Original Article

Content validation of current and new defining characteristics of the nursing diagnosis: decreased cardiac output*

Validação de conteúdo das atuais e de novas características definidoras do diagnóstico de enfermagem débito cardíaco diminuído

Validación de contenido de las actuales y nuevas características que definen el diagnostico de enfermería: disminución del gasto cardíaco

Juliana de Lima Lopes[1], Denise Altino[2], Rita de Cássia Gengo e Silva[3]

ABSTRACT

Objective: To validate the content defining characteristics of the currently approved and of those identified through reviewing the literature, for the nursing diagnosis: decreased cardiac output. **Methods:** Is a content validation study using the model proposed by Fehring. The defining characteristics were validated by 18 experts (eight doctors and ten nurses), using the five points Likert scale and according to the following classification: scores higher than 0.80 were considered as the main features; those with weight between 0, 50 and 0.79 as secondary; and, those with average less than or equal to 0.50 as irrelevant. **Results:** Of 79 defining characteristics investigated, 38 (48.1%) were validated, among which 17 were present in NANDA-I, and 41 (51.9%) were considered as irrelevant to this diagnosis, of these, eight are listed in NANDA-I. **Conclusion:** The defining characteristics currently listed in the NANDA-I classification taxonomy do not completely cover the nursing diagnosis: decreased cardiac output.

Keywords: Validation studies; Nursing diagnosis; Cardiac output

RESUMO

Objetivo: Validar o conteúdo das características definidoras, tanto aquelas atualmente aprovadas como as identificadas por meio de revisão de literatura, para o diagnóstico de enfermagem Débito Cardíaco Diminuído. **Métodos:** Trata-se de um estudo de validação de conteúdo utilizando o modelo proposto por Fehring. As características definidoras foram validadas por 18 peritos (oito enfermeiros e dez médicos), usando uma escala do tipo Likert de cinco pontos e seguindo a classificação: escore maior do que 0,80 foram consideradas como as características principais, as com peso entre 0,50 a 0,79 como secundárias e as com média menor ou igual a 0,50, como irrelevantes. **Resultados:** Dentre as 79 características definidoras investigadas, 38 (48,1%) foram validadas, dentre elas, 17 presentes na NANDA-I e, 41 (51,9%) foram consideradas como irrelevantes para este diagnóstico, sendo que oito estão listadas na NANDA-I. **Conclusão:** As características definidoras listadas atualmente na classificação da Taxonomia da NANDA-I não abrangem completamente o diagnóstico de enfermagem débito cardíaco diminuído.

Descritores: Estudos de validação; Diagnóstico de enfermagem; Débito cardíaco

RESUMEN

Objetivo: Validar el contenido de las características definidoras, tanto de las actualmente aprobadas como las identificadas por medio de una revisión de la literatura, para el diagnóstico de enfermería: disminución del gasto cardíaco. **Métodos:** Se trata de un estudio de validación de contenido utilizando el modelo propuesto por Fehring. Las características definidoras fueron validadas por 18 expertos (ocho enfermeros y diez médicos), usando una escala de tipo Likert de cinco puntos y siguiendo la siguiente clasificación: las con puntaje mayor que 0,80 fueron consideradas como características principales; las con peso entre 0,50 y 0,79 como secundarias; y, las con promedio menor o igual a 0,50, como irrelevantes. **Resultados:** Entre las 79 características definidoras investigadas, 38 (48,1%) fueron validadas, entre ellas, 17 se encuentran presentes en la NANDA-I y, 41 (51,9%) fueron consideradas como irrelevantes para este diagnóstico, siendo que ocho están listadas en la NANDA-I. **Conclusión:** Las características definidoras listadas actualmente en la clasificación de la Taxonomía de la NANDA-I no abarcan completamente el diagnóstico de enfermería: disminución del gasto cardíaco.

Descriptores: Estudios de validación; Diagnóstico de enfermería; Gasto cardíaco

---

** Extracted from the monograph submitted to the Program of Professional Improvement in Cardiology Nursing at the Heart Institute (InCor) of the Hospital das Clinicas, University of São Paulo, Medical School - HCFMUSP – São Paulo (SP), Brazil.*

[1] Doctoral student in Health Sciences at the Federal University of São Paulo – UNIFESP – São Paulo (SP), Brazil. RN in the Intensive Therapy Care Unit of the Heart Institute (InCor), Hospital das Clinicas, University of São Paulo, Medical School - HCFMUSP – São Paulo (SP), Brazil.

