

# Nursing diagnoses and interventions for patients with congestive heart failure using the ICNP®\*

DIAGNÓSTICOS E INTERVENÇÕES DE ENFERMAGEM PARA PACIENTES PORTADORES DE INSUFICIÊNCIA CARDÍACA CONGESTIVA UTILIZANDO A CIPE®

DIAGNÓSTICOS E INTERVENCIONES DE ENFERMERÍA PARA PACIENTES PORTADORES DE INSUFICIENCIA CARDÍACA CONGESTIVA UTILIZANDO LA CIPE®

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## ABSTRACT

The aim of this descriptive exploratory study was to construct nursing diagnosis and intervention statements for patients with Congestive Heart Failure. To accomplish this aim, 53 terms were identified in the focus axis of the International Classification for Nursing Practice (ICNP®), which guided the construction of these statements using the guidelines of the International Council of Nurses and ISO 18.104. A total of 92 nursing diagnosis statements were constructed, which resulted in 66 statements after standardization. The standardized statements were separated according to the following pathophysiological models: 13 related to tachycardia, 20 related to dyspnea, 19 related to edema, and 14 related to congestion. A total of 234 interventions were constructed for these statements using the terms from the 7-Axis Model of the ICNP®, the literature in the area and the clinical experience of the authors. The nursing diagnosis and intervention statements designed are expected to facilitate the evaluation of CHF patients and assist in the construction of a terminological subset for the ICNP®.

## DESCRIPTORS

Heart failure  
Nursing diagnosis  
Nursing care  
Classification

## RESUMO

Estudo exploratório-descritivo, desenvolvido com o objetivo de construir afirmativas de diagnósticos e intervenções de enfermagem para pacientes portadores de insuficiência cardíaca congestiva. Para tanto, foram identificados na CIPE® 53 termos do eixo foco, que nortearam a construção dessas afirmativas utilizando as diretrizes do Conselho Internacional de Enfermeiros e a ISO 18.104. Foram construídas 92 afirmativas de diagnósticos de enfermagem, que depois de normalizadas, passaram a 66 e foram separadas de acordo com o modelo fisiopatológico, assim distribuídas: 13 para taquicardia, 20 para dispneia, 19 para edema e 14 para congestão. Para essas afirmativas construíram-se 234 intervenções, levando em consideração os termos do Modelo de Sete Eixos da CIPE®, a literatura da área e a experiência clínica das autoras. Espera-se que as afirmativas de diagnósticos e intervenções de enfermagem elaboradas possam favorecer a avaliação de indivíduos portadores de ICC e a construção de um subconjunto terminológico da CIPE®.

## DESCRIPTORIOS

Insuficiência cardíaca  
Diagnóstico de enfermagem  
Cuidados de enfermagem  
Classificação

## RESUMEN

Estudio exploratorio, descriptivo, objetivando construir declaraciones de diagnósticos e intervenciones de enfermería para pacientes portadores de insuficiencia cardíaca congestiva. Al efecto, fueron identificados en la CIPE® 53 término del eje foco, que orientaron la construcción de las declaraciones utilizando las directivas del Consejo Nacional de Enfermeros y la ISO 18.104. Se construyeron 92 declaraciones de diagnósticos de enfermería que, luego de normalizados, resultaron 66 y fueron separados acorde al modelo fisiopatológico, distribuyéndose así: 13 de taquicardia, 20 de disnea, 19 de edema y 14 de congestión. Para esas declaraciones se construyeron 234 intervenciones, tomando en consideración los términos del Modelo de los Siete Ejes de la CIPE®, literatura del área y la experiencia clínica de las autoras. Se espera que las declaraciones de diagnóstico e intervenciones de enfermería elaboradas puedan colaborar en la evaluación de individuos portadores de ICC y en la construcción de un subconjunto terminológico de la CIPE®.

## DESCRIPTORIOS

Insuficiencia cardíaca  
Diagnóstico de enfermería  
Atención de enfermería  
Clasificación

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## INTRODUCTION

Congestive heart failure (CHF) is considered a global public health problem, and in the last three decades, it has increased in both its incidence and prevalence. There is no single cause of CHF, but there are factors that increase the probability of its occurrence, such as cardiovascular risk factors. The main types of cardiovascular risk factors are arterial hypertension, dyslipidemia (high cholesterol), smoking, diabetes mellitus, a sedentary lifestyle, obesity, heredity and stress<sup>(1-2)</sup>.

