



Nursing diagnoses identified in hospitalized patients during hemodialysis*

Diagnósticos de enfermagem identificados em pacientes hospitalizados durante sessões de hemodiálise

Diagnósticos de enfermería identificados en pacientes hospitalizados durante sesiones de hemodiálisis

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ABSTRACT

Objective: To establish NANDA International nursing diagnoses (NDs) in hospitalized patients with chronic renal failure (CRF), undergoing hemodialysis, using risk factors and signs and symptoms described in nursing developments. **Methods:** This was a retrospective cohort study, with a sample of 98 hospitalized adult patients with CRF who were having hemodialysis. Data were collected retrospectively from medical records, and analyzed statistically. **Results:** We identified three actual and four risk NDs: *excess fluid volume, nausea, acute pain, risk for infection, risk for unstable blood glucose, risk for electrolyte imbalance, and risk for imbalanced fluid volume.* **Conclusion:** These NDs enabled improved knowledge of the patients during the hemodialysis session, and therefore may be useful for nursing care.

Keywords: Nursing diagnosis; Renal dialysis; Renal insufficiency, chronic; Inpatients

RESUMO

Objetivo: Estabelecer os diagnósticos de enfermagem (DEs) de acordo com a NANDA *International* em pacientes hospitalizados com insuficiência renal crônica (IRC), submetidos a hemodiálise, a partir de fatores de risco e sinais e sintomas descritos em evoluções de enfermagem. **Métodos:** Trata-se de um estudo de coorte retrospectivo, com amostra de 98 pacientes adultos hospitalizados com IRC e em sessões de hemodiálise. Os dados foram coletados retrospectivamente em prontuários e analisados estatisticamente. **Resultados:** Foram identificados três DEs reais e quatro de risco: Volume de líquidos excessivo; Náusea; Dor aguda; Risco de infecção; Risco de glicemia instável; Risco de desequilíbrio eletrolítico e Risco de desequilíbrio do volume de líquidos. **Conclusão:** Estes DEs permitiram conhecer melhor os pacientes durante a sessão hemodialítica e assim, poderão subsidiar o cuidado de enfermagem.

Descritores: Diagnóstico de enfermagem; Diálise renal; Insuficiência renal crônica; Pacientes internados

RESUMEN

Objetivo: Establecer los diagnósticos de enfermería (DEs) de acuerdo con la NANDA *International* en pacientes hospitalizados con insuficiencia renal crónica (IRC), sometidos a hemodiálisis, a partir de factores de riesgo y señales y síntomas descritos en evoluciones de enfermería. **Métodos:** se trata de un estudio de cohorte retrospectivo, realizado con una muestra de 98 pacientes adultos hospitalizados con IRC y en sesiones de hemodiálisis. Los datos fueron recolectados retrospectivamente en historias clínicas y analizados estadísticamente. **Resultados:** Se identificaron tres DEs reales y cuatro de riesgo: Volumen excesivo de líquidos; Náuseas; Dolor agudo; Riesgo de infección; Riesgo de glicemia inestable; Riesgo de desequilibrio electrolítico y Riesgo de desequilibrio del volumen de líquidos. **Conclusión:** Estos DEs permitieron conocer mejor a los pacientes durante la sesión hemodialítica pudiendo subsidiar el cuidado de enfermería.

Descritores: Diagnósticos de enfermería; Diálisis renal; Insuficiencia renal crónica; Pacientes internos

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INTRODUCTION

The nursing process (NP) is the methodology used to systematize and organize nursing care, with a view to optimizing care and meeting the needs of the patient, family and community^(1,2).

In the “Hospital de Clínicas de Porto Alegre” (HCPA) the NP has been used for over 30 years. It consists of the following five stages that have now been computerized: Nursing history, composed of anamnesis and physical exam, nursing diagnosis (ND), nursing prescription, implementation of nursing interventions and nursing evaluation. The vocabulary of the NDs is based on the diagnostic taxonomy of NANDA-*International* (NANDA-I)⁽³⁾ and nursing care is guided by the Nursing Intervention Classification (NIC)⁽⁴⁾, literature related to the area and the institution’s clinical practice in nursing⁽⁵⁾.

