

Nursing outcome “Severity of infection”: conceptual definitions for indicators related to respiratory problems

Alba Luz Rodríguez-Acelas¹

Rejane Reich²

Miriam de Abreu Almeida³

Maria da Graça Oliveira Crossetti⁴

Amália de Fátima Lucena⁵

Nursing Outcome «Infection Severity»: conceptual definitions for indicators related to respiratory problems

Objective. Build conceptual definitions for some indicators of the nursing outcome Infection Severity in the Nursing Outcomes Classification (NOC) related to respiratory problems, based on scientific evidence of signs and symptoms of infection in adults. **Methods.** Integrative literature review with search in the databases PubMed, CINAHL, LILACS and SCOPUS. Studies whose full texts were available, published in

Spanish, Portuguese or English, using the descriptors infection severity, nursing outcomes classification NOC, respiratory infections and respiratory signs and symptoms. **Results.** Nine publications were analyzed that supported the elaboration of the conceptual definitions for eight indicators of the Nursing Outcome Infection Severity: purulent drainage, fever, chilling, unstable temperature, pain, colonization of drainage cultivation, white blood cell count elevation and white blood cell count drop. **Conclusion.** This study contributed to understand the terms used in the nursing outcome Infection Severity, in order to improve

1 RN, M.Sc. in Nursing, Ph.D. candidate. Graduate Program in Nursing at Universidade Federal do Rio Grande do Sul -UFRGS-. Porto Alegre, Rio Grande do Sul, Brazil. email: alra1900@yahoo.com

2 RN, Specialist in Intensive Care and Cardiology. Master's student. Graduate Program in Nursing at UFRGS. Porto Alegre, Rio Grande do Sul, Brazil. email: rejanere@yahoo.com.br

3 RN, Ph.D. Associate Professor, School of Nursing, UFRGS. Porto Alegre, Rio Grande do Sul, Brazil. email: miriam.abreu2@gmail.com

4 RN, Ph.D. Full Professor, School of Nursing, UFRGS. Porto Alegre, Rio Grande do Sul, Brazil. email: mgcrossetti@gmail.com

5 RN, Ph.D. Associate Professor, School of Nursing, UFRGS. Porto Alegre, Rio Grande do Sul, Brazil. email: afatimalucena@gmail.com

Conflict of interests: None.

Receipt date: June 2, 2015.

Approval date: December 4, 2015.

How to cite this article: Rodríguez-Acelas AL, Reich R, Almeida MA, Crossetti MGO, Lucena AF. Nursing outcome “Infection Severity”: conceptual definitions for indicators related to respiratory problems. Invest Educ Enferm. 2016; 34(1): 38-45.

DOI: 10.17533/udea.iee.v34n1a05

and facilitate the use of the NOC, as it enhances the conceptual clarity of the selected indicators with a view to producing better scientific evidence.

Key words: nursing assessment; respiratory tract infections; severity of illness index; outcome assessment (health care).

Resultado de enfermería «severidad de la infección»: definiciones conceptuales para indicadores relacionados a problemas respiratorios

Objetivo. Construir definiciones conceptuales para algunos indicadores del resultado de enfermería severidad de la infección de *Nursing Outcomes Classification* (NOC) relacionados con problemas respiratorios, a partir de evidencias científicas sobre señales y síntomas para infección en personas adultas.

Métodos. Revisión integrativa de la literatura en las bases de datos PubMed, CINAHL, LILACS y SCOPUS. Se incluyeron los estudios en texto completo publicados en español, portugués e inglés que incluyeran los descriptores severidad de la infección, clasificación de los resultados de enfermería NOC, infecciones respiratorias, y señales y síntomas respiratorios.

