RESEARCH PAPER (ORIGINAL)

Mapping and definition of terms used by nurses in a hospital specialized in emergency and trauma care

Mapeamento e definição de termos registados por enfermeiros de um hospital especializado em emergência e trauma

Mapeo y definición de términos registrados por enfermeros de un hospital especializado en urgencias y trauma

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Abstract

Background: Cross-mapping is a technique used in studies by the International Classification for Nursing Practice (ICNP®). The definition of new terms must apply principles of terminological definition.

Objectives: To map terms used by nurses in patient records according to ICNP®, and to define 15 terms which are not listed in the classification.

Methodology: Cross-mapping using the 2011 and 2013 versions of ICNP®. Terms were defined in accordance with the principles of terminological definition and assessed by 5 specialists by means of the Content Validity Index.

Results: Of the 2,638 terms identified, 2,349 were not listed in ICNP® 2011. Of these, 1,431 are identical, similar, or included in the definition of another term of ICNP® 2013. Of the 63 new terms, 15 were defined. Thirteen definitions were validated, and 2 were rewritten.

Conclusion: The use of similar terms shows that nurses have little contact with classification languages. The principle of simplicity can prevent the validation of definitions.

Keywords: nursing records; terminology; classification; concept formation

Resumo

Enquadramento: A técnica de mapeamento cruzada é utilizada em estudos pela Classificação Internacional para a Prática de Enfermagem (CIPE®). As definições de termos novos devem aplicar princípios de definições terminológicas.

Objetivos: Mapear termos utilizados por enfermeiros em registos de utente com a CIPE® e elaborar definição para 15 termos não identificados na classificação. Metodologia: Mapeamento cruzado com a CIPE° 2011 e 2013. As definições foram elaboradas segundo os princípios de definições terminológicas e avaliadas por 5 especialistas, por meio do Índice de Validade de Conteúdo.

Resultados: Dos 2.638 termos identificados, 2.349 não constavam na CIPE® 2011. Destes, 1.431 são idênticos, similares ou presentes na definição de outro termo da CIPE® 2013. Dos 63 termos novos, 15 foram definidos. Treze definições foram validadas e 2 reformuladas. Conclusão: O uso de termos similares demonstra pouca aproximação dos enfermeiros com linguagens classificatórias. O princípio da simplicidade pode determinar a não validação de definições.

Palavras-chave: registros de enfermagem; terminologia; classificação; formação de conceito

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Resumen

Marco contextual: La técnica del mapeo cruzado se utiliza en estudios de la Clasificación Internacional para la Práctica de Enfermería (CIPE®). Las definiciones de términos nuevos deben aplicar los principios de las definiciones terminológicas.

Objetivos: Mapear términos utilizados por enfermeros en registros de usuarios con la CIPE® y elaborar una definición para 15 términos no identificados en la cla-

Metodología: Mapeo cruzado com la CIPE® 2011 y 2013. Las definiciones se elaboraron de acuerdo con los principios de las definiciones terminológicas, y las evaluaron 5 especialistas por medio del Índice de Validez de Contenido.

Resultados: De los 2.638 términos identificados, 2.349 no constaban en la CIPE® 2011. De estos, se identificaron 1.431, similares o presentes en la definición de otro término de la CIPE® 2013. De los 63 términos nuevos, se definieron 15. Se validaron 13 definiciones y se formularon 2.

Conclusión: El uso de términos similares demuestra la poca aproximación de los enfermeros a los lenguajes clasificatorios. El principio de simplicidad puede determinar la no validación de las definiciones.

Palabras clave: registros de enfermería; terminología; clasificación; formación de concepto

Received for publication: 15.09.16 Accepted for publication: 29.11.16

Revista de Enfermagem Referência | Série IV - n.º 12 - JAN./FEV./MAR. 2017

Introduction

In their work environment, nursing professionals use a specialized language which is represented by a set of terms. The terms of a specialized language should be recorded in a standard manner in order to allow the use of data and information from nursing records in research, management, education, and development of public policies (Garcia & Nóbrega, 2013).

The International Classification for Nursing Practice (ICNP®) is becoming the most commonly used terminology classification system for standardizing the documentation of nursing care. It is a combinatorial and enumerative terminology composed of primitive and pre-combined concepts which represent nursing practice (Conselho Internacional de Enfermeiros, 2015). The classification was developed by the International Council of Nurses (ICN), which approved its creation in 1989. Throughout its existence, the structure of ICNP® was adapted and terms were included in a process of ongoing development (Garcia & Nóbrega, 2013).

