Additionally, national guidelines were analyzed, concerning official documents and technical specifications for the development of projects of FSE. The analysis of the scientific literature showed that nursing data in the EHR can be used to develop some Clinical Decision Support Systems. Relevant were also used to clarify how the nursing data could be structured in the "Nursing Summary". The research findings have identified which could be the main components of a possible nursing section to integrate the FSE. This project is proposed as a preliminary study that needs further development. (www.actabiomedica.it)

Key words: Electronic Health Record, nursing information system, electronic nursing documentation

Introduction

In the process of modernization of health, there are many initiatives aimed at improving the efficiency of health services and at the simplification of the exercise of the right to health of person. An example is the introduction of information and communication technologies (ICT) in healthcare. The use of ICT in healthcare has led to important changes in the field of tools used for the management and evaluation of assistance. One of the major changes concerns the transition from paper-based electronic-based information systems such as the Electronic Health Record (EHR).

An EHR is an electronic information system that contains retrospective, simultaneous and future information about the person's clinical history; these data and information are stored in digital format and are accessible and shared, both by the different professionals who take charge of the person and by the person himself [1, 2]. One of the main objectives is to have a complete and exhaustive collection of information that will ensure a better continuity of care and the development of a citizen-centered healthcare system.

In Italy, an example of electronic documentation, with similar structure and purpose of the EHR is the Fascicolo Sanitario Elettronico (FSE), one of the lead-

ing eHealth projects developed over the past years. The FSE is a tool that collects electronic data, concerning health and socio-health information that makes up the medical history and health of the person (3, 4). The patient's clinical history is available both for the user himself and for all healthcare professionals involved in taking care of the patient. The FSE is, therefore, a tool that contains information from the different healthcare professional. For this reason, the ministerial guidelines (3) defined sanitary profiles enabled to enter the information and how can they access the information (reading and/or writing) depending on the type of data entered. The data that can be entered have been divided into five categories: personal, administrative, prescriptive, clinic and consensus. Specifically for the nursing figure, the ministerial guidelines specify only those that should be the skills for reading personal, administrative, prescriptive and consensus data and for writing clinical and consensus data. The role of nursing documentation, and the use of data and information deriving from the assistance provided is not yet specified.

This suggested the idea of proposing the integration of the FSE with a dedicated nursing section. The nursing documentation is a key tool to ensure continuity of care and communication with other healthcare professionals. Specifically, the nursing documentation is the instrument that represents the ability of nurses to communicate health status, regarding the needs and responses of patients to the received care.

In addition, some studies suggest how nursing electronic documentation and, data sharing could contribute to the improvement of care and continuity of care (2, 5, 6). As stated in the study of Westra et al. (7) nursing information sharing is an important contribution to the welfare of the person, as they evaluate aspects of human response to health problems, emphasizing not only the clinical data but also the emotional, social and psychological aspects of the individual with respect to its state of health. The value of nursing data emerges, along with how their sharing could contribute, to the improvement of the assistance granted, in a multidisciplinary approach to the patient.

Considering these elements, seems appropriate to propose the integration of the FSE with a dedicated nursing section, titled "Nursing Summary". This section should consist of a single electronic document in which are gathered the salient information of the health condition of the person, in relation to the received nursing care. Shared in the FSE, nursing data and information could implement the quality of care provided, allowing both the nurses and other health professionals to base clinical decision-making on a broader collection of information. The aim of this paper is to analyze which components are needed to organize and structure the information and data within the "Nursing Summary".

Methods

To carry out the work, a literature review (8) approach was conducted.

The following research question has been elaborated: "What is present in scientific literature about the use and integration of electronic health data pertaining to nursing?". Several keywords have been chosen and then combined through Boolean operators "OR" and "AND". The used keywords are: electronic health records, electronic patient records, computerized patient record, electronic health information, electronic medical records, EHR and nursing.

Literature searches were conducted using the following available online Databases: CINAHL, PubMed and Cochrane Library. The searches were conducted by analyzing publication from the last five years (2012-2016). The choice to analyze only studies published over the past five years is due to the fact that, in the Italian context, the use of electronic information system represents a novelty, while in the international context is a more consolidated practice. For this reason, it was decided to analyze the most recent international literature regarding studies on electronic information system. Titles and abstracts returned by the search were read and assessed.

The results obtained from the research were imported into Endnote® database, eliminating duplicates and selecting only results in English language. Were considered only articles in English, because of not understanding of other languages such as Portuguese or Spanish.

