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Decreased Cardiac Output: Clinical Validation in Patients With Decompensated Heart Failure

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PURPOSE: *Clinically validate (using Fehring's model) characteristics of the nursing diagnosis (ND) of decreased cardiac output (DCO) in 29 patients with decompensated heart failure.*
METHODS: *Cross-sectional study conducted in a Brazilian university hospital.*
FINDINGS: *According to the reliability rate (R) between the experts, the major characteristics (R ≥ 0.80) were fatigue, dyspnea, edema, orthopnea, paroxysmal nocturnal dyspnea, and elevated central venous pressure, and the secondary characteristics were weight gain, hepatomegaly, jugular vein distension, palpitations, crackles, oliguria, coughing, clammy skin, and skin color changes.*
CONCLUSION: *Characteristics with R > 0.50 and ≤1 were valid in the ND of DCO. Implications for the nursing practice: Clinical validation studies are necessary to determine the adequacy of this diagnosis and its determining characteristics with Taxonomy II.*
Search terms: *Clinical validation, congestive heart failure, decreased cardiac output, nursing diagnosis*
OBJETIVO: *Validar clinicamente, segundo o modelo proposto por Fehring, as características definidoras do diagnostico de enfermagem (DE) débito cardíaco diminuído (DCD) em 29 pacientes com insuficiência cardíaca congestiva descompensada.*
MÉTODOS: *Estudo transversal conduzido em um hospital universitário no sul do Brazil.*
RESULTADOS: *De acordo com a taxa de fidedignidade de Fehring (R) obtidas entre as peritas, as características definidoras consideradas maiores (R ≥ 0.80) foram fadiga, dispnéia, edema, ortopnéia, dispnéia paroxística noturna e pressão venosa central aumentada; e características secundárias foram ganho de peso, hepatomegalia, distensão da veia jugular, palpitações, crepitações, oliguria, tosse, pele fria e pegajosa e mudanças na cor da pele.*
CONCLUSÃO: *Características com R > 0.50 e ≤1 foram validadas para o diagnóstico débito cardíaco diminuído (DCD).*
IMPLICAÇÕES PARA PRÁTICA DE ENFERMAGEM: *Estudos de validação clínica são necessários para evidenciar a adequação deste diagnóstico e suas características definidoras a Taxonomia II.*
Descritores: *Clinical validation, congestive heart failure, decreased cardiac output, nursing diagnosis*

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Introduction

Heart failure (HF) is a complex clinical syndro characterized by impairments in the left ventricu function and in the neural and humoral regulati moreover, these impairments are found in combinati with reduced exercise capacity, water retention, a reduced longevity. Decompensation can occur patients previously diagnosed with HF, or the deco pensation may be the first acute manifestation of t HF syndrome (Braunwald & Bristow, 2000). At prese the incidence and prevalence of patients admitted w decompensated HF has been increasing in emergen departments (Maisel et al., 2004; Mangini et al., 200

The initial admission and evaluation of the patients in emergency rooms should be guided by nursing process that provides fast, efficient, and re able evaluation; furthermore, this nursing proce would aim to determine the best procedures based the present evidence. The nursing diagnosis (ND) one of the most important stages of the interventi because it requires critical and accurate judgment nurses (Diane, 2005; Lunney, 2003; Mangini et a 2008).

Clinical nursing research to validate nursing dia noses in clinical contexts is essential in developi ongoing ND knowledge, in validating ND in relati to daily clinical nursing assessments, and in reinfo ing critical and reflective clinical reasoning. Seve studies have been conducted to validate the diagnos in a clinical context (Dougherty, 1985; Oliva & Cru 2002; Zeitoun, Barros, Michel, & Bettencourt, 2007), b

the ND of decreased cardiac output (NANDA-I, 2008) in the context of patients admitted with decompensated HF remains unexplored in the literature.

The NANDA-I has demonstrated interest in developing studies that investigate the validity of ND, particularly those regarding the situations found in clinical practice (NANDA-I, 2008). These validation studies are essential to assess and legitimize the use of ND in relation to the findings of the daily clinical examination, a common nursing practice. Beyond that, the validation studies serve as important tools for establishing practical boundaries to the nursing profession (Garcia, 1998).

The validation of a diagnosis indicates the degree to which a group of defining characteristics describes the reality evidenced by the observation of the client/environment interaction (Gordon, 1994). From this perspective, the defining characteristics are considered valid when their occurrence can be identified as a group in a given clinic situation (Fehring, 1987).