By 2020 in Brazil, CHF is estimated to affect approximately 6.4 million people, with a mortality of approximately 1%. Healthy eating habits are deteriorating and the incidence of sedentary lifestyles, smoking and stress are increasing, causing an increased incidence of potential causes of heart dysfunction such as artery disease, diabetes mellitus and arterial hypertension in the population<sup>(2)</sup>.

CHF can be classified in several ways according to its clinical conditions, either acute or chronic, and cause hemodynamic or functional alterations. Depending on whether the CHF is acute or chronic, complications may occur in the right, left or both cardiac chambers. Complications on the left side are characterized by the signs and symptoms of pulmonary congestion, which refers to the failure of the left ventricular to fill and empty properly and leads to increased pressure in the ventricle and congestion in the pulmonary vascular system. Complications on the right side are related to the inability of the right ventricle to pump properly, the most common cause of right-sided heart failure (RHF), and generally present as symptoms of systemic congestion, which are: peripheral edema, hepatic congestion and jugular turgescence. Recognizing the heart chamber(s) affected is essential for the differential diagnosis<sup>(3)</sup>.

Generally, CHF does not progress slowly; instead, it abruptly increases in severity, evolving into acute decompensation. However, when precipitant conditions are controlled and the treatment is intensified, patients can remain stable for months or up to years. The treatment of patients with CHF has short and long term objectives. The short-term aim is to improve the hemodynamics and relieve symptoms; in the long term, the aim is to improve the quality of life and prolong the survival of the patient by slowing, halting or reversing the progression of ventricular dysfunction<sup>(4)</sup>.

Considering these aspects, this disease has become increasingly frequent over the years, and the preventive and care aspects should be reviewed by the health team. The number of new patients with heart failure has grown despite advances in treatment. What are the possible explanations for the increased incidence? Some of the pos-

sible causes are the survival conditions of the population, increasing industrialization and urbanization in the developing countries<sup>(5)</sup>.

Nursing action in recent decades has emphasized supporting and treating this disease because non-pharmacological treatment has been shown to be increasingly important, thus justifying the development of clinics and support programs for heart failure patients<sup>(6)</sup>. Systematic care by nurses practicing evidence-based teaching and research reduces the negative impact of cardiovascular complications on patient outcomes<sup>(4, 6)</sup>.

To implement nursing care in a systematic way, the nursing process and the classification systems of the nursing practice elements should be used. Among these systems, the International Classification for Nursing Practice (ICNP<sup>®</sup>) allows the construction of nursing diagnosis, interventions and outcomes statements, and its use promotes the registration and quality of the care in the practice, especially when targeted at specific areas of nursing care represented by terminology subsets of the ICNP<sup>®</sup>. The terminology subsets are understood as subsets of nursing diagnosis, intervention and outcome statements for a particular selected area or specialty of nursing care with specific purposes. Notably, these subsets do not replace the clinical judgment or the decision-making process of the nurse, which will always be essential for providing individualized care to the clients and their families; however, they do act as an available reference to the nurse<sup>(7)</sup>.

In 2007, the International Council of Nurses (ICN) presented a methodology for the development of ICNP<sup>®</sup> Catalogues that contained ten steps: to identify the intended clientele and the health priority; to document the significance for nursing; to contact the ICN to determine if other groups were already working with the health priority of interest in the Catalogue; to identify potential collaborations; to use the 7-Axis Model of the ICNP<sup>®</sup> to compose the nursing outcome and intervention statements; to identify additional statements by reviewing the literature and relevant evidence; to develop support content to test or validate the statements of the Catalogue in two clinical studies; to append, delete or revise the statements of the Catalogue, as needed; to work with the International Council of Nurses for the preparation of the final copy of the Catalogue; and to assist in the dissemination of the Catalogue<sup>(8)</sup>.

Another process to develop terminology subsets was announced in 2010. The developmental process contained six steps related to the main areas of the ICNP<sup>®</sup> Terminology Lifecycle: identification of clients; collection of terms and concepts relevant to the health priority; mapping of identified concepts to the ICNP<sup>®</sup>; structuring of new concepts; completion of the catalogue and dissemination of

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the catalogue. Nurses are requested to use this methodology or develop other methods to facilitate the development of ICNP® terminology subsets<sup>(9)</sup>.

With respect to the previously mentioned processes, the aim of this study was to construct nursing diagnosis and intervention statements for patients with CHF in the functional category III of the *New York Heart Association* (NYHA) scale based on the ICNP® terms with the aim of developing an ICNP® terminology subset for CHF.

