

# Nursing Diagnosis of Activity Intolerance: Clinical Validation in Patients With Refractory Angina

Clarissa Garcia Rodrigues, Spec, RN, Maria Antonieta Moraes, MSc, RN, Jaqueline Messer Sauer, MSc, RN, Renato Abdala Karam Kalil, PhD, MD, and Emiliane Nogueira de Souza, MSc, RN

**PURPOSE.** The study aims to clinically validate the defining characteristics (DCs) of the nursing diagnosis (ND) of Activity Intolerance for patients with ischemic heart disease and refractory angina.

**METHODS.** Cross-sectional study was used, involving 22 patients with ND of Activity Intolerance. The Fehring method was used to validate the ND.

**FINDINGS.** Most DCs presented reliability indexes between 0.5 and 0.79. Three DCs presented reliability indexes  $\geq 0.8$ .

**CONCLUSION.** All DCs were validated, and electrocardiographic changes indicating ischemia, verbal report of fatigue, and abnormal rate response to activity were considered as DC major.

**IMPLICATIONS FOR NURSING PRACTICE.** This study is relevant in daily nursing practice for guidance in establishing the care plan and describing the assistance for this group of patients.

**Search terms:** Clinical nursing research, myocardial ischemia, nursing diagnosis

**OBJETIVO.** Validar clinicamente as características definidoras (CD) do diagnóstico de enfermagem (DE) Intolerância à Atividade em pacientes cardiopatas isquêmicos com angina refratária.

**MÉTODOS.** Estudo transversal envolvendo 22 pacientes com DE Intolerância à Atividade. Método de Fehring foi utilizado para validação do DE.

**RESULTADOS.** A maioria das CD apresentaram taxa de fidedignidade entre 0.5–0.79. Três CD apresentaram índices de confiabilidade  $\geq 0.8$ .

**CONCLUSÃO.** Todas as CD foram validadas, sendo que alterações eletrocardiográficas indicando isquemia, relato verbal de fadiga e resposta anormal da frequência cardíaca à atividade foram validadas como CD maiores.

## IMPLICAÇÕES PARA A PRÁTICA DE

**ENFERMAGEM.** Este estudo é relevante na prática diária de enfermagem auxiliando no planejamento e orientação do plano de cuidados a esse grupo de pacientes.

**Descritores:** Diagnóstico de enfermagem, isquemia miocárdica, pesquisa em enfermagem clínica

Clarissa Garcia Rodrigues, Spec, RN, Maria Antonieta Moraes, MSc, RN, Jaqueline Messer Sauer, MSc, RN, and Emiliane Nogueira de Souza, MSc, RN, are research nurses at the Cardiology Institute of Rio Grande do Sul/Cardiology University Foundation, Rio Grande do Sul, Brazil. Renato Abdala Karam Kalil, MD, PhD, is at the Cardiology Institute of Rio Grande do Sul/Cardiology University Foundation, Rio Grande do Sul, Brazil. Clarissa Garcia Rodrigues, Spec, RN, is a member of the Research on Research Group, Duke University in Durham, North Carolina, USA.

## Introduction

Refractory angina is a debilitating condition characterized by severe and constant chest/heart discomfort (Brorsson, Bernstein, Brook, & Werkö, 2002; Mannheimer et al., 2002). This discomfort is, by definition, resistant to all conventional treatments for coronary artery disease (CAD), including drug treatment as well as surgical and percutaneous myocardial revascularization (Brorsson et al., 2002; Mannheimer et al., 2002). Patients with refractory angina often experience recurrent and continuous thoracic discomfort, poor general health, mental disorders, impairment of functional capacity, activity restriction, and limited self-care (Cohen, Pascual, Scirica, & Magnus Ohman, 2010; McGillion, Watt-Watson, LeFort, & Stevens, 2007; Yang, Barsness, Gersh, Chandrasekaran, & Lerman, 2004).