Among the studies concerning the validation of the ND of decreased cardiac output, one study of 20 patients with HF or cardiogenic shock should be highlighted. In that study, a previous content validation was performed by cardiovascular nurses. The major defining characteristics among patients with HF were systolic pulmonary arterial pressure over 30 mmHg, altered electrocardiogram, left ventricle ejection fraction lower than 20%, and altered chest X-ray. Among patients with cardiogenic shock, the major characteristics were cardiac arrhythmias, skin color changes, rales, weak femoral pulse, and altered electrocardiogram. The characteristics found in this study contributed to the inclusion of new characteristics that had not been previously described in the literature (Dougherty, 1985). Soon after, this diagnosis was clinically validated in 49 patients that were in the postoperatory period of cardiac surgery. In this study, the clinical evaluation was compared with the cardiac output due to thermodilution. The defining characteristics associated with decreased cardiac output were similar to those described in the literature (Oliva & Cruz, 2002).

However, in the context of patients admitted w decompensated HF, the diagnosis of decreased card output remains unexplored in the literature. As result, this study was designed to clinically validate t ND of decreased cardiac output in patients with c compensated HF.

Methods

This cross-sectional study was performed betwe January and June 2007 at a university hospital in t city of Porto Alegre, State of Rio Grande do Sul, Bra This study included 29 patients with a diagnosis decompensated HF, either class III or IV, according the New York Heart Association (NYHA) classificati (Kenneth et al., 2008). The study included patients both genders, aged 18 years or older, who had be admitted to the emergency unit, the intensive care u or the admission unit. The patients had left ventri ejection fractions of 45% or less, as confirmed w echocardiogram. In addition, the patients had scores eight or more according to the Boston criteria for c compensated HF (Carlson, Goroll, Leahy, & Johns 1985). The study excluded patients with HF due acute myocardial infarction within 2 months prior data collection, patients with HF secondary to sep conditions, and patients with myocardial revascul ization surgery within 30 days of data collection.

The method chosen to validate the characteristics the proposed ND followed the clinical validati model described by Fehring. The clinical validati relies on evidence of a determined diagnosis in a r clinical environment in which the data are obtain through direct evaluation of the patient's answers. T steps of the clinical validation model are the followi first, two expert nurses evaluate a set of patients wh ND need to be tested; second, for each patient, the t experts individually evaluate the presence or abser of each of the diagnosis defining characteristics; a third, a reliability score is calculated. The reliabil score (R) determines the valid defining characterist for the studied diagnosis. More specifically, t

characteristics with R ≥ 0.80 are considered major or main characteristics, whereas the characteristics with R > 0.50–0.79 are considered secondary or minor characteristics (Fehring, 1987). For this reason, two nurses were invited to participate in the study as appraisers or experts; moreover, both of these nurses had consistent clinical experience in the area of interest for the studied diagnosis and had solid knowledge of the nursing process. The selected patients were evaluated by the experts at the units where they were hospitalized; the evaluation occurred in rooms equipped with a bed or stretcher and with proper illumination. The instruments were applied to each patient individually, and the evaluations occurred at distinct time points, with less than a 10-min interval. The interval was determined to avoid any time-related changes in the clinical examination.

The first instrument for data collection systematized the patient's initial clinical exam to establish the Boston criteria and the functional class evaluation for decompensated HF. The determination of decompensated HF was based on the patient's history, physical exam, and radiologic findings (Carlson et al., 1985).

The second instrument used for this study includes the demographic and clinical data, as well as responses from the clinical exam, which were classified according to the determining characteristics of the ND of decreased cardiac output (NANDA-I, 2008). This study was approved by the institutional Ethics Committee. The patients were fully informed of the study objectives, and all patients signed the Letter of Informed Consent prior to inclusion in the study.

Statistical Analysis

Data analysis was performed using the *Statistical Package for Social Sciences*, version 14.0 (Pereira, 2006). The categorical variables are described as absolute and relative frequencies, and the continuous variables are described as mean and standard deviation or interquartile median and interval. The reliability rate between the experts was calculated using the following formula for each evaluated determini characteristic:

$$R = \frac{A}{A+D} \times \frac{F1/N + F2/N}{2}$$

where A is the number of agreements, D is the numb of disagreements, F1 indicates the frequency of t characteristics observed by the first appraiser, F2 in cates the frequency of the characteristics observed the second appraiser, N is the number of observ people, and R is the reliability rate between t appraisers (Fehring, 1987).

