Analysis of the Nursing Documentation in Use in Portugal – Building a Clinical Data Model of Nursing Centered on the Management of Treatment Regimen

Inês CRUZ[a,1], Fernanda BASTOS[b], Filipe PEREIRA[b], Abel SILVA[b], Paulino SOUSA[b]

[a] *Nursing Professor at Nursing School of Porto, PhD Student in Nursing Science*
[b] *Nursing Professor at Nursing School of Porto, PhD in Nursing Science*

Abstract. The use of technology to support information produced by nurses, especially information and communication technologies, is a current reality, but the proliferation of different statements of nursing diagnosis has made it more difficult for the production of indicators, hindering semantic interoperability of data. This study analyzed all statements of diagnosis focused on the management of medication regimen, customized to the Nursing Practice Support System (SAPE®) that was being used in Portugal in 2013. A total of 598 statements of nursing diagnoses about the phenomenon under study were analyzed, through an *a priori* analysis model - the ISO 18104 standard: 2003. The purpose was to identify terms used by nurses to describe the range of diagnoses, thus avoiding conceptual redundancy. After a content analysis process conducted by researchers and a broader group of experts, and when excluded all conceptual redundancy, 30 statements of nursing diagnosis were identified.

Keywords. Nursing Information Systems, Nursing Diagnosis, Clinical Data Model, Management of Treatment Regimen

1. Introduction

Since 1999 a digital platform of a Nursing Information System (NIS) is being used, comprising the International Classification for Nursing Practice (ICNP® beta 2 version) [1]. Nowadays, the majority of the Portuguese health care services have adopted this information system. This NIS is used in more than 50 hospital units and more than 300 primary health centres. The main features of the NIS are: the inclusion of ICNP® language; customized contents for care units; referential data integrity; and the NIS integration in the Health Information Network [2].

One of the goals in the genesis of this NIS was contributing to "nurses' reflection on their practice through the need of customization in each care unit" [3]. This initial goal, which was decisive for the dissemination of the NIS, has led to the conception of a vast number of statements of diagnosis in each institution over the past few years. The proliferation of different statements of diagnosis and interventions in the NIS,

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[1] Corresponding author: PhD Student, Adjunct Professor at Nursing School of Porto. Rua Dr. António Bernardino de Almeida 4200-072 Porto. Email inescruz@esenf.pt

often reflecting the same reality, makes information management and production of indicators more difficult, highlighting semantic interoperability problems [4, 5]. These interoperability problems disclose the need for harmonization of available contents through the definition of clinical data models (CDM) based on archetypes [4, 5].

The Centre for Information Systems Research and Development (CIDESI) of Nursing School of Porto, a research centre devoted to Information Systems (IS) and the use of ICNP® language, accredited by the International Council of Nurses, is engaged in an ongoing research project – "Conception of nursing care: clinical data models and IS" – aiming at the development of CDM in nursing. One of the primary phases of the project includes the analysis of customized nursing documentation in the most widely used IS in Portugal.

The complexity of therapeutic regimen management as a phenomenon related with self-care of people with chronic disease is a central area for nursing practice [6, 7]. Self-care can be interpreted as personal and daily care required by the individual to regulate his own operation and development [7]. This analysis focuses on "health deviation self-care requisites" [8], which are requirements arising from illness or injury situations.

In fact, one of the great challenges that health systems, their employees and clients face nowadays is the substantial increase of chronic diseases, which already represent the leading cause of death and morbidity in Portugal and in the world [9].

In this study, our concern is focused on management of the therapeutic regimen. However, given the extent and complexity of the subject, we limit the analysis to one aspect of the regimen cross-related to all situations of chronic disease – the medication regimen. The selection of this component of the regimen is motivated by the significant increase in the number of chronic diseases. In many cases several chronic diseases coexist in the same individual, adding the need to take multiple medications to control them, thus increasing the complexity of the regimen and the difficulty in managing it.