However, although there have been various advancements in the development of the institution’s NP, there are a few units of the hospital in which all of its stages are still not performed. This is the case with the Hemodialysis Unit (HD), which does not develop the ND and nursing prescription, in spite of the history, nursing evolution and evaluation being realized. The stage of the ND presupposes judgment of the data collected on the health of patients, in order to identify the need for adequate care of each of them, and the nursing prescription consists of a daily care routine with a prefixed time schedule for performing it^(3,6).

Among others, this unit attends patients with Chronic Renal Failure (CRF), a metabolic syndrome resulting from irreversible loss of renal function. HD is a substitute renal therapy that consists of filtration and removal of toxic substances and water from the body^(7,8).

New technologies and greater knowledge have, over the years, contributed to HD becoming a safer and more efficient process, as regards the complications that occurred during its use. However, complications still present in 30% of sessions, due to hydroelectrolytic equilibrium changes in dialysis patients⁽⁹⁻¹¹⁾.

The most frequent complications in hemodialysis sessions are arterial hypotension and hypertension, cramps, nausea, vomiting, headaches, cardiac arrhythmias, itching lumbar and thoracic back pain. The less common complications include the dialysis disequilibrium syndrome (DDS), hypersensitivity reactions, hypoxemia, hemorrhages, convulsions, pyrogenic reactions, hemolysis and gaseous embolism^(12,13). These complications may be casual and/or easy to manage, which depends on the patient’s clinical conditions. Nevertheless, they may even be fatal, which shows the need for attentive and precise nursing care for patients during the dialysis process⁽¹⁴⁾.

In this context, knowing of the importance of NP as a method of qualification nursing care of patients

submitted to HD, and consequently, the need for implementing the stages of diagnosis and prescription in the HD Unit of HCPA, the motivation appeared for development of this study. The aim of this study was to establish the NDs in accordance with NANDA-I⁽³⁾ in patients hospitalized with CRF submitted to HD session, from the risk factors and signs and symptoms that occur during this procedure, and described in nursing evaluation. As one of its main purposes, in addition to deepening the degree of knowledge about these patients is, by means of its results, to subsidize the development of NP in all of its stages in this unit.

The data generated in clinical practice (risks, signs and symptoms) are constituted of the pathways and evidences that have been analyzed by the process of critical thought and diagnostic reasoning, in order to establish possible NDs in patients in this unit⁽¹⁵⁾.

METHODS

This retrospective cohort study was conducted in the Hemodialysis unit of HCPA. The sample consisted of 98 record charts of patients with CRF, selected systematically from a population of 378 patients. The sample was calculated with an interval of confidence of 95% and absolute error of 10%.

The patients included in this study were adults with diagnosis of CRF, hospitalized in clinical and surgical units of HCPA in the period from January to December 2008, who underwent HD sessions. Patients with CRF under ambulatory hemodialysis treatment, and those who were hospitalized and showed no improvement in the nursing evaluation on the charts during HD sessions were excluded from the study.

Data collection was performed from the charts in a retrospective manner, in the month September 2009; For this purpose, an instrument that covered items of identification and clinical data such as: name, chart number, sex, age, date of hospitalization, date of discharge, reason for hospitalization, comorbidities, kidney transplant, number of weekly HD sessions. In addition, data with reference to risk factors and signs and symptoms described in a total of 294 nursing evaluations were collected, considering the last three described, in order to establish, at a later time, the possible NDs based on NANDA-I⁽³⁾, for each patient.

Initially, the data were analyzed according to the descriptive statistics, using the *Statistical Package for Social Science* (SPSS) version 17, considering a level of significance of $p < 0.05$, and using measures of occurrence such as central tendency (mean, median) and the respective measures of dispersion (standard deviation and percentiles 25; 75). To verify association between the variables, the T and Chi-square tests were used.

For analysis of the data with reference to risk factors and signs and symptoms collected from the nursing evaluation, these were grouped, bearing in mind the establishment of possible NDs for each patient⁽³⁾. Afterwards, these NDs were presented at a meeting with nurses from the HD Unit of HCPA, all of them specialists with clinical experience in the area, to obtain their judgment and consensus with regard to the NDs established⁽¹⁶⁾. The NDs that obtained 100% consensus were considered valid.