[2] Specialist in Cardiology Nursing, RN in the Intensive Therapy Care Unit of the Heart Institute (InCor), Hospital das Clinicas, University of São Paulo, Medical School - HCFMUSP – São Paulo (SP), Brazil.

[3] PhD in Sciences (Cardiology Program) University of São Paulo, Medical School – USP – São Paulo (SP), Brazil. RN in the Education Service of the Heart Institute (InCor), Hospital das Clinicas, University of São Paulo, Medical School - HCFMUSP – São Paulo (SP), Brazil.

Corresponding Author: **Juliana de Lima Lopes**
R. Correia de Lemos, 780 - Apto. 11 - Chácara Inglesa - São Paulo - SP - Brazil
Cep: 04140-000 E-mail: julianalimalopes@gmail.com

Received article **09/02/2010** and accepted **19/07/2010**

INTRODUCTION

Cardiovascular diseases are the main causes of morbidity and mortality in Brazil and in the world[1-4]. Given the high number of hospitalizations due to these conditions, nurses identify diverse nursing diagnoses for these patients, among which is Decreased Cardiac Output[5-7].

The nursing diagnosis Decreased Cardiac Output is defined by the NANDA International (NANDA-I)[8] as "inadequate blood pumped by the heart to meet metabolic demands of the body". Its defining characteristics are obtained through systematic observation, physical assessment or invasive methods.

Among the invasive methods, based on those that derive from diagnostic evaluation, the pulmonary artery catheter is highlighted. This catheter allows one to obtain various data that reflect the patient's hemodynamic condition such as cardiac output and cardiac index. Various studies indicate that the use of the pulmonary artery catheter is declining given the gap existent between the parameters it provides and their applicability in clinical practice[9-12], in addition to the high procedure costs and risks posed to patients such as the risk of infection.

In contrast, a strong tendency for health professionals to evaluate the adequacy of cardiac output for the patient's metabolic demands has been observed in the literature and in healthcare practice. The variables most frequently used for this purpose are: CO2 gap, blood lactate levels, and venous oxygen saturation[13-15]. Such parameters present a series of advantages over the pulmonary artery catheter such as the use of minimally invasive techniques and the evaluation of adequate tissue perfusion. In a study previously conducted by our research group, these data seem to be evidence of the diagnosis Decreased Cardiac Output even though they are not listed in the NANDA-I Nursing Diagnoses[16].

Given these new defining characteristics found in the literature that characterize decreased cardiac output and considering the interfaces established with those already listed by NANDA-I, further research to validate these is needed. Hence, the objective of this study was validated the content of defining characteristics, both of those currently approved and of those identified in a literature review for the diagnosis Decreased Cardiac Output.

METHOD

This content validation study was carried out between November 2007 and January 2008 and was utilized the method proposed by Fehring[17]. A content validation is based on obtaining the opinions of experts concerning the level to which certain defining characteristics are indicative of a certain diagnosis[18].

The sample was composed of 18 health professionals considered experts on the subject: eight nurses and ten physicians. For health professionals to be considered experts on this subject, they must have more than two years of clinical experience in cardiology. Nurses, in addition to clinical experience, must also have familiarity with nursing diagnoses.

The data collection instrument was composed of two parts. The first included a characterization of the experts and the second was composed of defining characteristics found in NANDA-I and in the literature. The 79 defining characteristics found in the literature were grouped as:

- Dependent on clinical assessment: decreased peripheral pulse, anxiety, restlessness, somnolence/mental confusion, skin color changes, loss of appetite, nausea, changed breathing pattern, jugular stasis, peripheral edema, ascites, hematomegaly, weight gain, cardiac cachexia, changed skin temperature, oliguria/anuria, changed fluid balance, decreased peripheral capillary perfusion, crackles, cough and sputum, S3 and S4 sounds, syncope, dizziness, lethargy, dilated pupils, chest pain, palpitations, abdominal pain, vomiting, fatigue, weakness, intolerance to activity, hyperthermia, changed level of consciousness, sweating and mood swings;