## METHOD

This study is included in the research project, *Terminology subsets of the ICNP® for areas of clinical specialties and primary health care*, which is being developed by the ICNP® Center of the Federal University of Paraíba Postgraduate Nursing Program. This project was submitted to the Research Ethics Committee of the Lauro Wanderley University Hospital of the Federal University of Paraíba before commencement and was in accordance with the aspects mentioned in Resolution No. 196/96, which regulates research involving human subjects<sup>(10)</sup>, and authorized under protocol No. 141/08.

This is a descriptive exploratory study<sup>(11)</sup> developed in two stages: the collection of terms and concepts relevant to nursing care for patients with CHF in functional category III and the construction of nursing diagnosis and intervention statements from the identified terms. In the first stage, the concepts that were relevant to the nursing practice with patients with CHF contained on the focus axis were identified, which could guide the construction of nursing diagnosis and intervention statements. The pathophysiological model of CHF was used to facilitate this process, which classifies its main signs and symptoms according to the clinical data relevant to the disease: edema, tachycardia, dyspnea and congestion. Initially, the

authors read the terms in the ICNP® focus axis repetitively to identify the terms relevant to the nursing practice with patients with CHF, taking into consideration experience in the area of cardiology and the use of the ICNP®. Subsequently, lists of the terms identified were unified after removing repetitions to generate a list of 53 words.

When the nursing diagnosis and intervention statements were constructed, the 53 terms identified and the guidelines presented by the International Council of Nurses<sup>(7)</sup> for the construction of these statements were considered. The guidelines were developed with consideration of the ISO 18. 104 standard: Integration of a reference terminology model for nursing<sup>(12)</sup>. For the construction of the nursing diagnosis statements, one term from the Focus axis (area of care that is relevant to nursing) and one term from the Judgment axis (clinical opinion or determination related to the focus of the practice) were obligatorily included, along with additional terms as needed from the Focus, Judgment, Client, Location and Time axes. For the construction of nursing intervention statements, one term from the Action axis and one Target axis term, any term of the other axes except the Judgment axis, were obligatorily included, along with additional terms as needed from the Focus, Client, Location, Means, Action and Time axes<sup>(7,13)</sup>. Following the construction of the nursing diagnosis and intervention statements for CHF, they were classified according to the relevant clinical data, i.e., edema, tachycardia, dyspnea and congestion, and presented in alphabetical order.

## RESULTS

A total of 53 terms on the **Focus** axis were identified as relevant to the care of a patient with CHF; the terms were related to the main signs and symptoms relevant to the disease: edema, tachycardia, dyspnea and congestion, shown in Chart 1.

**Chart 1** - Distribution of the terms identified on the Focus Axis of the ICNP® Version 1. 0, related to CHF - João Pessoa, PB, 2009

Terms of the Focus Axis related to CHF		
1. Metabolic acidosis	19. Fluid and electrolyte imbalance	36. Respiratory pattern
2. Respiratory acidosis	20. Airway clearance	37. Dry Skin
3. Anxiety	21. Dyspnea at rest	38. Tissue perfusion
4. Arrhythmia	22. Functional dyspnea	39. Blood Pressure
5. Ascites	23. Exhaustion	40. Vascular process
6. Self-performance activity	24. Fatigue	41. Response to medication
7. Psychomotor activity	25. Cardiac rate	42. Response to fluid therapy
8. Ability to groom self	26. Respiratory rate	43. Response to treatment
9. Ability to bathe self	27. Hypertension	44. Water retention
10. Ability to perform hygiene	28. Hyperventilation	45. Cardiac rhythm
11. Ability to transfer self	29. Hypoxia	46. Respiratory rhythm
12. Ability to dress self	30. Intolerance to activity	47. Cardiovascular System
13. Cardiogenic shock	31. Mobility in bed	48. Sleep
14. Vasogenic shock	32. Non-adherence	49. Dizziness
15. Knowledge	33. Nausea	50. Cough
16. Cardiac insufficiency	34. Physical activity pattern	51. Exchange of gases
17. Deglutition	35. Urinary elimination pattern	52. Ventilation
18. Thoracic discomfort		53. Fluid volume

Using these terms and the guidelines of the International Council of Nurses, 92 nursing diagnosis statements were constructed, normalized, edited for repetitions, and classified by the main signs and symptoms

most frequent in CHF patients. This process resulted in 66 statements, with 13 related to tachycardia, 20 related to dyspnea, 19 related to edema and 14 related to congestion.