ICNP® terms are currently structured based on the 7- Axis Model (focus, judgment, means, time, action, client, location). Since Version 1.0 (2005), terms related to nursing diagnosis, outcomes, and interventions are also listed. According to ICNP®, focus is "an area of attention that is relevant to Nursing"; judgment is the clinical opinion related to the focus; means are the manners or methods through which an intervention is executed; time is "the instant, period, moment, interval or duration of an occurrence"; action is an "intentional process applied to, or performed by a client"; client is the subject being diagnosed or the beneficiary of the intervention; and location is an "anatomical or spatial orientation of a diagnosis or intervention" (Conselho Internacional de Enfermeiros, 2015, p. 29).

The implementation of a classification system in care environments entails a previous comparison between the information in patient records and the standardized language (Luciano, Nóbrega, Saparolli, & Barros, 2014). Such a comparison is called cross-mapping. The results from the use of this technique can help professionals be aware of terms which they use on a daily basis but record in a non-standardized way.

Despite its evolution, ICNP® still has limitations in representing nursing practice. A Korean study on the applicability of ICNP® to home care nursing concluded that it should be improved and that more terms should be added, namely to the focus and action axes (Kang, Kim, Lee, Jung, & Kim, 2015). Taking into account that the major goal of ICNP® is to facilitate the representation of nursing practice, its concepts should be analyzed in and applied to clinical practice (Garcia, 2016). Its implementation will be more effective if nurses are able to identify the meaning of the recorded terms in the ICNP®. As such, the definition of terms not included in ICNP® may improve their identification.

With the purpose of serving as basis for the proposal to standardize patient progression records at a university hospital, and suggesting the addition of new terms to ICNP®, this article aims to map terms used by nurses in patient records based on ICNP® and define 15 terms that are not listed in the ICNP®.

Background

Researchers have used cross-mapping between ICNP® terms and terms listed in nursing terminology databases as a necessary step towards the creation of subsets of nursing diagnosis, outcomes, and interventions in different care domains, for example, physical-motor rehabilitation (Souza, Andrade, Napoleão, Garcia, & Chianca, 2015) and child development (Dantas, Souza, & Nóbrega, 2013).

Tannure, Salgado, and Chianca (2014) crossmapped nursing diagnoses for adult patients admitted to intensive care units based on ICNP® and NANDA-I diagnoses (NANDA International, Inc.), and identified 47 diagnoses that were not listed in the NANDA-I. The findings from this study suggest the need for further research and proposals for term validation so as to contribute to the development of both classifications (Tannure et al., 2014). This conclusion justifies the relevance of the topic addressed in this article. ICNP® terms have also been cross-mapped with other terminological languages, such as the Systematized Nomenclature of Medicine-Clinical Terms (SNOMED CT), with the purpose of enabling interoperability between terminologies (Kim, Hardiker, & Coenen, 2014).

The definitions of terms that are not listed in standardized languages such as ICNP® should be based on principles for drafting terminological definitions (Pavel & Nolet, 2002): a) predictability - the definition should insert the concept into a conceptual tree, according to the term hierarchy in ICNP®; b) simplicity the definition should be concise and clear, and no longer than one sentence; c) affirmativeness - the definition should state what the concept is, rather than what it is not; d) non-circularity - the definition should not refer to other definitions, which in turn refer back to the concept being defined; e) absence of tautology - the definition should not be an explanation of the term, but rather a description of the semantic features of the concept.

Research questions

Are the terms used by nurses in patient progression records listed in ICNP®? It is possible to recognize the principles of terminological definition in the definitions drafted for terms that are not listed in ICNP®?

Methodology

This is a descriptive, quantitative study on 148,299 electronic patient records made by nurses at a university hospital located in a capital city of the Southern region of Brazil. The records corresponded to the total number of annotations over a 2-year period.

This is a high-complexity hospital specialized in trauma and emergency care. Patient progression is recorded in an unstructured field, allowing for free text insertion. The secondary database was provided by the hospital in 2013, without patient identification and chronologically organized by patient date of admission into an electronic spreadsheet.