Results

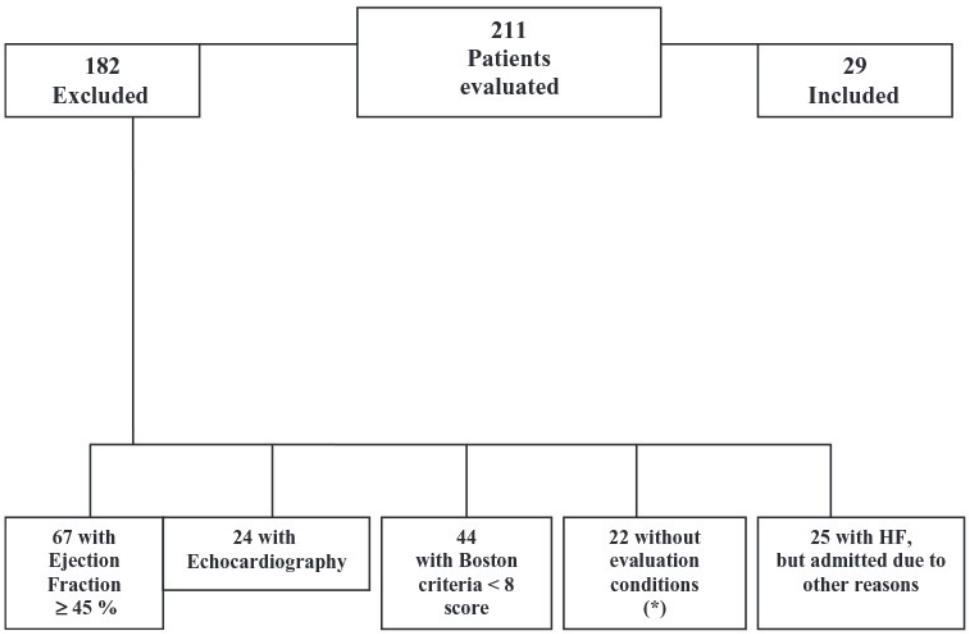
In this study, 211 patients admitted with decompe sated HF were evaluated. Of these patients, 182 we excluded. The main reason for exclusion was an ej tion fraction above 45%, as detected with echocard graphy. In total, 29 patients who fulfilled all inclusi criteria were included in the study, as shown Figure 1.

This study analyzed 29 patients with a diagnosis decompensated HF; the mean age was 61 ± 14 yea and 15 (51%) were male. Data were collected from t emergency department for 26 (90%) patients. The fu tional class, according to the NYHA criteria, w predominantly class III. The investigators observ that the main cause of the HF decompensation w nonadhesion to both pharmacological (angiotens converting enzyme inhibitors, diuretics, beta-blocke and digoxin) and nonpharmacological therap (sodium and fluid restriction, weight control, exerci and vaccination), which was the case in 19 (65.5 patients as shown in Table 1.

Characteristics That Determine the ND of Decreased Cardiac Output

Table 2 shows the reliability rate between t experts for each characteristic that determines the N

Figure 1. Flowchart of Patients. (*) Patients with stroke, or in mechanical ventilation, or mental confusion



of decreased cardiac output. Using the formula proposed by Fehring, six major (R ≥ 0.80) determining characteristics were found, and nine minor (R > 0.–0.79) characteristics were found. The other determining characteristics—prolonged peripheral capillary reperfusion, decreased vesicular murmurs, arrhythmias, arterial pressure alterations, weak peripheral pulse, and changes in mental state (anxiety and agitation)—that had scores below 0.50 were considered nonrepresentative. The determining characteristics that required cardiac output measurement through a Swan–Ganz catheter for diagnosis were not evaluated, as this catheter was not used for the patients in this study.

Discussion

Among the 29 patients recruited to participate in this study, several main or major determinant characteristics (R ≥ 0.80) were validated: fatigue, dyspnea, eden orthopnea, paroxysmal nocturnal dyspnea (PND), a elevated central venous pressure (CVP). The seconda or minor determinant characteristics (R > 0.50–0.7 included the following: hepatomegaly, weight ga jugular vein distension, palpitations, crackles, oligur coughing, clammy skin, and skin color changes.