2. Methods

This study is thus focused on the analysis of nursing documentation being used in the Portuguese NIS. It is a qualitative study, as insofar identifies exemplarities and takes into account the dimension of the phenomena represented in the NIS. The aim of this study was to identify the terms used by nurses to document nursing diagnoses centered on the management of therapeutic regimen, more specifically on one of its components – the medication regimen.

The aim of the analysis in this study was the customization of the NIS in use, known as SAPE® (Nursing Practice Support System) concerning all health centres and public hospitals in Portugal, dated January 1, 2013. Content analysis was conducted by the main researcher and validated by the two other researchers. After this first stage of analysis, data was presented to a group of fourteen Portuguese experts in the field of NIS, particularly those integrating CIDESI, with the final purpose of reaching consensus on the content to be included in the CDM.

Content analysis of nursing documentation was based on the 2013 ICNP® version, to make easier future "migration" of terms and clinical content to a more up-to-date version of the ICNP®. The analysis was structured based on the ISO 18104: 2003 standard [10].

3. Results

A total of 598 statements of nursing diagnoses centered in management of medication regimen were identified. The comparative analysis of different statements disclosed multiple redundancies, i.e. different syntaxes for the same semantics. Redundancy resulted from the use of different focuses to represent the same diagnosis, as well as different terms to represent judgments or dimensions in which the focus was envisaged.

To represent the core focus, 24 terms were considered, such as adherence to therapeutic regimen, self-medication, management of therapeutic regimen, etc. From the analysis and reached consensus, it was decided that the focus would be "Managing medication regimen".

After an analysis of the judgments about this focus, 32 different terms were identified. Since the majority of these 32 different terms refer to damage or ineffectiveness, they can be represented as "impaired" (10012938).

However, one of the terms that appear in customizations of the NIS, as judgment on the focus refers to "chance for", having a positive connotation. The "chance for", which is a concept of probability axis in beta 2 version of ICNP®, is used when considering that "a desirable nursing phenomenon is estimated to occur with a certain probability" [1]. This judgment is used in some services adopting a more focused nursing diagnoses in the client's potential to develop or improve the "management of medication regimen" and less concerned with the "problem" or person limitation. The way to represent this documentation logic with the 2013 version of ICNP® requires the use of concatenation of the term "potentiality" (10015151), which is a "state" with the term "enhancing" (10006945) – "potential to enhancing".

In some statements of nursing diagnoses, nurses used gradients to judge the problem more specifically, such as: low, moderate, high and very high grade (example: "Management of therapeutic regimen ineffective in very high degree". It is worth noticing the lack of evidence and formal knowledge support to sustain the use of these gradients. After expert consensus, different judgments with low and moderate gradients were categorized as "partial" (10014081); due to the semantic proximity the high and very high gradients were categorized as "total" (10019876).

As for the statements of diagnoses being used, we found that often such terms – other focus – were used to compose the syntax. These terms, considering ISO 18104: 2003 standard, are understood as "dimensions" for which the principal focus is to be put in perspective, or as a quality owned by the individual or group that offers a perspective on the focus as to the nursing diagnosis [9]. A total of 20 different "dimensions" were found, such as cognitive learning, knowledge, decision making, support, willpower, health belief, etc. After analysis by the expert group, they were reduced to 6: knowledge (10011042); ability (10000034); awareness (10003083); meaninglessness (10023900); support (we suggest the inclusion of this term) and family support (10023680) (table 1).

Table 1. Examples of the new categorized dimensions

Focus	Dimension
Managing medication regimen	Knowledge about ….
	Ability to…
	Awareness of …

When we looked at the judgments associated with dimensions in which the focus is put in perspective we found 8 terms, such as "not demonstrated", "demonstrated in moderate degree", "chance for", etc. These 8 terms can be represented by a single expression – "potential to enhancing". The following sentences are examples of using this expression in statements of diagnoses to be included in the CDM: "Potential to enhancing knowledge and the ability to administering medication" and "Potential to enhancing family support to manage the medication regimen".