It is estimated that 6.5 million people worldwide suffer from angina. In the United States, there are around 900,000 diagnosed cases of patients with CAD and angina refractory to cardiology conventional treatment. Additionally, between 25,000 and 75,000 new cases are diagnosed each year (McGillion et al., 2007; Yang et al., 2004). The European Society of Cardiology estimates that 15% of diagnosed cases of angina can be characterized as refractory angina (Mannheimer et al., 2002). With the increasing age of the population and

## Nursing Diagnosis of Activity Intolerance: Clinical Validation in Patients With Refractory Angina

the reduction of CAD mortality, it is believed that the incidence of such patients will increase. Given this, there is an evident need for trained teams of health professionals who are prepared to care for this patient population.

Nurses are concerned with assessing, diagnosing, and the provision of appropriate care for each individual patient. In this context, the nursing diagnosis (ND) of *Activity Intolerance* is of particular importance considering the clinical findings of refractory angina. *Activity Intolerance* is defined as insufficient physiological or psychological energy to support or supplement the required or desired daily activities (NANDA-I, 2008). The defining characteristics (DCs) of *Activity Intolerance* include electrocardiographic changes indicating ischemia or arrhythmia, exertional discomfort or dyspnea, verbal report of fatigue or weakness, abnormal heart rate or blood pressure response to activity (NANDA-I, 2008). To date, there are no known studies in the nursing literature that aim to clinically validate the DCs of *Activity Intolerance* in patients with refractory angina.

NANDA-I has stimulated the performance of validation studies designed to consider the situations encountered in clinical practice (Chaves, Carvalho, & Rossi, 2008; Galdeano, Rossi, & Pelegrino, 2008; Martins, Aliti, & Rabelo, 2010; Oliva & Cruz, 2002). Such validation studies are essential for legitimizing the use of ND in relation to clinical examination findings in nursing practice. Moreover, such studies serve as important tools in establishing the practical limits of nursing as a profession (Garcia, 1998).

Validation of an ND indicates the degree to which each set of DCs describes reality as evidenced by observation of the client/environment interaction (De Cássia Lopes Chaves, De Carvalho, De Souza Terra, & De Souza, 2010; Fehring, 1987; Garcia, 1998). From this perspective, the DCs are considered valid when true groupings occur within a particular clinical situation (De Cássia Lopes Chaves, De Carvalho, De Souza Terra, & De Souza, 2010; Fehring, 1987; Garcia, 1998). Fehring's model of clinical validation is based on the

search for evidence in a real clinical environment, in which data are obtained through direct evaluation of the patient (Fehring, 1987).

Studies that address this validation approach are important because they provide subsidies for the development of the tools necessary for the daily activities of clinical practice (De Cássia Lopes Chaves et al., 2010; Fehring, 1987; Garcia, 1998). Therefore, this study aimed to clinically validate the DCs of the ND of *Activity Intolerance* in patients with refractory angina.

### Methods

This is a cross-sectional study for the validation of an ND. The population consisted of patients, with ischemic heart disease, with refractory angina, and without the option of CABG or PCI treatment, who presented symptoms of angina or heart failure, even with maximal medical therapy, attending an outpatient department cardiology referral hospital in southern Brazil. Data were collected from March 2009 to March 2010. In this outpatient department, patients are evaluated by a multidisciplinary team consisting of a cardiologist, cardiovascular surgeon, interventional cardiologist, and nurses specialized in cardiology. All patients that had the ND of *Activity Intolerance* were invited to participate. The only exclusion criterion was not agreeing to participate in the study.

### Method Validation of ND

The method used to validate the DC of ND was that proposed by Fehring, which is based on the search for evidence of a specific diagnosis from the real clinical environment, where data are obtained through direct assessment of the patient's responses (Fehring, 1987). There is a lack of uniformity about the criteria of what constitutes the profile of an expert such as: the number of years of clinical experience, length of time elapsed since graduation, level of title, or experience with research and publications on the subject

studied (Chaves, Carvalho, & Rossi, 2008). The scoring system proposed by Fehring, for the selection of experts, in order to validate the diagnosis has been one of the most widely employed in the literature. In this study, we used a scoring system adapted from Fehring shown in Table 1. This scoring system was previously used in another Brazilian study of the clinical validation of ND in patients with cardiac disorders (Martins et al., 2010), in order to include nurses with consistent clinical experience in the area of interest for the studied diagnosis and solid knowledge of the nursing process. The experts who participated in this study had high scores on the items required by this adapted model; therefore, both of these were considered able to participate in this study.