The determining characteristic of fatigue has be found in some studies to be the main compla reported by patients with HF (Falk, Swedberg, Gastc Johansson, & Ekman, 2007; Friedman & King, 199 Several studies have also shown an association fatigue with stress and depression, and this sympto has been correlated with the higher functional class III and IV, according to the NYHA (Carels, 2004; Frie man & King, 1995). In addition, fatigue is considered be one of the factors that has the largest affect on t daily activities and quality of life of these patients (Fa et al., 2007; Friedman & King, 1995). In a previo

Table 1. Characteristics of Patients Admitted With Decompensated Heart Failure $n = 29$

Characteristics	
Age (years)*	61 ± 14
Gender (male)	15 (51)
Color (Caucasian)	18 (62)
Functional class III (NYHA)	19 (65.5)
Functional class IV (NYHA)	10 (34.5)
LV ejection fraction (%) (echocardiogram)*	28 ± 9
Cause of decompensation: nonadhesion	19 (65.5)
Etiology	
Hypertensive	9 (31)
Ischemic	7 (24)
Idiopathic	5 (17)
Others	8 (28)
Boston criteria (score of 10 or above)	17 (58.5)
Dry weight, kg*	68 ± 17
Weight gain, kg†	3.3 (1.0–7.4)
Current weight, kg*	71.3 ± 16.9
Systolic arterial pressure, mmHg*	114 ± 28
Diastolic arterial pressure, mmHg*	77 ± 17
Heart rate, bpm*	84 ± 12.5
Urea, mg/dL*	63 ± 46.5
Creatinine, mg/dL*	1.3 ± 0.8

NYHA, New York Heart Association; LV, left ventricle. Categorical data presented as *n* (%).
*Variable presented as mean ± standard deviation.
†Variable presented as median and percentiles 25–75.

Table 2. Reliability Between the Experts, for the Characteristics That Determine the Nursing Diagnosis of Decreased Cardiac Output

Determining characteristics	Reliabil rate (R)
Fatigue	1
Dyspnea	0.96
Edema	0.95
Orthopnea	0.95
Paroxysmal nocturnal dyspnea	0.88
Elevated central venous pressure	0.85
Hepatomegaly	0.78
Weight gain	0.78
Jugular vein distension	0.74
Palpitations	0.71
Crackles	0.71
Oliguria	0.67
Coughing	0.63
Clammy skin	0.61
Skin color changes	0.52

$R = (A/A + D) \times [(F1/N) + (F2/N)]/2$ (A = number of agreemer
D = number of disagreements; F1 = frequency of the characterist
observed by the first appraiser; F2 = frequency of the
characteristics observed by the second appraiser; N = number o
observed people; and R = reliability rate between the appraisers

study of HF and cardiogenic shock patients, the fatigue was identified in 54% of the individuals (Dougherty, 1985). In our study, the fatigue was present in 100% of the patients. However, it should be noted that this investigation evaluated patients with decompensated HF, who were able to report their physical condition and limitations more clearly than the patients with cardiogenic shock, as mentioned in the previous study. The evaluation of fatigue in the context of HF is extremely important for the determination of procedures to be performed by the nursing team, as it illustrates the patient's physical degradation in relation to the HF and the care urgency and intensity.

In the HF scenario, respiratory symptoms such as dyspnea, PND, and orthopnea are common. In general, these symptoms begin gradually and a usually related to each other (Peggy, 2006). The sens tion of shortness of breath or dyspnea validated in tl investigation is a clinically important complaint, a when identified, it is considered to be an abnorm clinical finding that can manifest itself with differe levels of intensity (Barreto & John, 2005; Shiber Santana, 2006). Dyspnea is one of the most comm complaints in emergency rooms of hospitals wor wide (Wang, FitzGerald, Schulzer, Mak, & Ayas, 200 However, a global evaluation of the patient is requir for the correct diagnosis of HF (Sarkar & Amelur 2006). In the content validation study that involv patients with HF and patients with cardiogenic sho dyspnea was not mentioned; however, superfic breathing was identified and observed in both patie

with HF (90%) and with cardiogenic shock (92%) (Dougherty, 1985).

Orthopnea is defined as the aggravated shortness of breath when lying down, which is common in patients with cardiovascular disorders (Peggy, 2006). Studies show that among patients with HF, persistent orthopnea can determine a group at high risk for hospitalization, as well as the patients without any possibility of improvement, due to their low left ventricle ejection fraction (Beck-da-Silva et al., 2004). In the previously mentioned study for the content validation of the diagnosis of decreased cardiac output, orthopnea was identified as a determining characteristic in 45% of the patients with HF (Dougherty, 1985). Therefore, orthopnea, as validated in this study, is in agreement with other studies in the literature that also identified this characteristic in patients with cardiovascular pathologies.