Resultados. Se analizaron nueve publicaciones que fundamentaron la elaboración de las definiciones conceptuales de ocho indicadores del resultado de enfermería severidad de la infección: esputo purulento, fiebre, hipotermia, inestabilidad de la temperatura, dolor, colonización en el cultivo de esputo, aumento de leucocitos, disminución de leucocitos. **Conclusión.** El estudio contribuyó para la comprensión de los términos utilizados en el resultado de enfermería severidad de la infección, para perfeccionar y facilitar el uso de NOC, en la medida que presenta mayor claridad desde el punto de vista conceptual de los indicadores seleccionados, de modo que se pueda producir mejores evidencias científicas.

Introduction

Respiratory illnesses rank among the non-transmissible chronic conditions that most cause deaths around the world, represent about 7% of global mortality and cause 4.2 million deaths each year.¹ In the hospital context, data on

Palabras clave: evaluación en enfermería; infecciones del sistema respiratorio; índice de severidad de la enfermedad, evaluación de resultado (atención de salud).

Resultado de Enfermagem «Gravidade de Infecção»: definições conceituais para os indicadores relacionados a problemas respiratórios

Objetivo. Construir definições conceituais para alguns indicadores do resultado de enfermagem Gravidade de Infecção da *Nursing Outcomes Classification* (NOC) relacionados aos problemas respiratórios, a partir de evidências científicas sobre sinais e sintomas de infecção em pessoas adultas. **Métodos.** Revisão integrativa da literatura com busca nas bases de dados PubMed, CINAHL, LILACS e SCOPUS. Foram incluídos estudos com textos na íntegra, publicados em espanhol, português ou inglês, usando os descritores gravidade da infecção, classificação dos resultados de enfermagem da NOC, infecções respiratórias, e sinais e sintomas respiratórios. **Resultados.** Analisaram-se nove publicações que embasaram a elaboração das definições conceituais de oito indicadores do Resultado de Enfermagem Gravidade de Infecção: expectoração purulenta, febre, hipotermia, instabilidade da temperatura, dor, colonização em cultura de expectoração, elevação na contagem das células brancas e depressão na contagem das células brancas. **Conclusão.** O estudo contribuiu para a compreensão dos termos utilizados no resultado enfermagem Gravidade de Infecção, de modo a aperfeiçoar e facilitar o uso da NOC, à medida que apresenta refinamento do ponto de vista conceitual dos indicadores selecionados, de modo a produzir melhores evidências científicas.

Palavras-chave: avaliação em enfermagem; infecções respiratórias; índice de gravidade de doença; avaliação de resultados (cuidados de saúde).

respiratory problems are also relevant. In intensive care contexts, in some contexts, respiratory tract infections represent between 40 and 60% of infection cases.^{2,3} As regards the profile of nursing diagnoses in patients with respiratory conditions, recently, a Brazilian study has shown that the most frequent diagnoses were: risk of infection

(97.3%), acute pain (68.4%), deficient knowledge (68.4%), sedentary lifestyle (65.7%), ineffective airway drainage (65.7%), trend to adopt conducts that represent a risk for health (63.1%), activity intolerance (52.6%) and sleep pattern disorder (33.3%).⁴ This scenario is a source of concern and demands nursing interventions, monitoring and assessment.

In that sense, nursing has classification systems at its disposal, whose application is related to the different phases of the nursing process. Based on the collection of nursing data, one or more diagnoses are established to plan appropriate interventions for each case. To formulate them, the terminology of NANDA International⁵ (NANDA-I) is used, which comprises nursing diagnoses for the different scenarios of clinical practice. The Nursing Interventions Classification⁶ (NIC) determines interventions related to the diagnoses and the Nursing Outcomes Classification⁷ (NOC) documents the development of standardized outcomes to assess the nursing care.