The research project was approved by the Ethics Committee of the Research and Post-Graduation Group of HCPA, Report No. 09-341, in compliance with the ethical principles of the National Health Council Resolution No.196/96⁽¹⁷⁾.

RESULTS

The mean age of patients was 51 (± 14) years, with the minimum age of 17 and maximum of 77 years, with predominance of the male sex ($n=66$, 67.3%).

Among the 98 patients studied, 66 (67.3%) were men, 43 (43.9%) kidney transplants and of the latter, 29 (67.4%) men. The mean age was 44.58 (± 12.9) years, while the mean age of the other patients was 55.95 (± 12.0) years. Kidney transplant and the lowest mean age presented statistical significance ($p=0.000$).

As regards the origin of patients, 60 (61.2%) of them were hospitalized in surgical units of the hospital. The mean time of hospitalization was 17 days; (10.7-30.2), with a minimum of four and maximum of 88 days of hospitalization.

The most frequent reasons for hospitalization of these patients, according to the International Classification of Diseases (ICD), were other tubular and interstitial renal disease, which included the kidney transplants and/or their complications, nephropathies, polycystic renal disease, membranous glomerulonephritis, chronic pyelonephritis (Table 1).

Table 1. Reasons for hospitalization of patients with CRF submitted to HD at "Hospital de Clínicas de Porto Alegre"/RS, 09/2009

| Reasons for hospitalization (n=98) | f | % |
|--|-----------|------------|
| Other renal diseases (kidney transplant and complications, nephropathy, polycystic renal disease, membranous glomerulonephritis, chronic pyelonephritis) | 36 | 36.7 |
| Various infections (acute peritonitis, infection in catheter or surgery, osteomyelitis) | 21 | 21.4 |
| Cardiovascular diseases | 14 | 14.3 |
| Lung Diseases | 10 | 10.2 |
| Neoplasias | 6 | 6.1 |
| Diseases such as hernias, amyloidosis and fractures | 5 | 5.1 |
| Thyroid diseases | 4 | 4.1 |
| Encephalopathies | 2 | 2.0 |
| Total | 98 | 100 |

Among the comorbidities presented by the 98 patients, 55 (56.1%) referred to systemic arterial hypertension (SAH) and 22 (22.4%) diabetes *mellitus* (DM). These two comorbidities were analyzed separately from the others, due to their high prevalence.

Among the 55 patients with SAH, 34 (61.8%) were men, with a mean age of 50.44 (± 13.5) years. The association between SAH, sex and age presented no statistical significance ($p=0.187$ and $p=0.669$ respectively).

Among the 22 patients with DM, 17 (77.3%) were men with a mean age of 56.45 (± 7.5) years. The association of DM with age presented statistical significance ($p=0.003$), as the diabetic patients were older than the non diabetics. Among the diabetic patients, five (22.7%) presented hypoglycemia during the HD session ($p=0.117$).

With further regard to comorbidities, 35 (35.7%) patients presented no other comorbidities apart from SAH and/or DM; 17 (17.3%) had cardiovascular diseases, 13 (13.3%) other kidney diseases, 10 (10.2%) neoplasias, 8 (8.2%) other diseases (ophthalmological diseases, hernias and hepatic diseases), 4 (4.1 %) thyroid diseases and 3 (3.1%) lung diseases.

In the second stage of the study, a total of 294 nursing evaluation made during HD were analyzed, being the three last progress reports on the chart of each patient. However, some of them had various nursing evaluation made during their hospitalization, with a median of 6 (3-9) progress reports per patient, the minimum being three and the maximum 30. When associating the time of hospitalization with the number of nursing evaluation, significance was found with a Spearman's r_s correlation value = 0.51 ($p<0.001$); that is to say, the longer the hospitalization time the higher the number of progress reports.

Analysis of the last three nursing evaluation of the studied patients identified the presence of 14 different signs and symptoms that occurred during the performance of HD sessions, with hypotension and hypertension being the most frequent (Table 2).