From the content analysis comprising the various dimensions in which the focus is put in perspective, the need to "specify" the content of each dimension associated with the focus has emerged. The specification of dimensions found can be summarized as follows: ways of administering medication (inhaled, subcutaneous); type of medication (insulin, vaccine, etc.); monitoring physiological parameters (blood glucose, blood pressure, etc.); effects of medication (response to medication and side effect of medication); complications of compromised drug regimen, and the use of devices.

The 589 statements of nursing diagnoses identified, after comparative analysis and consensus among experts, were reduced to 30 clinically useful statements, which will be included in the CDM to be specified.

4. Discussion

The few existent studies that make a conceptual analysis of the terms used to identify the nursing diagnoses in the NIS highlights the importance of this type of studies, with the aim of improving the disciplinary knowledge in this area. The 2013 version of ICNP® does not consider the concept of management of therapeutic regimen, but self-management of disease, that is not necessarily a synonym. Whereas managing the therapeutic regimen, and in particular the medication regimen, is related with the individual's ability of managing a pharmacological treatment plan to control his/her disease, settled with the health professional, the disease self-management encompasses other aspects, such as signals and symptoms management [7].

In the absence of a classified term to represent the "focus", we believe that the concatenation of the terms "managing" (10011625) and "medication regimen" (10011884), in the expression "Managing medication regimen" is quite representative of the concept under study. Managing (10011625) is, according to ICN (2013), a self-initiated and intentional action. It can thus be understood as a self-care behaviour, which must be held and managed by the individual, and the medication regimen (10011884) relates to a specific component of the regimen.

 The intention to eliminate the conceptual redundancy concerning terms to represent judgments about the focus allowed us to identify two "judgments": "impaired" to represent diagnoses with a negative formulation; and "potential to enhancing" to represent diagnoses with a positive connotation. Two examples of the new categorization of these sentences of diagnoses are: "Managing medication regimen impaired", and "Potential to enhancing managing of medication regimen".

As for the judgment gradients on the focus, in this area of self-care, a self-initiated behaviour, the evidence to support the appropriate definition of gradients or the intensity of the diagnoses centered on managing medication regimen is diminished. Even its clinical usefulness is questionable. We believe that it is very difficult to distinguish between "low level", "moderate" or "high". It may be useful to speak of, for example, "partial" or "total" impaired when we refer to the extension of the "problem".

The dimensions of the focus – "Managing medication regimen" – according to what has emerged in this phase of the project are 6: knowledge (10011042); ability (10000034); awareness (10003083); meaninglessness (10023900); support and family support (10023680). Knowledge refers to the development of the client's informational content about how to manage his medication regimen. The ability reports to the development of client instrumental skills, concerning the way of administering and managing his/her medication. The awareness [11] reports to the knowledge and the client recognition of his/her ability to manage the medication regimen, which somehow brings us to the client perception of the ability to take and manage medication. The meaninglessness [11] is associated with the meaning that the client attributes to the medication management, and the difficulties that he/she encounters in this process. The support [11] is related to the external resources of the client, and can be multiple, which may be a facilitating factor in managing drug regimen. One of these external resources is the family; therefore the last dimension is family support.

These 6 dimensions, according to Meleis et al. [11], refer to conditions that can influence, positively or negatively, the development process of client mastery to manage their medication regimen. As for terms that can be used as judgments, in association with these 6 dimensions, our findings suggest that nurses should not only identify constraints or "problems" of clients, but also proceed to the identification of each person's potential to improve.

We believe this will be a first contribution to the definition of a CDM on management of the medication regimen, which will facilitate semantic interoperability between different information systems. Moreover, these results will be confronted and expanded with literature reviews about the phenomenon under study at a later stage.

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