The selected studies concern the development of instruments or the employment of methodologies

for a better management and use of nursing data in electronic documentation. The following studies were not considered of interest: nursing data usage in connection with specific diseases; nursing education; the satisfaction or the nurses› perception about the use of electronic health tools. Moreover, many of the studies were not included in the final selection because they were focused on implementing standardized nursing terminologies within the electronic health documentation. Exclusion criteria were added concerning the type of study (dissertations, editorials and posters). Irrelevant articles were excluded with respect to the title and the abstract, as the suitable results were analyzed by reading the full text. By reading the full text, studies that did not focus on the implementation or use of nursing data in the EHR have been excluded (Figure 1).

Finally, national guidelines concerning official documents and technical specifications for the development of projects of FSE were analyzed (3, 4, 9, 10).
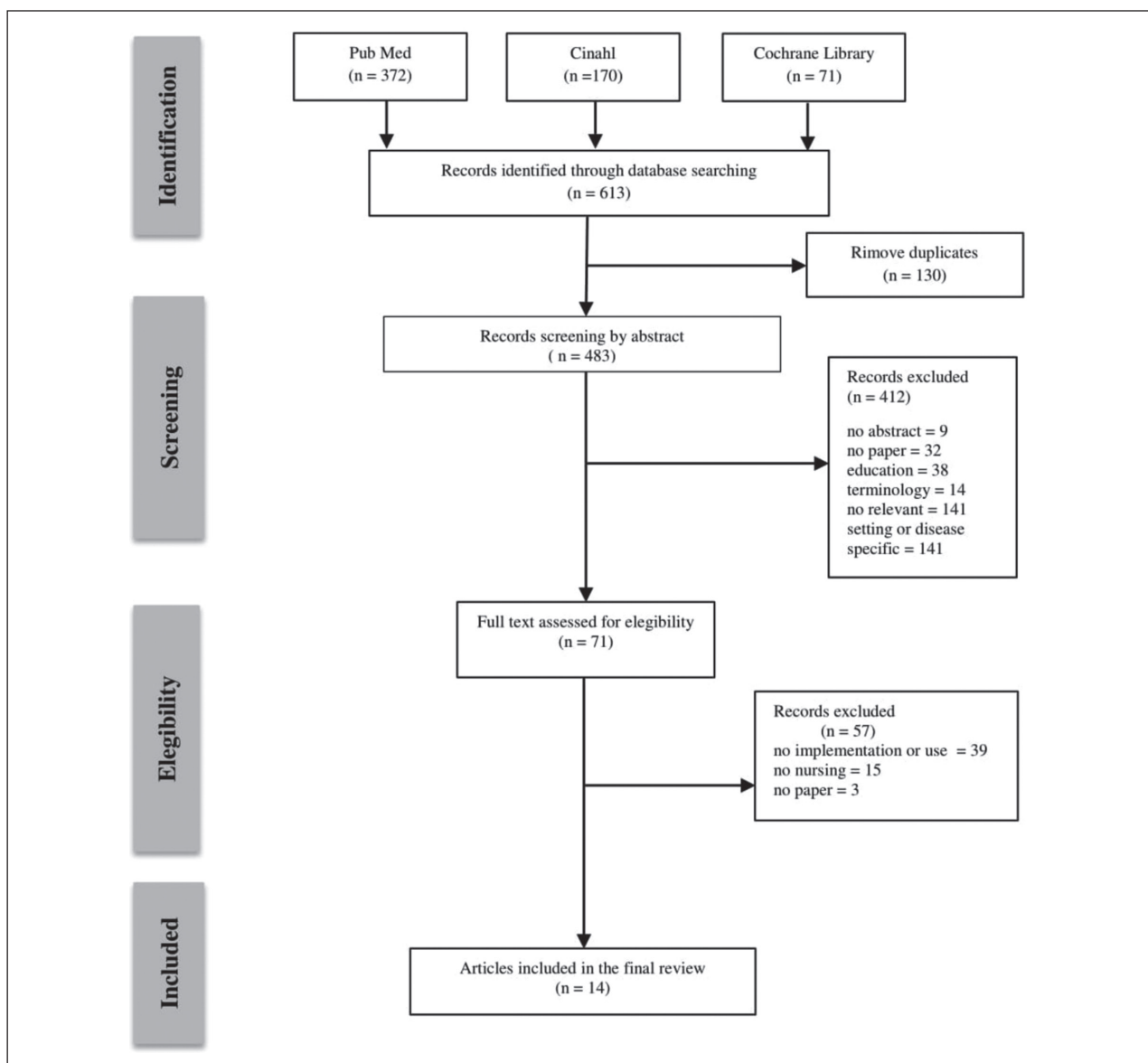

Figure 1. Flow chart

Results

The process of selection of studies was created according to the four phases of the PRISMA method (11). From the initial 483 identified references, and after the elimination duplicates, 14 relevant studies were considered (Figure 1).