Some of the signs and symptoms were described in the three nursing evaluation of one and the same case, with hypotension and hypertension once again appearing as the predominant type (Table 3).

In addition to the signs and symptoms, it was also possible to identify risk factors that made these patients more vulnerable to some NDs. Among these, instability of tensional levels, volume of liquids, electrolytes and glycemia. Associated with this, the invasive procedure of hemodialysis which, although essential for the maintenance of life of the patients, is also an important risk factor to be considered by the nurse at the time of performing the process of diagnostic reasoning.

Thus, once signs and symptoms, as well as the risk factors to which these patients were exposed

were identified, they were used as a basis for the establishment of the possible real and risk NDs as described by NANDA-I⁽³⁾. Afterwards, these NDs were

presented to the nurses of the Hemodialysis Unit, to obtain their judgment and consensus as regards their applicability (Chart 1).

Table 2. Signs and symptoms identified in the nursing progress reports of patients hospitalized in “Hospital de Clínicas de Porto Alegre”, undergoing HD sessions/ RS, 09/2009

| Sign and symptom (SS) | Progress Report 1 | | Progress Report 2 | | Progress Report 3 | | Total (n=98) | |
|-----------------------------------|-------------------|------|-------------------|------|-------------------|------|--------------|------|
| | f | % | f | % | f | % | f | % |
| Hypotension | 34 | 34.7 | 30 | 30.6 | 31 | 31.6 | 95 | 96.9 |
| Hypertension | 28 | 28.6 | 25 | 25.5 | 28 | 28.6 | 81 | 82.7 |
| Pale mucous membranes | 19 | 19.4 | 15 | 15.3 | 17 | 17.3 | 51 | 52.0 |
| Edema | 13 | 13.3 | 13 | 13.3 | 15 | 15.3 | 41 | 41.9 |
| Lumbar pain | 5 | 5.1 | 5 | 5.1 | 8 | 8.2 | 18 | 18.4 |
| Hypoglycemia | 5 | 5.1 | 5 | 5.1 | 4 | 4.1 | 14 | 14.3 |
| Nausea | 2 | 2.0 | 4 | 4.1 | 4 | 4.1 | 10 | 10.2 |
| Secretion in catheter | 2 | 2.0 | 3 | 3.1 | 5 | 5.1 | 10 | 10.2 |
| Chills | 3 | 3.1 | 2 | 2.0 | 1 | 1.0 | 6 | 6.1 |
| Hyperglycemia | 2 | 2.0 | 1 | 1.0 | 1 | 1.0 | 4 | 4.0 |
| Tachycardia | 1 | 1.0 | 1 | 1.0 | 3 | 3.1 | 5 | 5.1 |
| Tachypnea | 2 | 2.0 | 1 | 1.0 | 2 | 2.0 | 5 | 5.0 |
| Cramps | - | - | 1 | 1.0 | 1 | 1.0 | 2 | 2.0 |
| Hematoma in arteriovenous fistula | - | - | 1 | 1.0 | 1 | 1.0 | 2 | 2.0 |

Table 3. Signs and symptoms present in the three nursing progress reports with reference to HD of patients hospitalized in “Hospital de Clínicas de Porto Alegre”/ RS, 09/2009

| Sign and symptom (SS) | Number of patients with description of SS in three reports | % (n=98) |
|-----------------------|--|----------|
| Hypotension | 48 | 49.0 |
| Hypertension | 45 | 45.9 |
| Pale mucous membranes | 38 | 38.8 |
| Edema | 24 | 24.5 |
| Lumbar pain | 13 | 13.3 |
| Hypoglycemia | 11 | 11.2 |
| Nausea | 10 | 10.2 |
| Secretion in catheter | 8 | 8.2 |
| Chills | 6 | 6.1 |
| Hyperglycemia | 4 | 4.1 |
| Tachycardia | 3 | 3.1 |
| Tachypnea | 3 | 3.1 |