The latter, the NOC, supports the NANDA-I and NIC taxonomies by standardizing the language for the final evaluation phase of the nursing process.⁷ This classification helps to understand and analyze the nursing process and permits assessing the efficiency of care delivery. Similarly, the growing interest in its use in clinical practice is due to the need to assess the quality of care delivery, besides being a requirement of the health system due to the increasingly high costs of care.⁸ In the context of respiratory illnesses, the nursing diagnoses: risk for infection and ineffective breathing pattern are widely used in clinical practice, whether related to the invasive procedures of the respiratory tract or disease conditions. The identification of these diagnoses, the interventions and their appropriate assessment can improve the quality of life and reduce the use of more complex health services, as many problems can be solved at the primary health care level.

As for the assessment, the NOC represents, in combination with the other classification systems, a tool to support the execution of the planning

and assessment phases of the nursing process, as it offers indicators and scales for its operation. Nevertheless, the indicators do not contain conceptual definitions that permit unifying the understanding and analysis of the assessments. This context gives rise to the interest in deepening the NOC outcome: Infection Severity (0703)⁷, which contains 27 indicators ranging from severe to none, from which eight indicators were selected based on the literature, being the main indicators used to assess patients with respiratory problems.

Based on these considerations, the proposal rests on the lack of conceptual definitions for the indicators of the NOC nursing outcome infection severity. Thus, the study expects to contribute to the improvement and use of the classification, as enhancing the outcome indicators favors the assessment of care delivery and the measuring of patient outcomes, besides increasing the scientific evidence on this taxonomy. Therefore, the objective was to construct conceptual definitions for some indicators of the NOC nursing outcome infection severity, related to respiratory problems, based on scientific evidence on signs and symptoms of infection in adults.

Methods

An integrative literature review⁹ was undertaken to identify and analyze records that would support the review of the NOC nursing outcome infection severity. This research method permits synthesizing multiple publications and drawing general conclusions about a particular study area. It is a valuable method for nursing since, often, the professionals do not have time to read all scientific knowledge available due to the large volume, besides the difficulty to critically analyze the studies.¹⁰ Following the evidence-based method in the elaboration of an integrative review, the steps undertaken were: identification of the theme, research question for the elaboration of an integrative review, descriptors adopted in the search, establishment of inclusion and exclusion criteria of studies in the literature, ranking of the studies, assessment of the studies, interpretation

of the results and presentation of the knowledge synthesis.

The first step was the selection of the theme and formulation of the guiding question. Thus, the research theme in this study is focused on the conceptual definitions for some indicators of the nursing outcome infection severity, related to respiratory problems. Therefore, three guiding questions were defined: What signals and symptoms are present in the respiratory problems? What characteristics are analyzed in infection severity? How can the severity level of the infection be measured? In the second step, the descriptors were chosen: infection severity, classification of the NOC nursing outcomes, respiratory infections, respiratory signs and symptoms. The Boolean operators AND and OR were also used.

In the third step, the inclusion and exclusion criteria of the study were defined. The following inclusion criteria were considered: a) studies that addressed infection severity, classification of NOC nursing outcomes, respiratory infections, respiratory signals; b) full texts available in the selected databases; c) Spanish, Portuguese and English; d) published within five years at most, in the adult area and e) doctoral theses. The following exclusion criteria were considered; a) articles that did not discuss the theme completely; b) whose full text was not available; c) Editorials or Letters to the Editor. The databases PubMed (National Library of Medicine, USA), CINAHL (Cumulative Index to Nursing and Allied Health Literature), LILACS (Latin American and Caribbean Literature in Health Sciences) and SCOPUS (accessed through the portal of journals and databases of the Coordination for the Improvement of Higher Education Personnel (CAPES-Brazil).

In accordance with the determinations of the method, the fourth step was the categorization of the studies in the software Excel Windows 2010®, aiming to facilitate the visualization and categorization of the selected articles, which produced a data sheet (title of the article, author(s), journal, year, place, research objective, method, sample and results). The fifth step was

the evaluation of the studies included, so that all articles selected were read in depth to develop a detailed analysis of the evidences.