The process for validation of the ND and DC was as follows. The two expert nurses individually assess the presence or absence of each of the DC of the ND, after which the reliability index (R) between the observers is calculated. Characteristics for which  $R \geq 0.8$  are considered major DCs, and those for which R is between 0.5 and 0.79 are considered minor DCs, while those for which  $R < 0.5$  are considered not to be DCs of the ND in question.

**Table 1. Criteria for Selecting the Experts, Adapted from Fehring**

Criteria	Points
Master's degree in cardiovascular sciences	4
Specializing in cardiovascular science	3
Current clinical practice of at least 5 years in cardiology units	3
Experience teaching postgraduate and graduate courses in the area of cardiovascular semiology	2
Article published on systematization of nursing care or cardiovascular disease in scientific journal	2
Abstract published on systematization of nursing care or cardiovascular diseases	1

### Logistics study

Once included in the protocol, each patient received an outpatient clinical evaluation from each of the two expert nurses, separately. A specific instrument was used to collect data containing history, physical examination, and the DCs of *Activity Intolerance*.

The presence of the DC of the ND in question was dichotomously categorically assessed (yes/no). The defining DC, electrocardiographic changes indicating reflecting ischemia or arrhythmia, was assessed by the expert nurses using a 12-lead electrocardiogram, and the DCs abnormal heart rate response to activity and abnormal blood pressure response to activity were evaluated by expert nurses using the Naughton protocol, which provides about 1 MET every 2 min for the evaluation of patients with low or very low cardiorespiratory fitness. Electrocardiograms and exercise tests are performed routinely in the clinic. The other DCs were evaluated by means of history taking and physical examination of the patients. It is emphasized that the nurses had no contact with each other during the assessments, so as not to avoid any exchange of opinion.

The study was designed according to the Guidelines and Norms Regulating Research Involving Human Subjects (Brazil, 1998) and was approved by the local Ethics Committee under no. 4216/08. All patients participated in the study voluntarily and signed a consent form.

Data were analyzed using the PASW statistics program, version 18.0 (IBM Corporation, Somers, NY, USA). Continuous variables were expressed as the mean and standard deviation. Categorical variables were described as absolute (n) and relative (%) frequencies. The Reliability index between the responses of experts was calculated using the formula:  $R = (A / A + D) \times ((F1 / N) + [F2 / N]) / 2$ , where A is the number of matches, D is the number of disagreements, F1 indicates the frequency characteristics observed by the first observer, F2 is the frequency of the characteristics observed by the second observer, N is the number of

# Nursing Diagnosis of Activity Intolerance: Clinical Validation in Patients With Refractory Angina

subjects observed, and R means the rate of reliability between observers (Fehring, 1987).

## Results

From March 2009 to March 2010, 38 ischemic cardiomyopathy patients with refractory angina were evaluated in the outpatient department under study by expert nurses. Of these, 22 individuals had the ND of *Activity Intolerance* and were included in the study. The average age of the study sample was  $59 \pm 5$  years, predominantly male patients (90.9%). Class II angina (45.4%) (Canadian Cardiovascular Society [CCS]) and class III heart failure (54.5%) (New York Heart Association [NYHA]) were predominant. The mean left ventricular ejection fraction was  $58 \pm 1$ . Most patients had previously undergone coronary artery bypass grafting (CABG) and percutaneous coronary intervention (PCI) (Table 2).

Once the expert nurses had evaluated the patients for the presence or absence of each of the DCs of *Activity Intolerance*, the values of the reliability test were obtained. Considering the previously established criteria for validation of ND, electrocardiographic changes indicating ischemia, verbal report of fatigue, abnormal heart rate response to activity were considered major DCs ( $R \geq 0.8$ ), while electrocardiographic changes indicating arrhythmia, discomfort on exertion, dyspnea, weakness, and verbal report of abnormal blood pressure response to activity were considered minor DCs ( $R = 0.5$  to  $0.79$ ). No defining characteristic showed  $R < 0.5$  (Table 3).