Chart 1. Real and Risk Nursing Diagnoses for patients submitted to hemodialysis sessions, hospitalized in “Hospital de Clínicas de Porto Alegre” – RS, 09/2009

| Real Nursing Diagnoses | Nursing Diagnoses of Risk |
|------------------------|---------------------------------------|
| Excess fluid volume | Risk for infection |
| Nausea | Risk for unstable blood glucose level |
| Acute pain | Risk for electrolyte imbalance |
| | Risk for imbalanced fluid volume |

DISCUSSION

The statistical data of the Dialysis Census of 2008, of the Brazilian Society of Nephrology, related that the majority (43.7%) of patients undergoing dialysis in Brazil and in the age-range between 40 and 59 years and are of the male sex (57%)⁽⁹⁾, thus corroborating the data found in this study.

Among the 98 patients in the sample, 43 (43.9%) were kidney transplant receivers, which explains the predominance of patients coming from surgical units of HCPA, where one of them is a reference in care of patients submitted to solid transplants such as kidneys.

The mean age of kidney transplant receivers is 40 years, with the majority being of the male gender^(18,19), data that are also similar to those found in this investigation, which presented a mean age of 44.58 ($\pm 12,9$) years and predominance (67.4%) of the male sex among the transplant receivers.

As regards the reasons that determined hospitalization of these patients with CRF, after the problems of a renal nature which accounted for 36 (36.7%) patients, infections were the main reason for hospitalization (21.4%). This is explained by the fact that they are generally immunosuppressed, have comorbidities and are exposed to invasive procedures such as venous access for HD, which make them more susceptible to infections. In view of this result, the importance is pointed out of the work of the nursing team in the HD, follow-ing up dialysis treatment, preventing, treating, and guiding patients with regard to possible infections and other complications that may result from the treatment^(20,21). From this aspect, the importance is reinforced of good collection of information from the patient, with a view to providing a precise ND, and consequently, adequate interventions in the case, in order to obtain the best possible results.

CRF is a disease associated with many comorbidities, and these are determinants in the survival and morbidity of patients undergoing HD⁽²²⁾. In this study, SAH and DM were found to be the prevalent comorbidities, followed by cardiovascular diseases, which is corroborated by other studies^(23,24).

Among the studied patient, 55 (56.1%) of them presented SAH, which is evidence of the high prevalence of this disease in patients with renal diseases. SAH is both one of the main causes and an important consequence of renal disease. In Brazil, there are around 17 million persons with SAH, and 35% are of an age equal to or older than 40 years, which demonstrates the severity of this health problem, in view of its consequences⁽²⁵⁾.

Another important comorbidity among the studied patients was DM that affected 22 (22.4%) patients. In Brazil, DM represents 62.1% of the primary diagnoses in patients submitted to HD, and one of its indicators of higher risk is age of over 45 years⁽²⁶⁾.

Although the association of DM with hypoglycemia was not statistically significant, one must consider it as a warning factor during the use of HD, in view of the high percentage of diabetic patients submitted to this treatment. In addition, the use of dialysate without glucose may induce losses of up to 30 grams of glucose per dialysis session, which may lead to hypoglycemia⁽¹¹⁾. Therefore, it was considered that the ND risk for unstable blood glucose level could be applied in these patients.

Among the 14 signs and symptoms found in this study, 10 are described in the literature: hypotension, hypertension, cramps, nausea, pain, chills, hyperglycemia, tachycardia, secretion in the catheter and hematoma in an arteriovenous fistula. Hypotension is also described as the most frequent complication during this therapy, which corroborates the finding of this study. The other signs and symptoms found in the investigation (edema, pale mucous membranes, tachypnea and hypoglycemia) are not described in the studies as complications of HD⁽¹¹⁻¹⁴⁾, nevertheless, these could result from the CRF itself and the associated comorbidities⁽²³⁾.

Patients with CRF may present an edematous condition, with excessive interdialytic weight gain, hypertensive and with tachypnea, resulting from pulmonary congestion and cardiac insufficiency, caused by hydric overload and uremic syndrome^(11,14,27), which points towards the ND Excess fluid volume.

In these patients there are also frequent complaints of pain and nausea during the dialytic process, caused by various factors. Among the hydroelectrolytic alterations, hypotension and the syndrome of imbalance. These signs and symptoms lead to the establishment of the NDs of Acute Pain and Nausea⁽²⁷⁾.