A total of 257,893 terms were extracted from the records using a software tool called Poronto (Zahra, Carvalho, & Malucelli, 2013), whose initial feature allows the extraction of word classes from free texts. In this case, we used broad categories: *simple terms* and *com-*

pound terms. After the extraction, the tool lists the terms by order of occurrence.

The listed terms were submitted to a process of exclusion of terms not eligible for mapping with nursing specialized language. To this end, we used the description of an alternative method for the creation of a terminology database of nursing specialized language (Tannure, Chianca, & Garcia, 2009). A total of 147,193 terms were excluded, consisting of repeated words, isolated letters (e.g., a, o), and symbols (e.g., a, +). Thus, the corpus was composed of 110,700 terms.

The standardization process was performed by a researcher and independently reviewed by two researchers. First, mistyped words were adjusted (e.g., abdômem to abdômen). Then, all verb tenses were put into the infinitive (e.g., trocando and trocado to trocar); plural was changed to singular (e.g., mãos to mão); and only masculine words were used (e.g., aumentado and aumentada to aumentado), except for common gender nouns (e.g., urina). This standardization was based on how terms are presented in ICNP®. During this step, 108,062 repeated words were excluded, thus the mapping was performed on a corpus composed of 2,638 terms.

The terms were cross-mapped with ICNP®2011 using the Access® software, to which the spreadsheet with 2,638 terms and the 3,290 terms from ICNP® 2011 were imported. The mapping produced two sets of terms: the first set was composed of terms that can also be found in the ICNP® (these were called listed), and the second set was composed of terms that could not be found in the ICNP® (these were called unlisted).

The listed terms were organized according to ICNP® 7-Axes Model and the unlisted terms were mapped with ICNP® 2013 because this version was released during the research period. We decided to perform a second mapping using only the unlisted terms to prevent a term from being considered new while already being included in the 2013 version. In addition, some terms can be excluded from new versions. Thus, the justification for not mapping listed terms relates to the purpose of defining terms: if the term was excluded from the 2013 version, its definition could be found in the 2011 version.

This second mapping resulted in four sets of

terms: terms identical to ICNP®, composed of identical terms to those of the ICNP®; similar terms, composed of the terms written in a different way, but with similar meaning; terms missing from ICNP®, but present in the definition of another term; and new terms, which were not identified in ICNP® 2013. This process was manually performed by three researchers who reached consensus after the presentation of individual results. The set of new terms was re-examined by these researchers, since some words tend to be used in informal speech (Tannure et al., 2009), but do not belong to a specialized language, and other terms may belong to other areas of knowledge. Although these terms are usually found in records made by health professionals, they are not specific to the profession nor do they limit the process of nursing diagnosis, outcomes, and interventions.

The reanalysis was also done because of the correlation found between the number of terms included in ICNP® 2013 and the number of terms initially classified as new. ICNP® 2013 has 3,894 terms (Conselho Internacional de Enfermeiros, 2015), and the number of terms classified as new (described in the results) represented 23.57% of the total number of terms of an international classification.

The following terminological categories were reanalyzed: a) Representatives of adjectives (e.g., orangish, yellowish); b) Indirectly applicable to nursing (e.g., theft, wage); c) Representatives of objects (e.g., handcuff, door); d) Referring to signs and symptoms (e.g., palpitation, contraction); e) Related to pathologies (e.g., hemophiliac, paraplegia); f) Referring to body components, included in broader terms of ICNP® hierarchy (e.g., ligament, tendon). Definitions were drafted for the terms resulting from the reanalysis. The group of researchers reached a consensus and selected 15 terms to be defined based on the higher number of occurrences of the term in patient progression records or on the level of nurses' adherence to the term in emergency and trauma care set-

The definition process was conducted by a researcher who used technical dictionaries and Portuguese language dictionaries in the attempt to provide an evidence-based meaning in compliance with the definitions found in ICNP®. The principles for drafting terminological definitions (Pavel & Nolet, 2002) were subsequently applied. The drafted definitions were analyzed by five nursing experts from different Brazilian regions, who were selected due to their studies on drafting terminological definitions for ICNP®. These experts were invited by email to participate in the study.