The sixth step permitted the interpretation of the results based on a process of comparison, analysis and interpretation of the data to answer the guiding questions and the study objective. Finally, the seventh step was the presentation of the review results evidenced in the investigations of the different databases. To find the studies, the literature search was undertaken between April and June 2014.

Results

Through the search and considering the use of the descriptors, in total, 192 scientific articles and one doctoral dissertation were found. Next, the titles, abstracts and some excerpts from the article were read, which permitted excluding the studies that did not comply with the inclusion criteria. Through this procedure, in the first step, 24 articles and one doctoral dissertation were selected because they presented evidences that attended to the objectives of this study.

After fully reading the articles, 16 others were excluded because they were not in line with the study objective, leaving a final sample of eight articles, including two in the database PubMed, two in CINAHL, three in LILACS, one in SCOPUS and one doctoral dissertation in CINAHL, whose results explicitly contained evidence on the conceptual definitions for the indicators of the nursing outcome infection severity (Table 1).

As regards the country of publication, the articles that were initially considered corresponded to Brazil, United States, Canada and Spain. In the final sample, seven (77.7%) articles belonged to Brazil, followed by two (22.3%) from Portugal, one of them a doctoral dissertation. The publications took place between 2009 and 2012.

The design of the studies was very diverse, that is, retrospective cohorts, cross-sectional, descriptive

and exploratory, observational, triangulation (qualitative – quantitative – Delphi technique), systematic review and narrative review.

Regarding the categorization of the studies, the detailed literature of the eight articles selected and

the doctoral dissertation permitted concentrating the outcomes according to similar content, constituting eight analysis categories related to the respective NOC indicators for the nursing outcome infection severity:

Table 1. Selection process of the studies according to the database.

Database	Excluded Studies		
	Included		Analyzed
PubMed	81	79	2
CINALH	36	33	3
LILACS	71	68	3
SCOPUS	4	3	1
Total	192	183	9

Indicator: Purulent drainage. Listed in the most recent edition of the NOC nursing outcomes classification. In this context, the literature defined drainage as the expulsion of mucus, mucopurulent material or fluids from the trachea, bronchi and lungs by coughing or expectoration.¹¹

Indicator: Fever. Concerning this indicator, a doctoral dissertation mentions that the abnormal elevation of the body temperature, involving the alteration of the thermoregulatory center of the internal thermostat, associated with increased respiratory frequency, increased metabolic activity, tachycardia with weak or full pulse and leaping, agitation, headache or confusion; fast rise of the fever accompanied by shivers, trembling, goose bumps, cold and dry skin; the crisis or drop of the fever comes with warm and blushing skin and sweating.¹¹ Other authors also mentioned it as body temperature > 38° C.^{12,13}

Indicator: Chilling. According to a doctoral dissertation, the decreased ability to regulate the internal thermostat, reduced body temperature, cold, pale and dry skin, shivering, slow capillary filling, tachycardia, cyanotic nail beds, hypertension, goose bumps associated with prolonged exposure to coldness, dysfunction of the central nervous system or endocrine system

in cold conditions or artificial onset of abnormally low bodily temperatures for therapeutic reasons.¹¹ It was equally mentioned by other authors as body temperature <35 °C¹² and <36° C.¹³

Indicator: Unstable temperature. Based on this study, the body temperature is one of the physiological parameters most strictly controlled by the organism. The system that performs this function permits variations between 0.2° and 0.4° Celsius (°C) around 37°C to maintain the metabolic functions. Thus, the temperature measure should be as reliable as possible.¹⁴

