



## INTEGRATIVE REVIEW OF LITERATURE

ACCIDENTS CAUSED BY *PHONEUTRIA NIGRIVENTER*: DIAGNOSIS AND NURSING INTERVENTIONSACIDENTES CAUSADOS POR *PHONEUTRIA NIGRIVENTER*: DIAGNÓSTICOS E INTERVENÇÕES DE ENFERMAGEMACCIDENTES CAUSADOS POR *PHONEUTRIA NIGRIVENTER*: DIAGNÓSTICOS E INTERVENCIONES DE ENFERMERÍAStephanie Barbosa de Medeiros<sup>1</sup>, Camila Dannyelle Fernandes Dutra Pereira<sup>2</sup>, Joyce Laíse da Silva Ribeiro<sup>3</sup>, Liva Gurgel Guerra Fernandes<sup>4</sup>, Priscilla Delfino de Medeiros<sup>5</sup>, Francis Solange Viera Tourinho<sup>6</sup>

## ABSTRACT

**Objective:** To identify the main nursing diagnostic labels and the respective interventions through the main clinical manifestations presented by individuals poisoned by the venom of the spider *Phoneutria nigriventer* found in the literature. **Method:** Integrative review of literature consulted in PubMed and BVS databases, printed publications and official websites related to the theme. The nursing diagnostic labels were developed based on taxonomy II from the American Nursing Diagnosis Association International and the planning of nursing interventions in accordance with the Nursing Interventions Classification. **Results:** From the findings, it was possible to identify eight diagnostic labels and the respective nursing interventions. **Conclusion:** We found few studies addressing the clinical manifestations presented by individuals poisoned by the venom of the spider *Phoneutria nigriventer* and nursing performance in these cases. **Descriptors:** Spiders, Arachnidism, Nursing, Nursing Care.

## RESUMO

**Objetivo:** Identificar os principais rótulos diagnósticos de enfermagem e suas respectivas intervenções de enfermagem, através das principais manifestações clínicas apresentadas pelos indivíduos intoxicados pelo veneno da aranha *Phoneutria nigriventer* encontradas na literatura. **Método:** Revisão integrativa da literatura consultada nas bases de dados PubMed e BVS, publicações impressas e sites oficiais relacionados à temática. Os rótulos diagnósticos de enfermagem foram elaborados com base na taxonomia II da North American Nursing Diagnosis Association International e o planejamento das intervenções de enfermagem de acordo com a Classificação das Intervenções de Enfermagem. **Resultados:** A partir dos achados, foi possível identificar oito rótulos diagnósticos e suas respectivas intervenções de enfermagem. **Conclusão:** Foram encontrados poucos estudos na literatura abordando as manifestações clínicas apresentadas pelos indivíduos intoxicados pelo veneno da aranha *Phoneutria nigriventer* e da atuação da enfermagem frente a esses casos. **Descritores:** Aranhas, Aracnidismo, Enfermagem, Cuidados de Enfermagem.

## RESUMEN

**Objetivo:** Identificar las principales etiquetas diagnósticas de enfermería y sus respectivas intervenciones a través de las principales manifestaciones clínicas que presentan las personas intoxicadas por el veneno de la araña *Phoneutria nigriventer* encontradas en la literatura. **Método:** Revisión Integral de la literatura consultada en los bancos de datos PubMEed y BVS, publicaciones impresas y sitios web oficiales sobre el tema. Las etiquetas diagnósticas de enfermería fueron elaboradas con base en la taxonomía II de la North American Nursing Diagnosis Association International y planeamiento de las intervenciones de enfermería de acuerdo con la Clasificación de Intervenciones de Enfermería. **Resultados:** A través de los resultados fue posible identificar ocho etiquetas de diagnóstico y las respectivas intervenciones de enfermería. **Conclusión:** Se encontraron pocos los estudios de las manifestaciones clínicas que presentan las personas envenenadas por el veneno de la araña *Phoneutria nigriventer* y la actuación de enfermería en estos casos. **Descriptor:** Arañas, Aracnidismo, Enfermería, Atención de Enfermería.