**Chart 2** - Distribution of the nursing diagnosis statements constructed from the terms identified in the **Focus** axis of the ICNP®, related to CHF - João Pessoa, PB, 2009

<b>Tachycardia</b>	Arrhythmia; Anxiety; Impaired psychomotor activity; Vasogenic shock; Cardiogenic shock; Decreased cardiac output; Increased cardiac output; Knowledge deficit regarding arrhythmia; Chest discomfort; Cardiac rate changes; Abnormal heart rhythm; Nausea; Dizziness.
<b>Dyspnea</b>	Conflicting attitude in relation to physical activity; Adherence to the physical activity regime; Respiratory acidosis; Impaired self-performance activity; Knowledge about physical activity; Functional dyspnea; Dyspnea at rest; Impaired deglutition; Knowledge deficit regarding physical activity; Lack of capacity to manage the physical activity regime; Fatigue; Altered respiratory rate; Intolerance to activity; Altered respiratory pattern; Impaired physical activity pattern; Altered respiratory rhythm; Impaired respiratory system; Impaired sleep; Impaired gas exchange, Impaired ventilation.
<b>Edema</b>	Metabolic acidosis due to electrolyte alteration; Ascites; Metabolic acidosis due to fluid alteration; Metabolic acidosis due to fluid and electrolyte alteration; Adherence to fluid volume; Imbalance of fluids and electrolytes; Exhaustion from the treatment; Knowledge deficit regarding fluid volume; Impaired skin integrity; Impaired movement in bed; Dry skin; Altered cardiac tissue perfusion; Decreased blood pressure; Increased blood pressure; Impaired urinary system process, Impaired peripheral vascular process; Water retention, Fluid volume deficit; Unsatisfactory response to fluid therapy.
<b>Congestion</b>	Impaired ability to dress self; Impaired ability to perform hygiene; Impaired ability to groom self; Impaired ability to bathe self; Impaired ability to transfer self; Impaired airway clearance; Knowledge deficit regarding the response to medication; Lack of response to the treatment; Hypoxia due to congestion, Lack of adherence to the therapeutic regimen; Unsatisfactory response to the medication; Productive cough; Dry cough; Excessive fluid volume.

A total of 234 nursing interventions were constructed from the 66 diagnosis statements, taking into consideration the terms contained in the 7-Axis Model of the ICNP® Version 1.0, that followed the guidelines of the International

Council of Nurses, the literature of the area and the clinical experience of the authors. Given space limitations, examples of diagnoses will be presented with their respective interventions according to the four signs and symptoms of CHF.

**Chart 3** - Examples of nursing diagnosis and intervention statements, according to the most relevant signs and symptoms of CHF: tachycardia and dyspnea - João Pessoa, PB, 2009

<b>Nursing diagnoses</b>	<b>Nursing interventions</b>
<b>Tachycardia</b>	
<b>Arrhythmia</b>	Analyze cardiovascular function and imminent risk of arrhythmia after patient exertion and reduce exertion. Institute Basic Life Support maneuvers. Observe frequency and regularity of the pulse if altered. Verify signs of lethal arrhythmias (VF, VT) such as decreased level of consciousness.
<b>Cardiogenic shock</b>	Note variations in blood pressure (orthostatic hypotension). Be familiar with the presence of the third heart sound. Observe signs of oliguria. Prepare circulatory containment measures (preparation of cardiotoxic drugs). Report episodes of rapid and thin pulse and altered peripheral perfusion, and initiate fluid resuscitation and basic support maneuvers.
<b>Increased cardiac output</b>	Control fluid volume gains. Monitor changes in cardiac rate after physical exertion. Appropriately position the patient in the bed. Reduce physical exertion.
<b>DYSPNEA</b>	
<b>Functional dyspnea</b>	Be familiar with the clinical conditions of the degree of CHF and its aggravations. Determine the hemodynamic status and compare with previous respiratory rate values. Examine pulmonary conditions. Observe the pulse oximetry values if <90%.
<b>Fatigue</b>	Monitor serum electrolyte levels (Ht, Hb, Na). Assist in social contact. Develop an individualized management plan for physical and social rehabilitation. Plan rest/activity periods.
<b>Impaired gas exchange</b>	Assist in arterial puncture for diagnostic examinations. Evaluate respiratory ventilation/perfusion. Maintain elevation of the bed at 90°. Maintain airway permeability. Monitor level of consciousness, arterial pressure, pulse, temperature and breathing pattern.