Each term was assessed based on each terminological principle, and was assigned the value 1 (one) if "agree" and 0 (zero) if "do not agree", with the possibility of making suggestions. Data were analyzed by means of the Content Validity Index (CVI; Alexandre & Coluci, 2011) using the mean score of each item, which was calculated individually. Definitions that reached an overall CVI ≥ .80 among experts were considered as valid. Definitions with CVI < .80 were adjusted taking into account the experts' suggestions. After this process, the defined terms were organized according to ICNP* 7-Axes Model.

The procedures adopted in this study complied with all ethical requirements. The project was approved by the Ethics Research Committee of the Pontifical Catholic University of Paraná - Brazil, opinion no. 96.331, of 13/09/2012.

Results

The cross-mapping between the terms used in the university hospital and ICNP® 2011 resulted in the identification of 289 terms listed in ICNP® and 2,349 unlisted terms. The listed terms were organized according to the 7-Axes Model of ICNP® 2011 as follows: 128 terms in the focus axis; 11 in the judgement axis; 40 in the means axis; 35 the action axis; 13 in the time axis; 58 in the location axis; and four in the client axis.

The focus axis was predominantly composed of terms from the process class (e.g., ferida, eliminação, and contusão), body process subclass; the judgment axis was composed of negative aspects (e.g., prejudicado, alterado, and deficit); the means axis was composed of artefacts used in direct care (e.g., muleta, cobertura, and cateter); the action axis consisted of interventions aimed at operational issues (e.g., irrigar, imobilizar, and comprimir); the location axis was composed of terms related to anatomical sites (e.g., braço, perna, and

abdómen); and, the client axis included terms directly related to the inpatient (e.g., *adulto*, *utente*, and *adolescente*). There were no quantitatively predominant terms in the time axis.

In the cross-mapping between the 2,349 unlisted terms and ICNP® 2013, we identified 366 terms identical to the classification; 622 similar terms; 443 terms found in the definition of another term; and 918 terms classified as new. Of the 366 identical terms, we identified 27 nursing diagnoses and 12 nursing interventions.

After reanalyzing the 918 new terms, 297 terms classified as representatives of adjectives that could not be included in the judgment axis; 273

terms indirectly applicable to Nursing; 57 terms classified as representatives of objects that could not be included in the means axis; 29 terms referring to signs and symptoms; 65 terms were related to pathologies; and 134 terms referring to body components that were included in broader terms of ICNP® hierarchy; and 63 new terms.

Fifteen of the 63 new terms were selected to be defined: agonia; agora; ampola; anasarca; berço; colar cervical; concussão; equimose; esvaziar; maca; serviço de fonoaudiologia; tracionar; posição de Fowler, unidade de cirurgia; and via cistostomia. The result of the experts' analysis is represented in Table 1.

Table 1
Content Validity Index (CVI) of the definitions drafted for the new terms identified in patient progression records, according to the principles of predictability, simplicity, affirmativeness, non-circularity, and absence of tautology

Term	CVI P1	CVI P2	CVI P3	CVI P4	CVI P5	OVERALL CVI
Agonia (agony)	.80	1.00	1.00	1.00	1.00	.96
Agora (now)	1.00	.80	1.00	1.00	1.00	.96
Ampola (ampoule)	1.00	1.00	1.00	1.00	1.00	1.00
Anasarca (anasarca)	1.00	.80	1.00	1.00	1.00	.96
Berço (crib)	1.00	.80	1.00	1.00	1.00	.96
Colar cervical (cervical collar)	1.00	1.00	1.00	1.00	1.00	1.00
Concussão (concussion)	.80	.60	1.00	1.00	.80	.84
Equimose (ecchymosis)	1.00	.80	.80	1.00	1.00	.92
Esvaziar (to drain)	1.00	1.00	1.00	1.00	1.00	1.00
Maca (stretcher)	1.00	.60	1.00	1.00	1.00	.92
Posição de Fowler (Fowler's position)	.80	1.00	.80	1.00	.80	.88
Serviço de Fonoaudiologia						
(speech-language pathology unit)	1.00	.60	.80	.80	.80	.80
Tracionar (to draw)	1.00	.60	1.00	1.00	1.00	.92
Unidade de cirurgia (surgical unit)	.40	.80	.60	.80	.80	.68
Via cistostomia (cystostomy route)	.60	.80	.60	.80	.80	.72
CVI mean score	.89	.81	.91	.96	.93	

Note. CVI = Content Validity Index; CVI P1 = Content Validity Index - Principle of predictability; CVI P2 = Content Validity Index - Principle of simplicity; CVI P3 = Content Validity Index - Principle of affirmativeness; CVI P4 = Content Validity Index - Principle of non-circularity; CVI P5 = Content Validity Index - Principle of absence of tautology.