The results obtained from the research of the scientific literature, have highlighted the lack of sufficient studies concerning the use of nursing data for the realization and implementation of tools or nursing sections within the electronic health records.

We considered studies that dealt with the implementation of tools or methodologies that make the information and data related to nursing, standardized and encoded so that they can be used for secondary assessments (e.g. administrative, statistical or economic) or to complete clinical decision support system. For this reason four studies were included in the final selection (12-15) that focus on a specific disease or setting of care (exclusion policy during screening). These studies were included as they dealt with the development of tools or methodologies that use nursing data present in the EHR, such as support to nursing care.

Most of the relevant studies (12, 13, 16-19) focus on the importance of encoding the nursing data contained in the databases of the EHR.

Three of the analyzed studies (14, 20, 21) focus on the development, of predictive models to be inserted in the electronic health records in order to improve and support the clinical practice, by analyzing the nursing data contained in the EHR. Two further studies (15, 22) develop instead specific software applications as tools to support and improve clinical practice. Specifically, the study of Topaz et al. (15) concerns the development of a Natural Language Processing (NLP) through an automated analysis of free text phrases that processes coded information. The study of Wilbanks & Langford (22) instead analyzes the possibility to develop a dashboard for hospital medical documentation to guide the nursing practice.

Two further studies included in this article (23, 24) are related to the development and validation of electronic nursing documentation tools that provide standardized data, which can be shared and used within the EHR.

Finally, the study of Looman (25) uses nursing data contained in the electronic documentation to get more information about the patients followed through a system of telenursing.

The results obtained from the literature review were used to understand which are the main components that the "Nursing Summary" should present in order for the information and data contained therein to be represented and shared within the FSE.

The main information regarding relevant articles were arranged in a table of data extraction (available upon request).

Discussion

The objective of the review is to analyze which components are needed to organize and structure the information and data within the "Nursing Summary". The results obtained are used to understand which are the main components that the "Nursing Summary" should have and how to organize them, to propose their integration in the FSE.

The "Nursing Summary" section is an electronic document that summarizes key information regarding the health condition of a person in relation to nursing care. To propose its integration into the FSE is necessary to establish a standard, organization of the document and to compare ways to share information, as set out in the ministerial guidelines (3, 4).

Defining standards of information means to define the contents, in order to ensure the ability to represent and use the information in the nursing section. One of the main requirements for this to happen is the use of standardized nursing terminology (16, 20, 26, 27) that encodes the data and makes it reusable. The use of a standardized terminology also allows representing the concepts and terms with which nurses document their assistance. For these reasons it is standardized nursing terminology define priority through which the information will be collected and stored. The study of Westra and colleagues (28) suggests choosing a standardized nursing terminology recognized by ANA, taking into consideration the context of the provision of care. For this reason, it is essential to perform a thorough examination of the clinical and organizational

setting in which will feed the nursing section and then choosing the most suitable language.

Even within ministerial guidelines (3, 4), is recommended the encoding of all data and information within the FSE, to ensure semantic interoperability between different regional systems. Semantic interoperability allows preserving the meaning and structure of information so that even the interpretation occurs correctly (29). In the choice of a standardized nursing terminology, it is therefore essential to consider a language that is mapped to a "reference terminology". The "reference terminologies" in fact make sure that the terms proper to discipline are connected with similar terms of meaning so that it is possible to share information between different professionals and between different information systems (28).

In addition, the possibility of having data on nursing in a standardized format and coded allows the use of high-quality information to produce new knowledge. For example, the analysis of data could be used to create predictive models or dashboard, to be included in the documentation, to improve and support the clinical practice (20-22).