**Chart 4** - Examples of nursing diagnosis and intervention statements, according to the most relevant signs and symptoms of CHF: edema and congestion - João Pessoa, PB, 2009

Nursing diagnoses	Nursing interventions
<b>EDEMA</b>	
<b>Ascite</b>	Monitor via physical examination associated alterations (stertors, neck vein distension). Control water intake. Measure abdominal circumference daily. Verify peripheral pulses if present and degree of leg edema.
<b>Metabolic acidosis due to fluid and electrolyte alteration</b>	Evaluate the extent and severity of the water retention. Define whether laboratory alterations are metabolic or respiratory. Identify triggering factors and discuss the therapy adopted with the interdisciplinary team.
<b>Altered cardiac tissue perfusion</b>	Identify signs such as cold skin, edema and pulmonary congestion. Keep limbs warm and clean to reduce risk of injury. Observe peripheral pulse. Recognize signs of cardiac tissue hypoperfusion.
<b>CONGESTION</b>	
<b>Impaired ability to dress and groom self</b>	Improve skills with their reduced functions. Watch for signs of dizziness and hypoperfusion. Advise family members and caregivers about easy-to-wear loose clothing with buttons. Keep hygiene materials close for the patient's own use. Observe the presence of sudden dyspnea. Provide guidance (to family and caregivers) about care in the exertion of the patient when grooming him/herself. Reduce factors that precipitate an alteration in blood pressure (greater exertion than their conditions allow) when grooming him/herself.
<b>Hypoxia due to congestion</b>	Minimize physical exertion. Observe better positioning of the patient in bed. Monitor the administration of oxygen therapy. Rigorously reduce water intake.
<b>Lack of adherence to the therapeutic regimen</b>	Know the social condition of the patient and adapt guidance according to their level of cognition. Provide guidance regarding the treatment proposed for the patient with the multidisciplinary team.

## DISCUSSION

Heart failure is a challenging disease for healthcare teams due to the multiple etiologies and high incidence. One of the major team objectives is to achieve and maintain clinical stability of patients in lieu of very complex treatments, which require more investments in physical and human resources to improve the quality of life, reduce the length of hospitalization and increase patient survival<sup>(11-12)</sup>.

Training the nursing staff to educate and influence patients to be conscientious of their quality of life is one of the goals and is an important activity to establish better outcomes. Nurse intervention becomes significant because it can provide clear and objective information regarding the health status and prognosis of the client, educate the patient on the disease process, which encourages self-care, and customize treatment regimens to the lifestyle of the patient<sup>(14)</sup>.

One of the main proposals of this study was to organize the care of clients suffering from CHF according to the main signs and symptoms related to CHF. Symptoms of *tachycardia* are present when a heart is abruptly seriously injured, which occurs as a compensatory mechanism such as in acute myocardial infarction, and subsequently, its pumping capacity is immediately decreased. As a result, there are two essential effects: reduced cardiac output and increased systemic venous pressure. When individuals with low cardiac reserves remain at rest, they maintain

themselves in the initial HF condition. However, *tachycardia* and its effects can be recognized during heart failure by requesting the patient to climb stairs or take a walk. The increased load on the heart rapidly consumes the small amount of reserve available. With the acute effect, an excessive increase in the cardiac rate is observed where nervous reflexes react excessively in an attempt to overcome the inadequate cardiac output<sup>(15)</sup>. This can increase the cardiac rate to > 140 bpm, cause discomfort and lead nursing professionals to develop actions that will reduce the burden of exertion for the patient, even if minimally, as they perform their hygiene habits<sup>(16)</sup>.

The constructed nursing diagnosis and intervention statements related to *tachycardia* are associated with an elevated heartbeat as the present and important factor establishing its clinical diagnosis. The evaluation is performed through a primary clinical examination that can support evaluations in which major changes can be found, such as arrhythmia (the formation and/or conduction of the cardiac impulse); the location of these alterations in certain anatomical regions of the heart determine the clinical presentation of arrhythmia<sup>(17)</sup>. Tachycardia can also generate anxiety or an uncomfortable feeling of distress or fear, followed by an autonomic response<sup>(18)</sup>. Cardiac pain (resulting from myocardial ischemia without infarction) is believed to stimulate the release of acidic substances, such as lactic acid, or other products, such as histamine, kinins or cellular proteolytic enzymes. Elevated concen-



trations of these substances stimulate the nerve endings in heart muscle, and pain impulses are conducted to the central nervous system<sup>(16, 19)</sup>.

The lack of knowledge about the factors that trigger tachycardia and may induce arrhythmias could be associated with cognitive deficits. That possible association indicates a point to be worked on due to the risk of this patient undergoing exertion and triggering a worsening of their clinical condition possibly evolving into cardiogenic shock, a clinical syndrome characterized by inadequate tissue perfusion caused by severe cardiac dysfunction<sup>(20)</sup>. This syndrome includes decreased cardiac output in the presence of adequate intravascular volume with consequent tissue hypoxia. Systemic arterial hypertension is considered essential for the diagnosis of heart failure and associated with the clinical signs of poor tissue perfusion, such as cold extremities, peripheral cyanosis, altered state of consciousness and presence of oliguria<sup>(19, 21)</sup>.