- Dependent on laboratory testing: decreased central oxygen saturation, increased blood lactate level, increased aspartate transaminase level, elevated level of the MB fraction of creatinine phosphokinase (CPK), increased levels of endothelin, increased levels of metalloproteinase, increased brain natriuretic peptide (BNP) levels, increased atrial natriuretic peptide (ANP) levels, decreased sodium levels, elevated levels of troponin-T, change in the level of serum hemoglobin, changed hematocrit, change in the level of serum potassium, increased urea level, change in the level of serum creatinine, metabolic acidosis, hypoxemia, increased levels of TNF-a, increased glucose, increased catecholamine levels, increased levels of C-reactive protein (CRP), increased NADPH oxidase activity, increased levels of interleukin, decreased 2, 3 diphosphoglycerate (DPG) levels;

- Dependent on imaging exams: decreased left ventricular ejection fraction, enlarged heart chambers, and increased heart size;

- Dependent on invasive hemodynamic monitoring: change in central venous pressure, altered systemic vascular resistance, altered pulmonary vascular resistance, decreased cardiac output, decreased cardiac index, altered oxygen uptake VO2; altered oxygen delivery (DO2), decreased systolic volume index, decreased left ventricular stroke work index, increased pulmonary capillary wedge pressure (PCWP), and altered left ventricular filling pressure;

- Dependent on minimally invasive hemodynamic monitoring: low blood pressure, arrhythmias, irregular heartbeat, and C02 gap.

In addition to the defining characteristics, this instrument used a Likert scale for the experts to indicate the extent to which each defining characteristic represented the nursing diagnosis Decreased Cardiac Output.

According to the adopted method, weights were assigned for each answer: not at all characteristic = 0.0; very little characteristic of the diagnosis = 0.25; somewhat characteristic = 0.50; considerably characteristic = 0.75; very characteristic = 1.00[17].

Based on the scores of each defining characteristic, an average was computed and the following classification was used: the defining characteristics that obtained weight ≥ 0.80 were considered as "major" ones; those whose weight was between 0.51 and 0.79 were considered as "minor", and those with an average ≤ 0.50 were considered irrelevant and should not be included[17].

The project was submitted to and approved by the Research Ethics Committee at the institution where data were collected and all the experts signed free and informed consent forms after consenting to participate in the study.

RESULTS

The study's sample was composed of health professionals: eight nurses and ten physicians. All nurses were female; 62.5% had a specialization in cardiology and of these nurses, 75% had a specialization in another field in addition to that of cardiology such as intensive therapy unit (37.5%), pediatric (12.5%), hospital administration (37.5%), and medical-surgical nursing (12.5%). The average time of graduation was 15 years, standard deviation of 10.3, and the average time working in the cardiologic field was 12 years, with a standard deviation of 9.8.

Table 1 – Defining characteristics of the nursing diagnosis Decreased Cardiac Output that obtained scores >0.80 in the content validation. São Paulo, Brazil, 2008.

Defining Characteristics	Score
Decreased Cardiac Output*	0.96
Decreased Cardiac Index*	0.96
Decreased Peripheral Pulses*	0.88
Increased blood lactate level	0.85
Decreased venous oxygen saturation (SvO2)	0.83
Decreased peripheral capillary perfusion*	0.81

*Defining characteristics listed in NANDA Taxonomy II

All the physicians were male and had a specialization in cardiology, and six also had a specialization in another field such as intensive therapy care (five) and heart failure (one). The average time of graduation was 12.6 years, standard deviation of 6.1, and average time working in the cardiology field was ten years, with a standard deviation of 6.0.

Table 2 – Defining characteristics of the nursing diagnosis Decreased Cardiac Output that obtained scores between 0.51 and 0.79 in the content validation. São Paulo, Brazil, 2008.