Another validated determining characteristic was PND, which is defined as the situation in which the person wakes up from sleep because of a strong sensation of shortness of breath, causing the patient to sit up in bed (Martinez, de Padua, & Terra Filho, 2004). This characteristic is closely related to the decreased cardiac output; while sleeping at night, the peripheral edema is reabsorbed, leading to systemic and pulmonary hypervolemia, with consequent aggravation of pulmonary congestion, which results in PND (Martinez et al., 2004). In a cohort study to analyze the relationship between the levels of b-type natriuretic peptide (BNP) and the effects of chronic HF on patients admitted in emergency units, the presence of PND was elevated and was observed in 59% of the 464 patients analyzed (Maisel et al., 2004). As a determining characteristic, PND does not appear in any of the studies reviewed on the diagnosis of decreased cardiac output. The validation of PND in the present investigation shows the importance of a consistent evaluation of the patient's clinical history, as this symptom is generally not observed by the professionals; thus, it is important to ask the patient about it. However, similar to the other respiratory symptoms, PND should be combined with other clinical findings to determine the diagnosis

decreased cardiac output. This study also validat

edema as a determining characteristic of HF. Edema

the excessive accumulation of fluids in the interstit

space (Boery, Quatrini, & Barros, 2005). In a study co

ducted with patients with systolic HF, periphe

edema and hepatojugular reflux were the clinical in

cators to determine the different levels of pressure

the right atrium (Rohde et al., 2004); moreover, tl

favors the identification of these patients at levels

better or worse prognosis. In the context of the valic

tion studies, this characteristic was present in 54%

the patients with cardiogenic shock (Dougherty, 198

In a study conducted in postoperative patients afte

cardiac surgery, for the purpose of analyzing the ass

ciations of the determining characteristics of decreas

cardiac output, edema was observed in 57% of t

patients (Oliva & Cruz, 2002). Hence, this determini

characteristic plays an important role in determini

the diagnosis of decreased cardiac output in patie

with HF. However, after a careful evaluation of t

medical and nursing literature, edema, although a ve

sensitive sign, may not be very specific if evaluat

separately.

The elevated CVP has appeared as an importa

determining characteristic. In this study, the CVP w

measured after the evaluation of jugular swelling

which the right atrial pressure was estimated and ve

fied by measuring the liquid column meniscus of t

external jugular vein (Biolo, Netto, Dora, & Polanczy

2005). This measurement provides important inform

tion for handling severely critical patients and is

simple, low-cost evaluation method (Vinayak et a

2006). Other studies have shown that the CVP evalu

tion method presents a significant correlation with t

CVP measured with a central venous catheter, a

thereby, the CVP constitutes a reliable clinical findi

to estimate the right atrial pressure (Parker et al., 20

Vinayak et al., 2006). In addition, the elevated CVP

associated with frequent hospitalizations, increas

risk of disease progression, and increased incidence

mortality resulting from decompensated HF, due to t

failure of the heart pump (Drazner, Rame, Phil, Stevenson, & Dries, 2001). The evaluation of the estimated CVP and its utilization to validate the elevated CVP as a determining characteristic are extremely important in the context of nursing, as it can be determined with a simple physical exam, with enough sensitivity to detect the intravascular volume status.

Of the symptoms mentioned, palpitation was observed to be a minor characteristic. Lung crackles typically utilized in clinical practice were also observed in this study as one of the minor determining characteristics for the diagnosis. A study was previously performed to evaluate the reliability and prognosis of traditional signs and symptoms in patients with HF, and it was observed that lung crackles alone were significant as predictors of congestion levels and survival of patients with HF (Rohde et al., 2004). However, these authors observed that the presence of crackles in the lung auscultation in these patients presented moderate specificity (77%), although it had low sensitivity (25%) to the identification of congestive parameters (Rohde et al., 2004). In the content validation study of the ND of decreased cardiac output, the determining characteristic of lung sounds was observed in 100% of the patients with cardiogenic shock (Dougherty, 1985).

Among the symptoms reported by the patients that comprised the group of minor characteristics, the presence of oliguria was observed with a reported volume of diuresis below 400 mL within a 24-hr period; moreover, this is likely related to the reduced renal perfusion due to decreased cardiac output (Portilla & Shaver, 2005). Although coughing was reported by many patients, it appears to be an unspecific determining characteristic in the patients with HF, as the presence of this symptom can involve a number of other clinical conditions. In HF, this symptom results from the stimulation of airway mucus receptors due to mechanical reasons linked with alterations in the pleural pressure, similar to that in pleural effusions and atelectasis (Barreto & John, 2005). Hence, such a determining characteristic should not be considered in the determination of decreased cardiac output in patients with HF, as it is a common symptom in congestive conditions, observed in this study. Additionally, the literature HF indicates that respiratory symptoms, such dyspnea, orthopnea, and PND, can be closely related the occurrence of congestive scenarios (Beck-da-Si et al., 2004). In this context, the importance of a nurs work is very clear in the education of these patie regarding the recognition of these signs and sympto to enable the early identification of decompensati signs of HF (Rabelo et al., 2006).