## Discussion

The ECG alterations reflecting ischemia, verbal report of fatigue, and abnormal heart rate response to activity were identified as major identifying characteristics, while electrocardiographic changes indicating arrhythmia, discomfort on exertion, dyspnea, weakness, and verbal report of abnormal blood pressure response to activity were identified as minor

**Table 2. Sample Characteristics (n = 22)**

Characteristics	n (%)
Age (years)*	$59 \pm 5$
Male	20 (90.9)
Left ventricular ejection fraction (%)*	$58 \pm 1$
Hypertension	20 (90.9)
Diabetes	10 (45.4)
Heart failure class (NYHA)	
I	1 (4.2)
II	8 (36.3)
III	12 (54.5)
IV	1 (4.2)
Angina class (CCS)	
I	1 (4.2)
II	10 (45.4)
III	9 (40.9)
IV	2 (9.0)
Previous vascular disease	
Myocardial infarction	22 (100)
Cerebrovascular accident	4 (18.1)
Peripheral vascular disease	4 (18.1)
Previous myocardial revascularization	
Surgical	19 (86.3)
Percutaneous	20 (90.9)

\*Average and standard deviation.

NYHA, New York Heart Association; CCS, Canadian Cardiovascular Society.

identifying characteristics. The major DCs are considered to represent more important manifestations of intolerance to activity, as they were identified with high frequency in the clinical validation of this diagnosis.

The verbal report of fatigue falls within the range of the limited functional classes of heart failure (NYHA) and angina (CCS) presented by the patient sample. The limitations brought about by ischemic heart disease and refractory angina are known (Brorsson et al., 2002; McGillion et al., 2007; Mannheimer et al., 2002; Yang et al., 2004), and its validation as a major DC demonstrates the importance of its identification for the ND *Activity Intolerance*, as well as for the subsequent definition of the appropriate nursing interventions.

**Table 3. Reliability Index for Defining Characteristics of Activity Intolerance Nursing Diagnosis**

Defining characteristics	N1		N2		R
	n	%	n	%	
Electrocardiographic changes indicating ischemia	20	90.9	21	95.4	0.89
Electrocardiographic changes indicating arrhythmias	16	72.7	19	86.3	0.69
Exertional discomfort	18	81.8	20	90.9	0.79
Exertional dyspnea	17	77.2	17	77.2	0.77
Verbal report of fatigue	21	95.4	21	95.4	0.95
Verbal report of weakness	16	72.7	17	77.2	0.58
Abnormal heart rate response to activity	20	90.9	19	86.3	0.85
Abnormal blood pressure to activity	12	54.5	12	54.5	0.50

N1, nurse 1; N2, nurse 2; R, reliability index.

The DCs, electrocardiographic changes indicating ischemia, considered major in this study, were identified by expert nurses through the analysis of electrocardiograms performed on the patients. As the sample consisted of patients with ischemic myocardial disease, such electrocardiographic changes were expected, as was its validation as a major DC of the ND of *Activity Intolerance* in this population of patients (Cardiologia, 2007).

Another DC identified as major was the abnormal heart rate in response to activity. This, identified by the expert nurses through the analysis of the exercise tests performed by patients, coincides with the findings cited previously and is frequently identified in patients with ischemic heart disease because of the imbalance between the supply and demand of myocardial oxygen, and by ventricular dysfunction, resulting in the inadequacy of the heart rate during activity (Busha, 2010).

The DCs of weakness and abnormal blood pressure response to activity are classified as minor because of

the frequency they were identified by the two expert nurses in the real clinical environment. Nevertheless, they are considered important and representative of the ND *Activity Intolerance*. The findings support the use of the ND for patients with ischemic heart disease with refractory angina.

Some limitations of this study should be mentioned, such as the small sample size, representing only one center of homogeneous patients. Many validation studies in the literature are only descriptive in nature (Chaves, Carvalho, & Rossi, 2008). A strength of this study was the use of statistical analysis, which reduced the possibility of biases. Such analysis provides support for nursing care based on clinical evidence and has the potential to further stimulate other validation studies in this population.