Defining Characteristics	Score
Oliguria or Anuria*	0.79
Decreased left ventricular stroke work index*	0.78
Decreased stroke volume index*	0.78
Decreased left ventricular ejection fraction *	0.76
Increased heart rate*	0.75
Low blood pressure*	0.74
Altered systemic vascular resistance*	0.74
Increased pulmonary capillary wedge pressure (PCWP)*	0.74
Altered left ventricular filling pressure	0.74
Altered in central venous pressure*	0.72
Increased levels of brain natriuretic peptide (BNP)	0.71
Altered oxygen delivery (DO2)	0.71
Altered pulmonary vascular resistance*	0.68
Changes in skin color	0.68
Altered respiratory pattern*	0.67
Altered oxygen uptake VO2	0.65
Jugular stasis*	0.64
Altered fluid balance	0.64
Increased cardiac area	0.63
Altered skin temperature*	0.63
Dilated heart chambers	0.63
Metabolic acidosis	0.61
Activity intolerance	0.61
CO2 Gap	0.59
Tiredness/ Fatigue*	0.58
Increased levels of atrial natriuretic peptide (ANP)	0.58
Increased catecholamine levels	0.57
Sleepiness/Mental confusion	0.57
Crackles*	0.57
Cardiac cachexia	0.56
S3 Sound*	0.54
Hypoxemia	0.51

*Defining characteristics listed in NANDA Taxonomy II

According to the validation model proposed for this study, only six defining characteristics obtained scores >0.80 and were, therefore, considered as "major" defining characteristics for the diagnosis Decreased Cardiac Output (Table 1). Table 2 presents the 32 defining characteristics that obtained scores between 0.51 and 0.79 and were considered as "minor" for this nursing diagnosis. The other 41 defining characteristics obtained scores ≤ 0.50 and were considered irrelevant for this diagnosis as shown on Table 3.

DISCUSSION

This study emphasizes that 48.1% of the studied defining characteristics were validated and 51.9%, more than half of the defining characteristics found in the literature were considered irrelevant for the nursing diagnosis Decreased Cardiac Output.

Table 3 – Defining characteristics of the nursing diagnosis Decreased Cardiac Output that obtained scores <0.50 in the content validation. São Paulo, Brazil 2008.

Defining characteristics	Score
Altered level of consciousness	0.50
Increased urea level	0.50
Restlessness*	0.49
Increased levels of endothelin	0.49
Peripheral edema*	0.49
Weakness	0.49
Decreased levels of sodium	0.47
Increased levels of TNF-a	0.47
Altered level of serum creatinine	0.47
Heart arrhythmias*	0.47
Hepatomegaly	0.47
Anxiety*	0.46
Nausea	0.46
Weight gain*	0.46
Sweating	0.46
Lack of appetite	0.44
Increased levels of metalloproteinase	0.43
Ascites	0.43
Increased levels of interleukin	0.43
Elevated levels of troponin-T	0.42
Syncope	0.42
Increased C-reactive protein levels (CRP)	0.40
S4 Sounds*	0.40
Elevated level of MB fraction of creatinine phosphokinase	0.39
Altered serum potassium level	0.39
Altered level of serum hemoglobin	0.36
Vomiting	0.36
Decreased 2.3 diphosphoglycerate (DPG) levels	0.35
Altered hematocrit	0.35
Increased aspartate transaminase level	0.34
Increased NADPH oxidase activity	0.34
Cough and expectoration*	0.33
Altered mood	0.32
Apathy	0.31
Increased blood glucose	0.31
Palpitation*	0.31
Dizziness	0.29
Precordial pain	0.25
Abdominal pain	0.24
Dilated pupils	0.17
Hyperthermia	0.13

*Defining characteristics present in NANDA Taxonomy II

Among the validated defining characteristics, two were considered as "major" characteristics and these are not yet listed in NANDA-I: 'increased blood lactate level' and 'decreased venous oxygen saturation (SvO2)'. Currently, these two defining characteristics are frequently used in clinical practice because they are important markers of tissue perfusion and adequacy of cardiac output for the patient's metabolic demands[13-15].

Another result was that among the 28 defining characteristics listed in the NANDA-I Taxonomy, four were considered as "major" ones, among them 'decreased cardiac output' and 'cardiac index'; 16 (57.1%) were considered as "minor", and eight (28.6%) irrelevant for the diagnosis Decreased Cardiac Output (restlessness, peripheral edema, anxiety, arrhythmias, weight gain, S4 sounds, cough and sputum, palpitation).

We note that even though the use of the pulmonary artery catheter is currently declining in clinical practice, many health professionals still consider some data that originates from this procedure essential to identifying Decreased Cardiac Output.