The episodes of *dyspnea*, a very common sign of heart failure, are originated from pulmonary venocapillary hypertension and are usually activated when the patient performs physical exertion greater than their capacity. Scales are used to measure the severity of the heart failure in patients, which use the tolerance of the patient to exertion as the reference. This evaluation, from the functional class with less dysfunction to its most severe form, is important. An example is the New York Heart Association scale; this scale was developed for those who have *dyspnea* at rest originating from heart failure that intensifies in the decubitus by increased hydrostatic pressure in the pulmonary region, improving in the sitting or standing position<sup>(22)</sup>.

The *dyspnea* symptom is abnormal, and when it occurs at rest or when triggered by moderate exertion, it can be related to cardiovascular complications. Shortness of breath or *dyspnea* is a sign of heart failure. The etiology of *dyspnea* is diverse, including lung, heart and chest wall diseases and anxiety. The presentation of *dyspnea*, such as respiratory discomfort, one of the most characteristic symptoms of CHF, is usually associated with pulmonary venocapillary congestion that sometimes occurs with difficulty breathing at night when the person is lying down due to the displacement of liquid into the interior of the lungs. Individuals with CHF may need to sleep in a sitting position to prevent pulmonary venocapillary congestion<sup>(21)</sup>.

The constructed nursing diagnosis and intervention statements related to *dyspnea* identified different definitions such as *dyspnea* at rest, which relates to the position of the patient, *dyspnea* when lying down and improving with the sitting position (orthopnea)<sup>(16)</sup> or functional *dyspnea*, a state in which the characteristics are associated with physical activity, such as exercising and walking. As the diagnostic event for CHF, *dyspnea* leads to dysfunctions of mechanical (ventilation-perfusion) and functional origins (gas exchange and respiratory acidosis), which have an impact on the quality of life of the patient defined

by walking, hygiene activities and even sleep, in phases III and IV of the NYHA scale<sup>(21)</sup>.

The development of *edema* in patients with heart failure is associated with the regulation of intravascular volume. The presence of *edema* confounds the control of arterial pressure because changes in arterial pressure are rapidly reflected as variations in the intravascular volume. During heart failure after a muscle injury, the heart is unable to maintain an adequate cardiac output, the effective volume decreases, mean arterial pressure, therefore, drops slightly and the kidneys start to rapidly retain water and sodium, as if the body was experiencing real hypovolemia. All of these interrelated events that occur during heart failure contribute to nervous and humoral stimuli that cause an elevated arterial pressure in the right atrium, reflecting the inability of the heart to provide for the kidneys; fluid and salt retention in the kidneys causes a continual accumulation in the interstitial space that may evolve into congestion<sup>(1, 2)</sup>. *Edema* occurs with disease progression because the circulatory demand causes a deterioration of cardiac function and other corrective mechanisms involved in the retention of salt (sodium) by the kidneys. To maintain a constant concentration of sodium in the blood, the body retains water concomitantly. One of the main consequences of fluid retention is that the increased blood volume promotes myocardial distension; distended muscle contracts with more force, which is one of the main mechanisms used by the heart to improve its performance in incidences of heart failure. However, as the heart failure progresses, the excess liquid escapes from the circulation and accumulates in different body sites, producing swelling (*edema*)<sup>(1, 16)</sup>.

A monitoring and guidance program for patients with CHF significantly decreased complication signals such as *edema*, defined as the accumulation of fluid in the interstitial space as a consequence of the altered homeostasis of sodium and water. The *edema* may be generalized or localized. *Edema* evaluation can be performed by the verification of weight gain, through pitting or the Godet sign<sup>(2, 22)</sup>. In the alteration records, *edema* is also associated with the state in which body fluids are composed of water (solvent) and dissolved substances, and these levels need to be within an acceptable range for the smooth operation of the body. The body uses mechanisms to control the balance. The kidneys must function properly because of their ability to alter the amount of acid or base excreted, but generally, this process takes several days. The heart also needs to pump competently to supply blood to the kidneys and other organs responsible for releasing hormones and for the function of the autonomous central nervous system, as a defense against sudden alterations in the body. In turn, when the condition worsens, the patient presents with *ascites*, the state in which there is excess fluid in the peritoneal cavity (the membrane lining the abdomen) between the organs of the cavity. The pathogenesis of *ascites* formation, also a change in the water balance in the body, may be caused by several fac-

tors and involves the kidneys, heart, liver, adrenal and pituitary glands and nervous system<sup>(16)</sup>. The factors related to this retention, such as movement in bed and the presence of dry skin, directly affect the quality of life of the patient, care and self-care, which are factors that can significantly contribute to complications such as peripheral vascular disorders, edema, a marker of chronicity, or possibly to treatment not suited to the needs of the patient.