Indicator: Pain. According to some studies, pain is conceptualized as an unpleasant sensitive and emotional experience, described in terms of real or potential tissue injuries, including the participation of mechanisms related to distinguished aspects, emotional factors symbolizing feelings in general.^{15,16} Another study shows that the increased sensory perception of the body parts, which tends to come with a subjective experience of intense suffering, with a characteristic facial expression, eyes lowered and weak, suffering look, fixed or dispersed facial movement, gestures, altered muscle tonus, variation between apathy and strictness, self-protective behavior, narrowing of the attention focus, altered temporal perception,

flight from social contact, commitment of thought process, distracted behavior marked by moaning, crying, walking with large steps, restlessly looking for other people or activities; the feelings of pain are related to the length of the pain, the sudden appearance associated with acute tissue injury, marked by automated responses like increased blood pressure, pulse, respiration, transpiration, cold sweat, goose bumps and pallor, accompanied by muscle tension, loss of appetite and anxiety; the feelings of acute pain are self-limited and act as a protective mechanism to make the victim flee or withdraw from the origin of the pain to avoid greater harm. Acute pain tends to be referred to as a continuing feeling of pain, constant or recurring, without automated responses; chronic pain is normally referred to as blunt, uncomfortable, dull, frightening or unbearable; it can be associated with difficulties to sleep, irritability, depression, isolation, despair and helplessness.¹¹

Indicator: Colonization of drainage cultivation.

About this topic, the drainage was defined as appropriate when > 25 <10 neutrophils and squamous epithelial cells seen over the low potency field.¹² Another author mentions that the cultivation continues being fundamental as a positive cultivation supports the diagnosis. A

positive culture permits assessing the sensitivity to the drugs and demonstrate the treatment efficacy. Despite taking a long time, it remains the gold-standard diagnostic technique. Despite the lack of a consensus on the results, some studies have suggested 90% of sensitivity for the diagnostic acuteness of the direct test and the cultivation of the expectoration collected.¹⁷ A prospective study evaluated the use of the drainage as a diagnostic clarification tool and evidenced that appropriate drainage samples were only obtained in about 16% of the cases.¹⁸

Indicator: Increased white blood cell count.

Described as the presence of white blood cells > 12 000 cells/mm³ and called leukocytosis.^{13,18} Other authors mention that leukocytosis is frequent and perceptible in patients with sepsis.¹⁹

Indicator: Drop in white blood cell count.

Described as the presence of white blood cells <4 000 cells/mm³ and called leukopenia.^{13,18} Leukopenia can be found in patients with sepsis.¹⁹

As an end product of the integrative review, the conceptual definitions could be built for each indicator of the NOC nursing outcome infection severity (Table 2).

Table 2. Indicators and conceptual definitions established for the nursing outcome NOC: Infection severity (O703).

Indicator	Definition
Purulent drainage	Presence of discharge from airways, eliminated through expectoration.
Fever	Abnormal increase in body temperature in response to a change in the organism, > 38° C.
Chilling	Decreased ability to regulate the internal thermostat. Is defined by body temperature inferior to 35°C.
Unstable temperature	Presence of variation in body temperature to values inferior or superior to physiological limits of normality.
Pain	Individual who refers unpleasant sensory and emotional experience associated with real or potential tissue damage, expressed through an organic and/or emotional reaction.
Colonization in drainage cultivation	Positive analysis result of airway material.
Increased white blood cell count	Analysis of test, showing an increase in the white blood cell count to more than 12 000 cells/mm ³ .
Decreased white blood cell count	Analysis of test, showing a drop in the white blood cell count to less than 4 000 cells/mm ³ .

Discussion

The integrative literature review resulted in nine publications that supported the elaboration of conceptual definitions for eight indicators of the NOC outcome Infection Severity (0703): purulent drainage, fever, chilling, unstable temperature, pain, colonization in drainage cultivation, increased white blood cell count, decreased white blood cell count. The results are expected to help and identify the indicators more precisely in clinical practice, permitting the estimation of the evolution in the patient's condition before and after the intervention, which will influence the quality of care delivery and assessment of the targets achieved.