These validated defining characteristics are also reported in other studies. A clinical validation study, which analyzed the association between the 32 defining characteristics and cardiac index measured by termodilution, observed that peripheral thready pulse and decreased peripheral perfusion were the main characteristics of this diagnosis[19].

Another study, carried out in an intensive care therapy unit, sought to identify the nursing diagnosis Decreased Cardiac Output and its respective nursing interventions, observed that the following defining characteristics were present: dyspnea, edema, changes in blood pressure (hypotension), decreased peripheral pulse, crackles, oliguria, cardiac arrhythmias of ventricular origin (ventricular extrasystoles), decreased central venous pressure, cyanosis and cold skin, somnolence/mental confusion, tachycardia and anxiety. Most of these defining characteristics were also considered relevant to this diagnosis in this study, with the exception of edema, cardiac arrhythmias, and anxiety[20].

A previous study[7] aimed to identify the diagnostic profile of patients with acute myocardial infarction observed that one of the most frequently found conditions was decreased cardiac output. Among the defining characteristics upon which the diagnosis was based were: dry cough, cough with sputum, tachycardia, decreased peripheral perfusion, jugular stasis, pale mucous membranes, edema, physical exhaustion and anxiety. Listen Read phonetically

In this context and challenging new validated defining characteristics and other items considered irrelevant for the nursing diagnosis Decreased Cardiac Output, new validation studies are extremely important to refine these characteristics and identify those having a strong association with this diagnosis.

CONCLUSION

Many defining characteristics found in NANDA-I Taxonomy and in the literature were considered relevant for the nursing diagnosis Decreased Cardiac Output. The defining characteristics 'decreased cardiac output' and 'decreased cardiac index' found in NANDA-I were seen to be the "major" ones in this validation of diagnostic content study, however its use in clinical practice has been limited due to the gradual disuse of the pulmonary artery catheter.

The defining characteristics 'increased blood lactate levels' and 'decreased venous oxygen saturation (SV02)' were also considered as "major" defining characteristics though they are not listed in NANDA-I. These are highlighted because they are obtained through less invasive procedures and also because they are indirect markers of tissue perfusion, that is, they are capable of providing information on adequate cardiac output given the patient's metabolic demand, even in the absence of cardiac output values and/or cardiac indexes.

The conclusion is that the experts validated some defining characteristics currently listed in NANDA-I and also new defining characteristics based on the literature review. Therefore, a review of the defining characteristics currently listed in NANDA-I and the inclusion of new markers for this diagnosis is suggested.