A frequent cause of death in heart failure is *pulmonary congestion*, occurring mainly in patients experiencing heart failure for prolonged periods of time. When pulmonary congestion occurs in a person without a new cardiac injury, it is usually triggered by a temporary overload of the heart, such as in an episode of heavy exercise, an emotional experience or a serious common cold. Congestion is believed to result from a weakened peripheral circulation venous return, due to the limited capacity of the left heart that results in the retention of blood in the lungs. In view of this occurrence, capillary pressure increases and a small amount of liquid begins to transude into the lung tissue and alveoli<sup>(4, 16, 22)</sup>. In the congestion process, the harmful effects of excessive fluid retention in the severe stages of heart failure appear, in contrast to the beneficial effects of moderate fluid retention. The physiological consequences of this are extremely severe; they include excessive stretching of the heart, which further weakens the heart and causes liquid filtration into the lungs, pulmonary edema and consequently deoxygenation of the blood. A small amount of liquid begins to transude to the alveoli and lung tissues when pulmonary capillary pressure increases. This can occur with heavy exercise and emotional experience, which can happen violently because the heart muscle injury is already present<sup>(19, 21)</sup>. Irregular clinical findings can be identified at this specific stage of pulmonary congestion, such as a cough, the sudden and explosive release of air from the lungs, or a productive cough, in which mucus is expelled. The mucus can drain the down the nasal passages to the throat and lungs and induction the cough reflex<sup>(15)</sup>. When the progress of the pulmonary congestion is monitored, hypoxia may exist due to lung congestion, and gas exchange cannot be performed in a satisfactory

manner, which may be sometimes caused by excess fluid volume and by physical exertion beyond the functional capacity. The cardiac patient is then restricted in their ability to perform tasks in their daily routines, such as difficulty bathing, dressing, grooming, transferring and performing activities related to hygiene.

The overall purpose of the nursing diagnosis and intervention statements constructed in the study was to cover all the previously mentioned aspects of the four main signs and symptoms of CHF. It should be noted that these statements need to be subjected to a content validation process by nurses of the area that is followed by clinical validation, where they will be tested with outpatient or hospitalized CHF patients.

## CONCLUSION

The aims achieved in this work were to develop nursing diagnosis and intervention statements based on the ICNP® for CHF patients. It is noteworthy that when these statements are validated they will be used to structure a terminological subset of the ICNP® for CHF patients; this subset aims to support systematic documentation in nursing practice, to facilitate the construction of electronic medical records and to make the ICNP® a useful instrument that can be integrated into the practice of nursing care onsite.

The ICNP® is a proven instrument that can facilitate the promotion, organization and quality of care, which contribute to professional autonomy and self-confidence, provide visibility to the nursing practice and reward the profession in specific areas such as cardiology, which require the professionals to develop committed activities for care. The heart failure outpatient clinics represent one of the possible applications of this work in the field of nursing; these are sectors that require monitoring, evaluation, teaching and research to support the well-being of patients with this clinical disorder, and the actions of the nurse can significantly improve the quality of life of patients and reduce the cost of readmissions.

## REFERENCES

1. Borges ES. Insuficiência cardíaca congestiva [Internet]. 2005 [citado 2011 abr. 17]. Disponível em: [http://educacao.cardiol.br/manualc/PDF/d\\_insuficiencia\\_cardiaca\\_congestiva.pdf](http://educacao.cardiol.br/manualc/PDF/d_insuficiencia_cardiaca_congestiva.pdf)
2. Dutra OP; Sociedade Brasileira de Cardiologia. II Diretriz Brasileira de Cardiopatia Grave. Arq Bras Cardiol. 2006;87(2):1-75.
3. Hunt SA, Baker DW, Chin MH, Cinquegrani MP, Feldman AM, Francis GS, et al. ACC/AHA Guidelines for the Evaluation and Management of Chronic Heart Failure in the Adult: executive summary a Report of the American College of Cardiology/American Heart Association Task Force on Practice Guideline (Committee to Revise the 1995 Guidelines for the Evaluation and Management of Heart Failure): developed in collaboration with the International Society for Heart and Lung Transplantation; Endorsed by the Heart Failure Society of America. Circulation. 2001;104(24):2996-3007.