In this study involving patients with refractory angina, the use of the ND of *Activity Intolerance* was considered appropriate and the DCs were considered pertinent for patients with ischemic heart disease. In the sample, the most frequently identified were verbal report of fatigue, electrocardiographic changes indicating ischemia, and abnormal heart rate in response to activity. Faced with the incidence of the disease, it is believed that such evidence may be relevant in daily nursing practice for guidance in establishing the care plan and describing the assistance given to this group of patients.

**Acknowledgments.** We would like to acknowledge the team of Nursing Residency in Cardiology at the Cardiology Institute of Rio Grande do Sul/Cardiology University Foundation, for helping in assisting those patients in the outpatient department, where this study took place.

Author contact: enogsouza@hotmail.com

#### References

- Brazil. (1998). Ministério da Saúde. Conselho Nacional de Saúde. Comissão Nacional de Ética em pesquisa. Resolução 196/96. *Cadernos de Ética em Pesquisa*, 1(1), 34–42.

## Nursing Diagnosis of Activity Intolerance: Clinical Validation in Patients With Refractory Angina

- Brorsson, B., Bernstein, S. J., Brook, R. H., & Werkö, L. (2002). Quality of life of patients with chronic stable angina before and four years after coronary revascularisation compared with a normal population. *Heart, 87*, 140–145.
- Busha, B. F. (2010). Exercise modulation of cardiorespiratory variability in humans. *Respiratory Physiology & Neurobiology, 172*, 72–80.
- Cardiologia, S. B. D. (2007). Guidelines for unstable angina and non-ST-segment elevation myocardial infarction of the Brazilian Society of Cardiology (II edition, 2007). *Arquivos Brasileiros de Cardiologia, 89*, e89–131.
- Chaves, E. C. L., Carvalho, E. C., & Rossi, L. A. (2008). Validação de diagnósticos de enfermagem: tipos, modelos e componentes validados. *Revista Eletrônica de Enfermagem, 10*(2), 513–520.
- Cohen, M. G., Pascual, M., Scirica, B. M., & Magnus Ohman, E. (2010). Therapeutic goals in patients with refractory chronic angina. *Revista Espanola de Cardiologia, 63*, 571–582.
- De Cássia Lopes Chaves, E., De Carvalho, E. C., De Souza Terra, F., & De Souza, L. (2010). Clinical validation of impaired spirituality in patients with chronic renal disease. *Revista Latino-Americana de Enfermagem, 18*, 309–316.
- Fehring, R. J. (1987). Methods to validate nursing diagnoses. *Heart & Lung, 16*, 625–629.
- Galdeano, L. E., Rossi, L. A., & Pelegrino, F. M. (2008). Content validation of the deficient Knowledge nursing diagnosis. *Acta Paulista de Enfermagem, 21*(4), 545–555.
- Garcia, T. R. (1998). Modelos metodológicos para validação de diagnósticos de enfermagem. *Acta Paulista de Enfermagem, 11*(3), 24–31.
- Mannheimer, C., Camici, P., Chester, M. R., Collins, A., DeJongste, M., Eliasson, T. . . Thelle, D. (2002). The problem of chronic refractory angina; report from the ESC Joint Study Group on the treatment of refractory angina. *European Heart Journal, 23*, 355–370.
- McGillion, M., Watt-Watson, J., LeFort, S., & Stevens, B. (2007). Positive shifts in the perceived meaning of cardiac pain following a psychoeducation program for chronic stable angina. *Canadian Journal of Nursing Research, 39*, 48–65.
- Martins, Q. C., Aliti, G., & Rabelo, E. R. (2010). Decreased cardiac output: Clinical validation in patients with decompensated heart failure. *International Journal of Nursing Terminologies and Classifications, 21*, 156–165.
- NANDA-I. (2008). *Nursing diagnoses: Definitions and classification 2009–2011*. Oxford: Wiley-Blackwell.
- Oliva, A. P., & Cruz, D. A. M. (2002). Diagnóstico de Débito Cardíaco Diminuído: validação clínica no pós-operatório de cirurgia cardíaca. *Revista Ciência, Cuidado e Saúde, 1*(1), 201–205.
- Yang, E. H., Barsness, G. W., Gersh, B. J., Chandrasekaran, K., & Lerman, A. (2004). Current and future treatment strategies for refractory angina. *Mayo Clinic Proceedings, 79*, 1284–1292.