The NOC defines an outcome as an individual, family or community state, conduct or perception that is continuously measured in response to a nursing intervention.⁷ Thus, it permits establishing and classifying the outcomes susceptible to professional interventions, permitting the evaluation of care delivery and determination of the patient outcomes. The NOC can be used in any scenario the nursing professionals deliver care in. In summary, a shared language typical of nursing permits fast and universal communication on the one hand and the systemization of nursing work on the other.²⁰ Therefore, the inclusion of the nursing outcomes in daily practice should be part of the forthcoming objectives in the discipline.

It was observed that many articles were excluded due to a lack of scientific evidence, therefore showing that some nursing outcome indicators need further specification, as the small number of articles on the theme hampered the analysis, although it permitted the identification of knowledge gaps regarding the them, signaling the need to develop further research on the NOC and its respective conceptual definitions and operations. That is the only way in which a consensus will exist regarding its use by nursing professionals.

Another relevant aspect and one of the study limitations was the lack of nursing publications,

showing difficulties in the search for interesting studies. Therefore, other literature sources, such as dissertations, were needed to complement certain aspects of some concepts, similarly to studies in other areas like medicine. Interdisciplinary research is fundamental as isolated disciplines are unable to express all knowledge. Hence, interdisciplinarity represents a possible contribution to the sharpness and perhaps to clarify an object shared by several professionals more reliably.²¹ Nevertheless, it is important to expand the nursing studies focused on care. It has been observed recently that the situation is starting to change and many studies are ongoing, some of which are focused on a standardized language like the NOC and its respective outcomes and indicators.²²⁻²⁵

In short, the study contributes to the refining of the Nursing Outcomes Classification (NOC), acknowledging the importance of further scientific evidence on this taxonomy and permitting new discussions on the need to standardize the conceptual definitions of the indicators to avoid differences in the understanding of their meanings. Furthermore, its applicability grants greater visibility to the nursing actions in practice. In that perspective, the need is highlighted to proceed with the construction of the conceptual definitions and the operations for the difference NOC outcome indicators, aiming to standardize their understanding and, therefore, their use. It should be mentioned that, to build concepts, the constructs need to be validated.

References

1. Goulart FA. Doenças crônicas não transmissíveis: estratégias de controle e desafios e para os sistemas de saúde. Brasília: PAHO; 2011 [cited 2014 Jan 20]. Available from: http://apsredes.org/site2012/wp-content/uploads/2012/06/Condicoes_Cronicas_flavio1.pdf
2. Padrão MC, Monteiro ML, Maciel NR, Viana F, Freitas N. Prevalência de infecções hospitalares em unidade de terapia intensiva. *Rev Bras Clin Med.* 2010;8(2):125-8.