4. Bocchi EA, Braga FGM, Ferreira SMA, Rohde P, Oliveira WA, Almeida DR et al.; Sociedade Brasileira de Cardiologia. III Diretriz Brasileira de Insuficiência Cardíaca Crônica. *Arq Bras Cardiol.* 2009;92(6 Supl. 1):1-71.
5. Bacal F, Veiga VC, Fiorelli A, Bellotti G, Bocchi EA, Stolf N, et al. Análise dos fatores de risco da doença vascular do enxerto em pacientes assintomáticos após transplante cardíaco. *Arq Bras Cardiol.* 2000;75(5):420-8.
6. Rabelo ER, Aliti GB, Domingues FB, Ruschel KB, Brun AO. What to teach to patients with heart failure and why: the role of nurses in heart failure clinics. *Rev Latino Am Enferm.* 2007;15(1):165-70.
7. Conselho Internacional de Enfermeiros. Classificação Internacional para a Prática de Enfermagem - CIPE® - versão 1.0. São Paulo: Algor; 2007.
8. Bartz C, Coenen A, Hardiker N, Jansen K. ICNP® Catalogues. Presented in: ACENDIO Conference; 2007 Apr 19-21; Amsterdam [Internet]. [cited 2011 Apr 14]. Available from: <http://www.icn.ch/Acendio2007/ICNPcatalogues-042107.html>
9. Coenen A, Kim TY. Development of terminology subsets using ICNP®. *Int J Med Inform.* 2010;79(2010):530-8.
10. Conselho Nacional de Saúde. Resolução n. 196, de 10 de outubro de 1996. Dispõe sobre diretrizes e normas regulamentadoras de pesquisas envolvendo seres humanos. *Bioética.* 1996;4(2 Supl.):15-25.
11. Fletcher RH, Fletcher SW. *Epidemiologia clínica: elementos essenciais.* 4ª ed. Porto Alegre: Artmed; 2006.
12. International Standards Organization (ISO). ISO 18104:2003 Health informatic-integration of a reference terminology model for nursing. Geneva; 2003.
13. International Council of Nurses (ICN). Guidelines for ICNP Catalogue Development. Geneva; 2008.
14. Silveira LMC, Ribeiro VMB. Grupo de adesão ao tratamento: espaço de “ensinagem” para profissionais de saúde e pacientes. *Interface Comun Saúde Educ.* 2005;9(16):91-104.
15. Adams KFJR. Characteristics and outcomes of patients hospitalized for heart failure in the United States: rationale, design, and preliminary observations from the first 100,000 cases in the Acute Decompensated Failure National Registry (ADHERE). *Am Heart J.* 2005;149(2):209-16.
16. Guyton AC, Hall JE. *Tratado de fisiologia médica.* 10ª ed. Rio de Janeiro: Guanabara Koogan; 2002.
17. Martins SJ, Cardenuto SL, Golin V. Mortality risk factors in patients over 65 years of age hospitalized in São Paulo, Brazil University Hospital. *Rev Panam Salud Pública.* 1999;5(6):386-91.
18. Rosa EM, Susin OAP, Scopel L. Levosimendana em pacientes com insuficiência cardíaca descompensada. *Arq Bras Cardiol.* 2008;91(2):132-33.
19. Guyton AC, Hall JE, Saunders WB. *Fisiologia humana e mecanismos das doenças.* 6ª ed. Rio de Janeiro: Guanabara Koogan; 1998.
20. Kopel L, Lage SG. Insuficiência cardíaca: conceito, importância e significado da classificação funcional. In: Timerman A, César LAM. *Manual de cardiologia da SOCESP.* São Paulo: Atheneu; 2000. p. 26-7.
21. Margoto G, Colombo RCR, Gallani MCBJ. Clinical and psychosocial features of heart failure patients admitted for clinical decompensation. *Rev Esc Enferm USP* [Internet]. 2009 [cited 2009 Aug 6];43(1):44-53. Available from: [http://www.scielo.br/pdf/reeusp/v43n1/en\\_06.pdf](http://www.scielo.br/pdf/reeusp/v43n1/en_06.pdf)
22. Martins AM, Carrilho JF, Alves VAF, Castilho EA, Cerri GG, Wen CL. *Clinica médica: doenças cardiovasculares, doenças respiratórias emergências e terapia intensiva.* São Paulo: Manole; 2009.