The characteristics of cool and viscous skin and sk color changes, although presenting the lowest indic are frequent signs found in patients with HF (Stevens & Perloff, 1989). Findings from several classic studi suggest that these signs can classify patients into fo hemodynamic profiles: profile A, dry and warm; prof B, wet and warm (orthopnea, jugular vein distensio presence of B3, edema, and ascites); profile C, w and cool (alternating pulse, cool extremities, reduc sensory capabilities, symptomatic hypotension, lo sodium level, alteration in renal function); and prof D, dry and cool, with the same signs and symptoms those of hypoperfusion but without pulmonary conge tion (Nohria et al., 2003; Shah et al., 2001). The results this study show that the determining characteristics "cool and clammy skin" classify our patients in prof C (congested and cool) or profile D (dry and co (Nohria et al., 2003; Shah et al., 2001).

Based on the data of this study, we can conclude th the evidence to support clinical decisions for nursi practices should be increasingly sought. The validati of the associations of objective and subjective data pr sented by the patient and the established diagnosis understood as the fundamental point. The evidenc based practice supports the consolidation of diagnos accuracy, as it is based on the studies that indicate su validation (Cruz & Pimenta, 2005).

Study Limitations

It should be noted that the large number of exclud patients (i.e., those who did not meet the criteria f

decompensated HF at the moment of the expert evaluation) has precluded us from obtaining a larger sample. Nevertheless, we strongly reinforce that the use of a protocol to treat decompensated HF, which indicates the use of IV diuretics, can lead to clinical stability more quickly. The small number of similar studies did not permit a more profound discussion of our findings.

Conclusions and Clinical Implications

In this study, we concluded that the main or major determining characteristics (R ≥ 0.80) were the following: fatigue, dyspnea, edema, orthopnea, PND, and elevated CVP. The secondary or minor characteristics (R > 0.50–0.79) were the following: hepatomegaly, weight gain, jugular vein distension, palpitations, crackles, oliguria, coughing, clammy skin, and skin color changes. We highlight that PND characteristic was not assessed to validate this diagnosis in previous studies and that it should be incorporated to the clinical exam of patients with HF because in the present study it was among the major defining characteristics. The other determining characteristics—prolonged peripheral capillary reperfusion, decreased vesicular murmurs, arrhythmias, alterations to arterial pressure, weak peripheral pulse, and changes in mental state—that had scores equal to or below 0.50 were considered as nonrepresentative. Hence, the study found that the characteristics with R between 0.51 and 1 were valid for the diagnosis of decreased cardiac output in patients with decompensated HF. Studies such as this one are important to verify the adequacy of Taxonomy II in a nurse's clinical practice.

The use of ND has been stimulated, and it augments the opportunities to interpret the data more accurately. Once the nurses announce their interpretations through the diagnoses, others may have the opportunity to discuss or even perform changes, which will contribute to more precise decisions. However, to build up precise and accurate diagnoses, the nurses must have proper scientific and technical backgroun
Under this perspective, we recently developed a stu
aiming at comparing the clinical assessment of cong
tion performed by a nurse to the one performed by
cardiologist, and correlate it with N-terminal pro-
type natriuretic peptide. Our data indicate that train
nurses in HF might have a similar performance to th
of physicians in detecting congestion and assessi
hemodynamic profile in patients with chronic H
(Sauer et al., 2010).

The role of nurses in treating patients with H
includes providing daily guidance to weight contr
sodium restriction, annual influenza vaccinatio
physical activity practice, regular use of medicatio
vital signs monitoring, and symptoms of decompens
tion (Rabelo, Aliti, Domingues, Ruschel, & Brun, 200
The nurse procedure in HF clinics must be focused
the clinical efficient exam, safe and based on evidenc
The establishment of accurate ND lead us to mo
effective interventions (Lunney, 2003).

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References

Barreto, S. M., & John, B. A. (2005). Sistema respiratório. In E. Barı
G. C. de Albuquerque, C. T. S. Pinheiro, & M. A. Czepielew
(Eds.), *Exame Clínico: Consulta râpida* (2nd ed., pp. 135–162). Po
Alegre, RS: Artmed.