The experts' suggestions were taken into account in the definition of terms that did not reach a CVI \geq .80: *unidade de cirurgia* and *via cistostomia*. For the latter, the suggestions were related to the need to explain the term; however, to comply with the principle of predictability, the definition was not modified, and the generic form, for example, bodily route, was kept.

The definition for the term *unidade de cirurgia* was changed. The term was initially defined as Healthcare Unit, but, after the experts' assessment, the following information was added: set of rooms where surgical interventions are performed. Table 2 describes the terms with CVI ≥ .80 per axis and the corresponding definition.

Table 2
Terms and definitions distributed according to the International Classification for Nursing
Practice (ICNP®)

Term	Axis	Definition			
Anasarca (anasarca)	Focus	Water retention: generalized edema, caused by the accumulation of liquical tissues and body cavities, without specification of body site.			
Agonia (agony)	Focus	Dying process: period preceding death, characterized by a progressive weak ness in vital functions, and that may last minutes, hours, or days.			
Concussão (concussion)	Focus	Injury: impact resulting from kinetic forces that cause the brain to rotate within the skull, affecting it as a whole; expressed mainly through confused facial expressions, disorientation, slow verbal and motor reaction, slurred or inconsistent speech, loss of coordination, migraine, loss of memory, and fatigue.			
Equimose (ecchymosis)	Focus	Bleeding: dark or bluish skin patches caused by blood overflow into the subcutaneous tissue, without edema, due to injury or rupture of small blood vessels.			
Esvaziar (to drain)	Action	To remove: to take something (or the contents of something) out in order to empty it.			
Tracionar (to draw)	Action	To execute: the act of gently pulling a mobile object out of a body cavity.			
Posição de Fowler (Fowler's position)	Location	Body position.			
Ampola (ampoule)	Means	Vial: fully closed and sealed container for holding liquids or fluids.			
Berço (crib)	Means	Assistive device: individual bed for newborns who do not require intensive care.			
Colar Cervical (cervical collar) Means		Immobilizing device: cervical spine immobilizer placed on the neck, used for temporary immobilization in emergency situations and in the postoperative period of some cervical diseases.			
Maca (stretcher) Means		Vehicle: rectangular bed with wheels, used to transport sick and/or injured patients in the supine position.			
Serviço de Fonoau- diologia (speech-language pathology unit)		Healthcare service.			
Agora (now)	Time	Moment in time or time interval.			

Note. Adapted from Pleis, LE. (2015) Definição de termos identificados em linguagem de enfermagem fundamentados na Classificação Internacional para a Prática de Enfermagem (CIPE®); Master's Dissertation, avaialable at: http://www.biblioteca.pucpr.br/tede/tde_busca/arquivo.php?codArquivo=3162.

Discussion

Studies that cross-mapped terms used in patient records with ICNP® point to a reduction in the number of terms comprising the corpus of analysis, after the process of exclusion and standardization (Albuquerque et al., 2015; Silva, Nóbrega, Medeiros, Jesus, & Pereira, 2015; Souza et al., 2015). In the domain of physical and motor rehabilitation, less than 1% of the listed terms initially extracted remained (Souza et al., 2015). This corroborates the results from this study, which used a corpus composed of slightly more than 1% of the universe of terms initially extracted.

On the other hand, when patient records are not the empirical basis for term extraction, this percentage increases. For example, a terminological mapping of published studies on domestic violence resulted in a corpus with 5.26% of the initially listed terms (Albuquerque et al., 2015), and a terminological mapping of interviews to palliative care nurses resulted in a corpus with 28% of the initially listed terms (Silva et al., 2015).

We observed a predominance of terms from the body process subclass in the cross-mapping process, which may be related to the characteristics of the hospital patients, as well as to the standard care model used in that setting (Trindade & Pires, 2013). The body process subclass of ICNP® includes terms related to vital functions (Conselho Internacional de Enfermeiros, 2015), which reflects a particular care need focused on life preservation from the perspective of the biomedical model.

The predominance of terms related to body process in patient records reflects that hospital nursing is still focused on the biomedical model. This fact was identified in a previous study (Trindade & Pires, 2013), which discusses autonomy in the nurses' work, particularly when their interventions are not directed towards nursing care.