3. Barros LM, Bento JNC, Caetano JA, Moreira RA, Pereira FG, Frota N, et al. Prevalência de micro-organismo e sensibilidade antimicrobiana de infecções hospitalares em unidade de terapia intensiva de hospital público no Brasil. *Rev Ciênc Farm Básica Apl.* 2012; 33(3):429-35.
4. Santos NA, Cavalcante TF, Lopes MVO, Gomes EB, Oliveira CJ. Profile of nursing diagnoses in patients with respiratory disorders. *Invest Educ Enferm.* 2015; 33(1):112-8.
5. North American Nursing Diagnosis Association (NANDA). *Diagnósticos de enfermagem da NANDA: definições e classificações – 2012-2014.* Porto Alegre: Artmed, 2013.
6. Bulechek GM, Butcher HK, Dochterman JM. *Classificação das intervenções de enfermagem - NIC.* 5th ed. Rio de Janeiro: Elsevier; 2010.
7. Moorhead S, Johnson M, Maas M, Swanson E. *Classificação dos resultados de enfermagem - NOC* 4th ed. Rio de Janeiro: Elsevier; 2010.
8. Garbin LM, Rodrigues CC, Rossi LA, Carvalho EC. Classificação de Resultados de Enfermagem (NOC): identificação da produção científica relacionada. *Rev. Gaúcha Enferm.* 2009; 30(3):508-15.
9. Pompeo DA, Rossi LA, Galvão CM. Revisão integrativa: etapa inicial do processo de validação de diagnóstico de enfermagem. *Acta Paul Enferm.* 2009; 22(4): 434-8.
10. Polit DF, Beck CT. Using research in evidence-based nursing practice. In: Polit DF, Beck CT, editors. *Essentials of nursing research. Methods, appraisal and utilization.* Philadelphia (USA): Lippincott Williams & Wilkins; 2006. P.457-94.
11. Pereira FMS. *Informação e qualidade do exercício profissional dos enfermeiros [Dissertation].* Porto: Instituto de Ciências Biomédicas Abel Salazar da Universidade do Porto; 2009.
12. Hoo Lee J, Hyung Kim Y. Comparison of clinical characteristics between healthcare-associated pneumonia and community-acquired pneumonia in patients admitted to secondary hospitals. *Braz J Infect Dis.* 2012; 16(4):321-8.
13. Valeiro DF, Silva RSU. Diagnóstico da síndrome da resposta inflamatória sistêmica e sepse. *Rev Bras Clin Med.* São Paulo. 2012; 10(1):5-10.
14. Castro FSF, Peniche ACG, Mendoza IYQ, Couto AT. Temperatura corporal, índice Aldrete e Kroulik e alta do paciente da unidade de recuperação pós-anestésica. *Rev Esc Enferm USP.* 2012; 46(4):872-6.
15. Saça CS, Carmo FA, Arbuleia JPS, Souza RCX, Alves SA, Rosa BA. A dor como 5º sinal vital: atuação da equipe de enfermagem no hospital privado com gestão do Sistema Único de Saúde (SUS). *J Health Sci Inst.* 2010; 28(1):35-41.
16. Sallum AMC, Garcia DM, Sanches M. Dor aguda e crônica: revisão narrativa da literatura. *Acta Paul Enferm.* 2012; 25(Sp.1):150-4.
17. Bento J, Silva AS, Rodrigues F, Duarte R. Métodos diagnósticos em tuberculose. *Acta Med Port.* 2011; 24(1):145-54.
18. Schawartzmann PV, Volpe GJ, Vilar FC, Moriguti JC. Pneumonia comunitária e pneumonia hospitalar em adultos. *Medicina (Ribeirão Preto)* 2010; 43(3):238-48.
19. Coelho FR, Martins JO. Diagnostic methods in sepsis: the need of speed. *Rev Assoc Med Bras.* 2012; 58(4):498-504.
20. McCloskey JC, Bulechek GM. Standardizing the language for nursing treatments: an overview of the issues. *Nurs Outlook.* 1994; 42(2):56-63.
21. Santos SSC, Lunardi VL, Herdmann AL, Caloni H. Interdisciplinaridade: a pesquisa como eixo de formação/profissionalização na saúde/enfermagem. *Rev Didática Sistêmica.* 2007; 5:13-22.
22. Almeida MA, Seganfredo DH, Barreto LNM, Lucena AF. Validação de indicadores da nursing outcomes classification para adultos hospitalizados em risco de infecção. *Texto Contexto Enferm.* 2014; 23(2):309-17.
23. Lucena AF, Holsbach I, Pruinelli L, Serdotte FCA, Schroeder MB. Brazilian validation of the nursing outcomes for acute pain. *Int J Nurs Knowl.* 2013; 24(1):54-8.
24. Azzolin K, Mussi CM, Ruschel KB, de Souza EN, Lucena AF, Rabelo-Silva ER. Effectiveness of nursing interventions in heart failure patients in home care using NANDA-I, NIC, and NOC. *Appl Nurs Res.* 2013; 26(4):239-44.
25. Almeida MA, Silva MB, Panato BP, Siqueira APO, Silva MP, Engelman B, et al. Clinical indicators to monitor patients with risk for ineffective cerebral tissue perfusion. *Invest Educ Enferm.* 2015; 33(1):155-63.