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## INTRODUCTION

Accidents of public health importance caused by spiders are given the title of "Araneism". In Brazil, it is an important public health problem because among accidents caused by venomous animals it is the third cause of human poisoning.<sup>1</sup> It is the second cause of animal poisoning and determines the highest number of toxic agent information requests, according to the data published by the National Toxic-pharmacological Information System (SINITOX/FIOCRUZ) of the Ministry of Health, referring to 2008.<sup>2</sup>

One of the spiders considered venomous to humans in Brazil that deserves attention is the genus *Phoneutria*, commonly known as the 'banana spider' or 'armed spider'. Practically restricted to Central and South America, this genus is responsible for the majority of clinical relevant bites in the country, with 2,687 cases registered in 2006. There are also reports of sporadic cases in Argentina, Bolivia, Colombia, Costa Rica, Ecuador, Guyana, and Uruguay.<sup>1,3</sup>

The most studied venom of *Phoneutria* species identified in Brazil belongs to *P. nigriventer*.<sup>3</sup> geographically distributed in the states of Goiás, Mato Grosso do Sul, Minas Gerais, Paraná, Rio de Janeiro, Rio Grande do Sul, São Paulo, and Santa Catarina. This species is characterized by a grayish-brown color.<sup>4</sup> It has a design made up of pairs of light patches in the dorsal region of its abdomen arranged longitudinally and its chelicerae are covered by orange or reddish orange hair.<sup>5</sup>

The species *P. nigriventer* is considered aggressive, wandering and with nocturnal habits. They usually hunt and feed on many species of insects, other spiders and small rodents. They do not build webs, so their success as a predator is

partly justified by the variety of toxin components of their powerful venom.<sup>6,5,1</sup>

In case of accidents involving humans, several symptoms of poisoning are observed, which are mostly more severe in children and if they not treated quickly they can progress to death.<sup>6</sup> This way, the exact identification of the venomous animal and the quick care provided to the individual affected significantly reduce morbidity and mortality rates.<sup>5</sup>

Although the accidents involving venomous animals occur frequently in Brazil, health care professionals are not adequately trained on the subject.<sup>5</sup> In this context, the participation of qualified nurses in caring for these intoxications becomes fundamental by planning a scientifically based nursing care focused to the needs presented by the victims of phoneutrism.

Through the application of nursing care systematization, nurses provide quality and safety in the care given to patients by making the operation of the nursing process (NP) possible, thus guiding its decision-making. The NP is a methodological instrument consisting of five steps, among them: the nursing diagnoses and interventions. This way, it constitutes a humanized and ethical nursing practice, focused on the needs of health and nursing care of an individual.<sup>7,8</sup>

This study aimed at identifying the main nursing diagnosis labels and their respective nursing interventions from the main clinical manifestations presented by individuals intoxicated by the venom of the spider *Phoneutria nigriventer* found in the literature. By means of its worldwide application, taxonomy II – of the North American Nursing Diagnosis Association International (NANDA-I) and the Nursing Interventions Classification (NIC) – is used as thematic proposal choice.

## METHODOLOGY

In order to guide the integrative literature review, the following issues were raised: What are the main symptoms present in the accident caused by *Phoneutria nigriventer*? What are the nursing diagnosis and interventions that can be applied in care for individuals intoxicated by the venom of this spider?

The articles were selected from PubMed and BVS databases, using the following descriptors from MeSH database: Arachnidism; Spiders; Nursing Care; and Nursing. The search was restricted to scientific production in English and Portuguese, predominantly from 2000 to 2010. Printed publications and official websites related to the theme proposed were also consulted.

Inclusion criteria were: articles addressing accidents caused by *P. nigriventer* and their main symptoms; articles written in English or Portuguese; and being available in electronic media.

After the bibliographical research, we performed a dynamic reading of the scientific production found, in order to select those works that met the inclusion criteria, thus totaling 15 references. Subsequently, through a meticulous reading of the relevant articles and chapters of printed material, we identified the main clinical manifestations of the victims of this type of accidents. From the results found, we performed a clinical trial and the preparation of nursing diagnostic labels based on NANDA-I taxonomy II. This process grounded the planning of nursing interventions according to the classification of the NIC. The diagnostic labels and nursing interventions identified are shown in tables 1 and 2.

Nursing diagnosis are scientific interpretations of the information gathered, used to guide the subsequent steps of the nursing

process.<sup>9</sup> With regard to nursing intervention, this is defined as any treatment with preventive or curative purpose, based on clinical judgment and knowledge, effected by nurses to improve patient outcomes.<sup>10</sup>

## RESULTS AND DISCUSSION

### Accidents caused by *Phoneutria nigriventer*: epidemiology, signs and symptoms

According to data from SINITOX/FIOCRUZ/MS for 2008, 2,937 cases of human poisoned by spiders were recorded in Brazil. These cases were distributed as follows: 0.88% in the north; 7.79% in the northeast; 10.48% in the southeast; 78.58% in the south; and 2.24% in the mid-west, without notification of deaths.<sup>11</sup> The highest percentage of cases registered was in the countryside (61.6%) and with respect to the affected gender, certain homogeneity was observed, with 48.92% related to men and 51.03% to women.<sup>12,13</sup> As regards the age group, the highest percentage achieved was between 20 and 39 years of age (corresponding to 36.15% of the total cases).<sup>14</sup>