Beck-da-Silva, L., Mielniczuk, L., Laberge, M., Anselm, A., Fras
M., & Williams, K. (2004). Persistent orthopnea and the prognc
of patients in the heart failure clinic. *Congestive Heart Failure*,
177–180.

Biolo, A., Netto, R., Dora, J. M., & Polanczyk, C. A. (2005). Exame
sistema cardiovascular. In E. J. G. Barros, G. C. de Albuquerq
C. T. S. Pinheiro, & M. A. Czepielewski (Eds.), *Exame Clínico* (
163–182). Porto Alegre, RS: Artmed.

Boery, R. N. S. O., Quatrini, H. C. P. G., & Barros, A. L. B. L. (20
Definições operacionais das características definidoras do di
nóstico de enfermagem volume de líquidos excessivo. *A*
Paulista de Enfermagem, *18*(2), 197–202.

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Braunwald, E., & Bristow, M. R. (2000). Congestive heart failure: Fifty years of progress. *Circulation*, *102*(Suppl. 4), 14–23.

Carels, R. A. (2004). The association between disease severity, functional status, depression and daily quality of life in congestive heart failure patients. *Quality Life Research*, *13*(1), 63–72.

Carlson, K. J. L. D., Goroll, A. H., Leahy, M., & Johnson, R. A. (1985). An analysis of physicians' reasons for prescribing long-term digitalis therapy in outpatients. *Journal of Chronic Diseases*, *38*(9), 733–739.

Cruz, D. A. L. M., & Pimenta, C. A. M. (2005). Prática baseada em evidências aplicada ao raciocínio diagnóstico. *Revista Latino-Americana de Enfermagem*, *13*(3), 415–422.

Diane, M. F. B. (2005). Critical thinking and patient outcomes: A review. *Nursing Outlook*, *53*(2), 59–65.

Dougherty, C. M. (1985). The nursing diagnosis of decreased cardiac output. *Nursing Clinics of North America*, *20*(4), 787–799.

Drazner, M. H., Rame, E., Phil, M., Stevenson, L. W., & Dries, D. L. (2001). Prognostic importance of elevated jugular pressure and a third heart sound in patients with heart failure. *New England Journal of Medicine*, *345*(8), 574–581.

Falk, K., Swedberg, K., Gaston-Johansson, F., & Ekman, I. (2007). Fatigue is a prevalent and severe symptom associated with uncertainty and sense of coherence in patients with chronic heart failure. *European Journal of Cardiovascular Nursing*, *6*(2), 99–104.

Fehring, R. (1987). Methods to validate nursing diagnoses. *Heart & Lung*, *16*(6), 625–629.

Friedman, M. M., & King, K. B. (1995). Correlates of fatigue in older women with heart failure. *Heart & Lung*, *24*(6), 512–518.

Garcia, T. R. (1998). Modelos metodológicos para validação de diagnósticos de enfermagem. *ACTA Paulista de Enfermagem*, *11*(3), 24–31.

Gordon, M. (1994). *Nursing diagnosis: Process and application*. St. Louis, MO: Mosby.

Kenneth, D., Cohen-Solal, A., Filippatos, G., McMurray, J. J. V., Ponikowski, P., Poole-Wilson, P. A., . . . Swedberg, K. (2008). ESC Guidelines for the diagnosis and treatment of acute and chronic heart failure 2008. *European Heart Journal*, *29*, 2388–2442.

Lunney, M. (2003). Critical thinking and accuracy of nurses' diagnoses. *International journal of nursing terminologies and classifications*, *14*(3), 96–107.

Maisel, A., Hollander, J. E., Guss, D. M. P., Nowak, R., Green, G., Saltzberg, M., . . . Jesse, R. (2004). Primary results of the Rapid Emergency Department Heart Failure Outpatient Trial (REDHOT). A multicenter study of B-type natriuretic peptide levels, emergency department decision making, and outcomes in patients presenting with shortness of breath. *Journal of the American College of Cardiology*, *44*(6), 1328–1333.

Mangini, S., Silveira, F. S., Silva, C. P., Grativol, P. S., Seguro, L. F. B. d. a. C., Ferreira, S. M. A., . . . Bocchi, E. A. (2008). Insuficiência Cardíaca Descompensada na Unidade de Emergência de Hospital Especializado em Cardiologia. *Arquivos Brasileiros de Cardiologia*, *90*(6), 400–406.

Martinez, J. A. B., de Padua, A. I., & Terra Filho, J. (2004). Dispn *Medicina*, *37*, 199–207.