In the client axis, the insufficient use of terms related to the family or caregiver may reveal that hospital nursing interventions towards families and caregivers, if they exist, are subsumed and unrecorded, thus contributing to the invisibility of one of the features of nursing work

A mapping on physical rehabilitation termi-

nology also identified a small number of terms from the client axis; however, issues related to the family or caregiver were not discussed (Souza et al., 2015).

The low occurrence of terms that represent potential or positive aspects in the judgment axis may reflect the lack of concern with recording nursing diagnoses with the purpose of preventing problems or promoting healthy phenomena. This situation is expected in a hospital setting and was observed in another study that made diagnoses for people with Acquired Immunodeficiency Syndrome (AIDS; Faria & Silva, 2014).

The use of terms representing nursing diagnoses and interventions listed in ICNP® points to the use of a specialized language. On the other hand, at the time of term standardization, nurses used a vocabulary with potential for the standardized designation of a nursing diagnosis. For example, the term *agitado*, by being identified as a focus of nursing care, comprises the diagnosis: *agitação*.

The fact that the updated versions of ICNP® include new terms puts into evidence the relevance of constantly updating a classification that is intended to universally represent nursing practice. It should be noted that standardized systems to record elements of nursing practice based on ICNP® must be adapted to revised classifications (Cubas, Brondani, & Malucelli, 2013) so as not to become obsolete. Emphasis should be given to the category of similar terms, which, in the analyzed universe, was represented by 26.5% of the terms. The use of different terms with the same meaning reflects the need to standardize terms used in nursing practice in order to measure and compare the results of this practice, facilitate communication between nurses and other health professionals, and, consequently, contribute to improving patient outcomes (Souza et al., 2015; Kim et al., 2014).

The simultaneous use of a technical dictionary and a Portuguese language dictionary helped to draft the definitions, particularly regarding the principle of predictability. These resources helped to list terms according to a hierarchy, based on similar characteristics which were mentioned in the explanation of the term found in the technical dictionary.

The construction of the nursing knowledge

requires addressing operational and conceptual aspects; therefore, it is necessary to further develop definitions in order to establish meanings for nursing practice (Favero, Wall, & Lacerda, 2013). Similarly, the elaboration of nursing diagnoses and outcomes based on ICNP® requires the development of terms and definitions used in nursing theory and practice (Barra & Dal Sasso, 2012).

The total agreement among experts on three definitions of terms can result from the incorporation of their meanings in everyday life. The term *esvaziar* represents a common nursing practice; the term *colar cervical* represents a key device in the hospital setting; and the term *ampola* is a universally used means. This leads us to believe that a comprehensive classification, such as ICNP°, is not yet able to represent the full extent of practice. Studies that focus on defining and validating terms and definitions contribute to the development and dissemination of ICNP° in several countries and nursing specialties (Barrra & Dal Sasso, 2012).

A total of 13 terms were considered valid based on the CVI; however, four terms (concussão, maca, serviço de fonoaudiologia, and tracionar) did not reach the minimum CVI on the principle of simplicity. This result shows that studies focused on drafting definitions should consider the principle of simplicity as a potential indicator of non-validation due to the difficulty to draft clear, concise, and objective definitions. In fact, a study that produced definitions for terms related to the physical-motor domain stated that the definitions found in ICNP® make the experts' assessment difficult for being concise and insufficiently detailed (Souza et al., 2015).

Conclusion

Nurses use different words for the same term. The use of similar terms shows that nurses are not aligned with classification languages, which hampers the retrieval of information and, consequently, the assessment of nursing outcomes.

Among the principles for drafting terminological definitions, the principle of simplicity can be an indicator of non-validation given the difficulty in drafting clear, concise, and objective

definitions.

Nurses must use adequate terms to their professional practice. To do so, they must know the meanings of the terms used in a certain care setting and reflect on their standardized documentation. The results of this study can contribute to the reflection on this matter.

The limitations of this study include: the lack of terms recorded by the team of nursing assistants, which could have revealed terms that are not used by nurses; the selection of only 15 terms for definition; and the exclusion of terms referring to body components, which could have been initially included as new terms but were not considered due to the diversity of anatomical structures. Based on these limitations, further studies should be conducted.

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