A large part of the actions of *Phoneutria nigriventer* venom is related to affecting the ion channels. Experiments demonstrated that there is activation and delay of inactivation of the neuronal sodium channels, thus depolarizing muscle fibers and sensory and motor nerve endings, as well as those in the autonomic nervous system. This way, the venom favors the release of adrenergic neurotransmitters, especially catecholamines and acetylcholine, determining the neurotoxic action of the venom.<sup>5,1,6,4</sup>

Other peptides isolated from the venom, regardless of the action of sodium channels, determine both the contraction of the vascular smooth muscle and the increased vascular permeability by activation of the kallikrein-kinin system and nitric oxide. The understanding of these mechanisms can help in comprehending the

pathophysiology of poisoning,<sup>3,4</sup> considering that the clinical picture developed can be variable, dependent on the amount of venom inoculated and the age group affected.<sup>5</sup>

The symptoms presented by the victims are divided into local and systemic manifestations. Among the former, the immediate pain is the most frequent symptom (more than 90% of cases), which can irradiate up to the root of the affected limb and with variable intensity.<sup>5,15</sup> In order to assess the intensity of pain and the therapeutic response objectively, it is recommended to use a validated instrument to assess pain.<sup>1</sup>

Other localized manifestations have been mentioned in the literature, such as: edema, erythema, rare muscle fasciculation, paresthesia and sweating on the site of the bite, and the two inoculation points can be observed.<sup>1,4,15</sup>

Despite its clinical importance, there are few detailed descriptions of systemic poisoning by *P. nigriventer*. Some of the systemic manifestations reported are: psychomotor agitation; blurred vision; diarrhea; contractures; bradycardia; convulsions; cold extremities; hypotension; hypertension; priapism; drooling; sweating; vomiting; tachycardia; arrhythmias; dyspnea; heart failure; neurologic depression; coma; pulmonary edema; acute cardiopulmonary arrest; and shock. These symptoms are usually more severe in children, and poisoning can evolve to death if left untreated.<sup>4,5,1,6,3</sup>

According to the Ministry of Health, accidents caused by *P. nigriventer* can be classified into mild, moderate and severe, according to the clinical manifestations that the affected individuals present. Mild accidents are the most frequent, corresponding to 83.4% up to 91% of cases,<sup>1,4</sup> with predominantly local symptoms and the patients may eventually present tachycardia and agitation derived from pain.<sup>5</sup>

Regarding poisoning considered moderate, in approximately 7.5% of the total cases systemic changes are observed and they are associated with local manifestations; they are: tachycardia; hypertension; discrete sweating; psychomotor agitation; blurred vision; occasional vomiting; priapism; and discrete drooling.<sup>4,5</sup>

Severe accidents are rare (0.5% of cases), restricted mainly to those involving children. In addition to the manifestations already described, patients may present: frequent vomiting; profuse sweating; contractures; priapism; bradycardia; hypotension; heart failure; cardiac and respiratory arrhythmias; dyspnea; neurological depression; coma; convulsions; acute pulmonary edema; cardiorespiratory arrest; and shock.<sup>1,4,5,15</sup>

The treatment includes pain relief through systemic analgesia and, if necessary, associated or not, local anesthetic infiltration with 2% lidocaine without vasoconstrictor. The recommended dose is 1 to 4 ml in adults and 0.5 to 1 ml in children, and it may be repeated if there is no pain relief. Another favorable procedure – useful in the control of pain – is to use hot compresses on the compromised site.<sup>5,1,4</sup>

The treatment with physiological saline solution refers to the administration of anti-arachnid serum intravenously as soon as possible.<sup>1</sup> It is intended for cases of children showing systemic manifestations and in all accidents classified as severe. The Ministry of Health recommends the administration of two to four ampoules of anti-arachnid serum for moderate cases, and five to ten ampoules for cases considered severe.<sup>5</sup> Under these circumstances, patients should be hospitalized for control of vital signs, hemodynamic parameters and care of possible associated complications.<sup>4</sup>

**Nursing care in accidents caused by *Phoneutria nigriventer*: diagnosis and interventions**

Nursing care of poisoning should be performed providing assistance to poisoned individuals, from children to older adults, by following some basic steps of treatment and nursing care, with the goal of eliminating the toxic agent action and restore the health of patients.

In view of the symptoms recorded in the integrative review of literature, it was possible to determine potential problems and risk factors that may arise as a result of accidents caused by the spider *Phoneutria nigriventer*. From the findings, we identified and selected the main nursing diagnostic labels and their definitions (Table 1), as well as the respective nursing interventions relevant to each diagnostic label found (Table 2).