NANDA-I. (2008). *Nursing diagnoses: Definitions and classificat 2009–2011*. Indianopolis, IN: Wiley-Blackwell.

Nohria, A., Tsang, S. W., Fang, J. C., Lewis, E. F., Jarcho, J. A., Mudge, G. H. (2003). Clinical assessment identifies hemo namic profiles that predict outcomes in patients admitted w heart failure. *Journal of the American College of Cardiology*, *41*(1797–1804.

Oliva, A. P., & Cruz, D. A. M. (2002). Diagnóstico de Débito Cardí Diminuído: validação clínica no pós-operatório de cirur cardíaca. *Ciência, Cuidado e Saúde*, *1*, 201–205.

Parker, J. L., Flucker, C. J., Harvey, N., Maguire, A. M., Russell, W. & Thompson, J. P. (2002). Comparison of external jugular a central venous pressures in mechanically ventilated pati *Anaesthesia*, *57*(6), 596–600.

Peggy, D. B. (2006). *Sinais e Sintomas*. Consedey CH, Trans. (1st e Rio de Janeiro, RJ: Guanabara Koogan.

Pereira, A. (2006). *Guia Prático de Utilização do SPSS: Análise de Da Para Ciências Sociais e Psicologia*. Lisboa, LX: Sílabo.

Portilla, D., & Shaver, M. J. (2005). Insuficiência renal aguda. In T Andreoli, C. C. J. Carpenter, R. C. Grings & J. Loscalzo (Ed *Cecil-Medicina Interna Básica* (6th ed., pp. 299–308). Rio de Jane RJ: Elsevier.

Rabelo, E. R., Aliti, G. B., Domingues, F. B., Ruschel, K. B., & Brun O. (2007). What to teach to patients with heart failure and w The role of nurses in heart failure clinics. *Revista Latino-americ de Enfermagem*, *15*(1), 165–170.

Rabelo, E. R., Aliti, G. B., Goldraich, L., Domingues, F. B., Claus N., & Rhode, L. E. (2006). Manejo não-farmacológico de pacier com insuficiência cardíaca em Hospital Universitário. *Arqui Brasileiros de Cardiologia*, *87*(3), 317–323.

Rohde, L. E., Beck-da-Silva, L., Goldraich, L., Grazziotin, T. C., I ombini, D. V., Polanczyk, C. A., et al. (2004). Reliability and pr nostic value of traditional signs and symptoms in outpatie with congestive heart failure. *Canadian Journal of Cardiology*, *20* 697–702.

Sarkar, S., & Amelung, P. J. (2006). Evaluation of the dyspneic pati in the office. *Primary Care*, *33*(3), 643–657.

Sauer, J., Rabelo, E. R., Castro, R. A., Goldraich, L., Rohde, L. Clausell, N., et al. (2010). Nurse's performance in classify heart failure patients based on physical exam: Comparison w cardiologist's physical exam and levels of NT-ProBNP. *Journa Clinical Nursing*, in press.

Shah, M. R., Hasselbald, V., Stinnett, S. S., Gheorhiade, Swedberg, K., Califf, R. M., et al. (2001). Hemodyna profiles of advanced heart failure: Association with clinical ch acteristics and long-term outcomes. *Journal of Cardiac Failure* 107–113.

Shiber, J. R., & Santana, J. (2006). Dyspnea. *Medical Clinics of N America*, *90*, 453–479.

Stevenson, L. W., & Perloff, J. K. (1989). The limited reliability physical signs for estimating hemodynamics in chronic he failure. *Journal of the American Medical Association*, *10*(6), 8 888.

Vinayak, A. G., Levitt, J., Gehlbach, B., Pohlman, A. S., Hall, J. B., & Kress, J. P. (2006). Usefulness of the external jugular vein examination in detecting abnormal central venous pressure in critically ill patients. *Archives of Internal Medicine*, *166*(19), 2132–2137.

Wang, C. S., FitzGerald, J. M., Schulzer, M., Mak, E., & Ayas, N. T. (2005). Does this dyspneic patient in the emergency department have congestive heart failure? *Journal of the American Med Association*, *294*(15), 1944–1956.

Zeitoun, S. S., Barros, A. L. B. L. D., Michel, J. L. M., & Bettencou A. R. C. D. (2007). Clinical validation of the signs and sympto and the nature of the respiratory nursing diagnoses in patie under invasive mechanical ventilation. *Journal of Clinical Nursi 16*, 1417–1426.