REFERENCES

1. Lloyd-Jones D, Adams R, Carnethon M, De Simone G, Ferguson TB, Flegal K, Ford E, Furie K, Go A, Greenlund K, Haase N, Hailpern S, Ho M, Howard V, Kissela B, Kittner S, Lackland D, Lisabeth L, Marelli A, McDermott M, Meigs J, Mozaffarian D, Nichol G, O'Donnell C, Roger V, Rosamond W, Sacco R, Sorlie P, Stafford R, Steinberger J, Thom T, Wasserthiel-Smoller S, Wong N, Wylie-Rosett J, Hong Y; American Heart Association Statistics Committee and Stroke Statistics Subcommittee. Heart disease and stroke statistics—2009 update: a report from the American Heart Association Statistics Committee and Stroke Statistics Subcommittee. Circulation. 2009;119(3):e21-181. Erratum in: Circulation. 2009;119(3):e182. Circulation. 2010;122(1):e11
2. Conroy RM, Pyörälä K, Fitzgerald AP, Sans S, Menotti A, De Backer G, De Bacquer D, Ducimetière P, Jousilahti P, Keil U, Njølstad I, Oganov RG, Thomsen T, Tunstall-Pedoe H, Tverdal A, Wedel H, Whincup P, Wilhelmsen L, Graham IM; SCORE project group. Estimation of ten-year risk of fatal cardiovascular disease in Europe: the SCORE project. Eur Heart J. 2003;24(11):987-1003. Comment in: Eur Heart J. 2004;25(7):619; author reply 620. Eur Heart J. 2003;24(22):2070-1; author reply 2071.
3. Brasil. Ministério da Saúde. Base de dados de mortalidade [Internet]. Brasília: DATASUS; c2009 [citado 2009 Fev 2]. Disponível em: http://tabnet.datasus.gov.br/cgi/idb2008/matriz.htm
4. Brasil. Ministério da Saúde. Base de dados de morbidade hospitalar [Internet]. Brasília: DATASUS; c2009 [citado 2010 Fev 2]. Disponível em: http://tabnet.datasus.gov.br/cgi/idb2008/matriz.htm
5. Cruz DALM, Arcuri EAM. Diagnóstico de enfermagem de pacientes internados por cardiopatia chagásica crônica. Rev Esc Enferm USP. 1990;24(2):265-80.
6. Bacchion MM, Robazzi MLCC, Carvalho EC, Veiga EV. Clientela com alterações cardíacas: perfil diagnóstico elaborado por alunos de enfermagem. Rev Latinoam Enferm. 1995; 3(2):83-92.
7. Martins DL, Garcia TR. Perfil diagnóstico de enfermagem de pacientes acometidos por infarto do miocárdio. Online Braz J Nurs [Intetnet]. 2004;3(2). Disponível em: <http://www.uff.br/nepae/objn302martinsgarcia.htm>.
8. NANDA-Internacional. Diagnósticos de enfermagem da NANDA: definições e classificação 2009-2011. Porto Alegre: Artmed; 2010.
9. Pereira Júnior GA, Marson F, Ostini FM, Antoniazzi P, Gomide MDA, Basile-Filho, A. Monitorização hemodinâmica invasiva. Medicina (Ribeirão Preto). 1998;31(3):380-99.
10. Sandham JD, Hull RD, Brant RF, Knox L, Pineo GF, Doig CJ, Laporta DP, Viner S, Passerini L, Devitt H, Kirby A, Jacka M; Canadian Critical Care Clinical Trials Group. The randomized, controlled trial of the use of pulmonary-artery catheters in high-risk surgical patients. N Engl J Med. 2003;348(1):5-14.
11. Hall JB. Searching for evidence to support pulmonary artery catheter use in critically ill patients. JAMA. 2005;294(13):1693-4. Comment on: JAMA. 2005;294(13):1664-70. JAMA. 2005;294(13):1625-33.
12. Rubenfeld GD, McNamara-Aslin E, Rubinson L. The pulmonary artery catheter, 1967-2007: rest in peace? JAMA. 2007;298(4):458-61. Comment on: JAMA. 2007;298(4):423-9.
13. Figueiredo LFP, Silva E, Corrêa TD. Avaliação hemodinâmica macro e micro-circulatória no choque séptico. Rev Med (São Paulo). 2008;87(2):84-91.
14. Silva E, Noritomi DT, Park M. Monitorização não-invasiva dos parâmetros oxi-hemodinâmicos nas disfunções cardíacas agudas. Rev Soc Cardiol Estado de São Paulo. 2009;19(2):265-72.
15. Silva E, Garrido AG, Assunção MSC. Avaliação da perfusão tecidual no choque. Medicina (Ribeirão Preto). 2001;34(1):27-35.
16. Brandão SMG, Altino DM, Lopes JL, Silva RCG. Defining characteristics of decreased cardiac output: a literature review. Int J Nurs Terminol Classif. 2010 In press.
17. Fehring RJ. Methods to validate nursing diagnoses. Heart Lung. 1987;16(6 Pt 1):625-9.
18. Garcia TR. Modelos metodológicos para validação de diagnósticos de enfermagem. Acta Paul Enferm. 1998;11(3):24-31.
19. Oliva APV. Diagnóstico de débito cardíaco diminuído: validação clínica no pós-operatório de cirurgia cardíaca [dissertação]. São Paulo: Escola de Enfermagem da Universidade de São Paulo; 2000.
20. Barbosa PMK, Pontelli LRO, Maurício MM, Nunes RCA. Débito cardíaco diminuído: diagnóstico e intervenções de enfermagem a pacientes internados na terapia intensiva. Nursing (São Paulo). 2003;6(59):21-7.

This article has received corrections asked by the editor on 2011 in agreement with the ERRATUM published in Volume 24 Number 1.(http://www.scielo.br/pdf/ape/v24n1/en_v24n1a23.pdf)