After the definition of the contents, the source from which the information is collected must be defined. The information in the "Nursing Summary" is drawn from the nursing care plans (12, 16, 24), found in the clinical documentation used in the various health care setting of the National Healthcare System. The care plans content can be organized in different ways: either according to a specific setting of care, or based on the choices made at organizational level by healthcare facilities. What characterizes nursing care planning -and represents its methodological basis- is the process of nursing (23, 24). This provides a logical and systematic model for the planning and delivery of assistance that focuses on the person's needs. The data recorded by the nurse are then not only linked to the clinical patient dimension, but also to other dimensions that are extremely important to understand the state of the health of the person (30): the psychological and social dimensions (7). From this perspective, one can easily understand why it is proposed to insert the latter types of information in the nursing section. Rather the issue could be that the amount of available information in the care plans can vary, depending

on the clinical case and its complexity. For this reason, it is proposed that the nurses extrapolate the salient information in the "Nursing Summary" through an automated computer process. The nurses will choose what information might be useful to achieve the well-being, in a perspective of multi-disciplinary assistance, according to their professional knowledge and skills.

The aim is to give a concise overview of the state of health of the person, in order to guide nurses and other healthcare professionals in the management of care. To facilitate the consultation of the information, these are organized into categories (16). The main "Nursing Summary" categories considered appropriate are:

- Personal data: here should be incorporated the biographic information that enables the identification of the patient.
- Social-relational unity: this category should contain information on the social life of the client, such as a household, caregiver or support figures, taking into account their relationship with patients.
- Lifestyle: this section should contain with information regarding the main daily habits and lifestyle, such as the physical activity or smoking attitude.
- Nursing diagnosis: it concerns the most relevant nursing diagnosis defined according to the general health of the person.
- Nursing interventions: it covers the main actions taken by the nurses for charitable objectives to reach the wellness of the person.
- Outcome: it refers to major ratings at discharge and to more information about the activation of educational pathways.

The nursing information grants a wider vision of the general health of the patient. This would allow to expand the vision on the assisted, and to implement effectively a multidisciplinary and holistic approach to the care of the person. To clarify how the "Nursing Summary" could improve the provision of care, we can take as an example the context of home care, where different professionals provide a set of health services. In this context, where continuity of care is very important, the ability to share accurate information about the person is of paramount importance.

Another aspect to consider is the proper functioning of the exchange of information between the nursing documentation, the "Nursing Summary" and the FSE.

In view of the necessity of data sharing they should be stored in a database. This will ensure interoperability of different regional systems, as required by the ministerial guidelines (4). Regarding the "Nursing Summary", it makes sense, then, to determine the methods of communication between different databases (which will contain the nursing information) and the registry or regional repository to ensure information sharing.

Finally, in case of sensitive information it, is necessary to respect the regulations in force about data privacy and the legal value of the produced documents. According to the guidelines of the Ministry of Health (3, 4), the use of information contained in the FSE and the handling of sensitive data are regulated in the «Personal Data Protection Code» (9), which refers to the procedures for information recording and to a set of needed electronic documentation. Ministerial guidelines stipulate further that what is present in the «Guidelines on the subject of Electronic Health Record and Health File» of the Italian Data Protection Authority must be respected (10) for what concerns the sharing of electronic documentation.

Conclusion

The aim of proposing a nursing section within the FSE is linked to the possibility that nursing data can help to improve care and continuity of care for the health of the person. The literature analysis suggested that inputting nursing data, into electronic documents, reduces the dispersion of information, encouraging their sharing with other healthcare professionals. This is one of the elements supporting this proposal. The use of data contained in the "Nursing Summary" could contribute to a multidisciplinary care management, by allowing a more effective communication between different health professionals. Better communication can also contribute to a better formulation of multidisciplinary therapeutic and educational plans.

Another essential element in favor of the use of nursing data in electronic information systems is the possibility of having a broader and comprehensive view of the state of health of the person, contributing to a holistic view of the person and care.

Furthermore, the information collected and stored in a standardized format can be used to support the management, planning and evaluation of nursing care regarding quality, workload assessment (31) or complexity of care, as well as to support studies and scientific research.

In the current context, in which the development of eHealth, marks the transition from paper to electronic, the need for coded data and information becomes huge. The "Nursing Summary" could therefore represent an opportunity to improve the visibility of nursing interventions and their value within the care process. It could also represent an opportunity to increase the knowledge and professional skills in the management of electronic information tools.

Since this work is intended as a preliminary study to conceive and analyze the potential characteristics of the "Nursing Summary", further investigation and research is necessary.

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