**Table 1 - Nursing diagnostic labels identified and their definitions.<sup>9</sup>**

Nursing diagnostic label	Definition
1 - Anxiety	"Vague and uncomfortable feeling of discomfort or fear, accompanied by autonomic response; or feeling of apprehension caused by the anticipation of danger." <sup>9:284</sup>
2 - Acute pain	"Unpleasant sensory and emotional experience that arises from actual or potential tissue damage or described in terms of such damage; sudden or slow onset, mild to severe intensity, with early or predictable termination and duration of less than six months." <sup>9:375</sup>
3 - Impaired skin integrity	"Changed epidermis and/or dermis" <sup>9:333</sup>
4 - Fear	"Reaction to the perceived threat that is consciously recognized as a danger" <sup>9: 284</sup>
5 - Impaired physical mobility	"Limitation on the independent and voluntary physical movement of the body or of one limb" <sup>9:148</sup>
6 - Ineffective breathing pattern	"Inspiration or expiration providing inadequate ventilation" <sup>9:169</sup>
7 - Risk of infection	"Increased risk of being invaded by pathogenic organisms" <sup>9:329</sup>
8 - Risk of deficient fluid volume	"Risk of vascular, cellular or intracellular dehydration" <sup>9:111</sup>

**Table 2 - Nursing interventions and performances for the nursing diagnostic labels identified.<sup>10</sup>**

Nursing interventions	Nursing actions
1- Anxiety reduction	1.1 - Perform a calm and tranquilizing approach; 1.2 - Offer real information about diagnosis, treatment and interventions; 1.3 - Observe verbal and non-verbal signs of anxiety; 1.4 - Create an atmosphere that enables trust.
1 - Pain control	1.1 - Perform a complete assessment of pain, including location, characteristics, beginning/duration, frequency, quality, intensity, and gravity, in addition to precipitating factors; 1.2 - Ensure that patients receive proper analgesia care; 1.4 - Provide guidance concerning pharmacological methods for pain relief.
1 - Skin monitoring	1.1 - Examine the skin and mucosa regarding redness, exaggerated heat, edemas and drainage; 1.2 - Monitor the occurrence of infection, especially in swollen areas.
1- Coping improvement	1.1 - Perform a calm and tranquilizing approach; 1.2 - Offer real information about diagnosis, treatment and interventions;
2 - Enhancing safety	2.1 - Explain all tests and procedures to patients/families; 2.2 - Answer the questions regarding the state of health honestly;

	2.3 - Help patients/families identify the factors that increase the feeling of protection.
1 - Assistance to self-care	1.1 - Provide assistance until patients are completely able to perform self-care; 1.2 - Encourage patients to perform normal daily life activities in accordance to their capacity;
1 - Ventilatory assistance	1.1 - Position patients in a way to minimize respiratory efforts; 1.2 - Monitor the respiratory state and oxygenation; 1.3 - Start and keep supplementary oxygenation according to prescriptions; 1.4 - Start efforts for reanimation as appropriate.
1 - Protection against infection	1.1 - Monitor systemic signs and symptoms, and infection spots; 1.2 - Monitor absolute counting of granulocytes, white blood cells and differential results; 1.3 - Provide adequate care to the skin in swollen areas; 2.1 - Establish universal precautions;
2 - Infection control	2.2 - Provide antibiotic therapy as appropriate.
1 - Hydration monitoring	1.1 - Determine possible factors of hydration imbalance; 1.2 - Monitor color, quantity and specific gravity of urine; 1.3 - Provide liquids as appropriate;
2 - Hydration control	2.1 - Monitor the state of hydration as appropriate; 2.2 - Monitor vital signs as appropriate; 2.3 - Assess the location and extension of the edema (if present).

In this sense, the implementation of the nursing care systematization through the nursing process in accidents caused by venomous animals enables the planning of a safe and effective care geared to the needs of patients bitten by the spider *P. nigriventer*. By its worldwide use, the identification of nursing diagnosis and interventions based on NANDA-I taxonomy II and NIC, respectively, subsidizes the actions of nursing staffs with scientific backing.

## CONCLUSION

Despite the relevance of the subject, few studies were found in the literature addressing the

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clinical manifestations presented by individuals intoxicated by the venom of the spider *Phoneutria nigriventer*, as well as the nursing work in these cases, showing that this issue is still little explored.

In this sense, we believe that this work has met its goal since we analyzed current trusted studies on the subject, contributing to the development of targeted and safe actions, expanding the scientific knowledge of professionals in the field.

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