For the establishment of NDs of risk, it is known that they are not considered signs and symptoms, but risk factors. These may be identified in the nursing evaluation as well as reasons for hospitalization and comorbidities, which indicated clues or of themselves constituted risk factors for a certain ND.

One of these situations was identification of the possibility of hypoglycemia, considering that there were various patients with DM, which led to pointing out the ND *Risk for unstable blood glucose level*; the presence of hypotension, edema and cramps, and or the possibility of these, were also factors considered when listing the NDs *Risk for electrolyte imbalance* and *Risk for imbalanced fluid volume* as being possible in these patients; and lastly, the constant presence of invasive procedures for performing HD, which determined the establishment of the ND *Risk for infection*^(3,27).

In a study about NDs in patients with CRF undergoing HD and kidney transplant patients, the most prevalent were: Risk for infection, Ineffective tissue perfusion: renal, Intolerance to activity, Disturbed sleep pattern and Risk for imbalance fluid volume^(28,29).

In a similar manner, the NDs Risk for infection and Risk for imbalance fluid volume were also identified in this study. In addition, it was verified that among the main reasons for hospitalization presented by the analyzed patients, infections were one of the most prevalent, which points towards the ND Risk for infection.

The ND Ineffective tissue perfusion: renal, was not established, because in this investigation the edition of NANDA-I (2010)⁽³⁾ was used as reference, in which this ND is no longer listed.

Whereas the NDs Intolerance to activity and Disturbed sleep pattern were not found in the present research, because here patients undergoing HD were studied, differently from other studies. Possibly if these same patients were studied in their day-to-day life, these two NDs might be found.

Finally, it is considered that the results found in this research are important elements in the evaluation of patients with CRF undergoing the dialytic process and that knowledge about them may favor the nurse in obtaining greater accuracy in establishing NDs. The data are also important factors to be observed by nurses so that they are able to prepare good nursing progress reports, instruments for recording and communication the patients clinical situation, which favor the quality of caring and Document the care provided⁽³⁰⁾. Moreover, these clinical evidences are the basis for identifying precise NDs, which allow the implementation of interventions that lead to positive results in health.

CONCLUSION

The majority of the 98 studied patients were men, with a mean age of 51 years, which points towards an adult population, however, relatively young when one thinks of contemporary life expectancy of the Brazilian population which is around 70 years in the South of the country. The main causes of hospitalization were tubular interstitial renal diseases and the most frequent comorbidities SAH and DM.

Fourteen different signs and symptoms and five important risk factors occurring during HD session

were found, as described in the 294 nursing evaluation analyzed. The predominant sign was hypotension, which is corroborated by the literature as being the most frequently described among the complications that occurred during this treatment, and therefore, demands constant attention by nurses in the control of arterial pressure.

From the signs, symptoms and risk factors described, six NDs were established, which can be identified during HD in patients with CRF: Excess fluid volume ; Nausea; Acute pain; Risk for infection; Risk for unstable blood glucose level; Risk for electrolyte imbalance; Risk for imbalanced fluid volume.

Among the implications for the practice of nursing, one thinks that this set of NDs, which represents the clinical practice of nursing in the HD Unit, could subsidize the planning of interventions directed towards the real or potential needs of these patients, enabling qualification of the assistance with more precise and efficient caring, both in the area of prevention and treatment of the complications of this treatment. Establishment of the ND is exclusively an attribute of the nurse, and its performance, in addition to providing better conditions of planning and qualification of the caring offered, improves communication between nurses and between them and the multiprofessional team, which contributes to development of the profession.

Another implication for the practice of nursing arising from the results of this study is its contribution to the implementation of the NP in the HD Unit of HCPA, in addition to helping to update the computerized system of nursing prescription of this hospital, thereby increasingly qualifying the caring provided by nursing.

As a limitation of the study, the sample number is mentioned, which resulted in an error of 10% as a result of the short time available for data collection and analysis, as this investigation is the result of work for the conclusion of the graduation course, which is conducted during one semester. Therefore, further studies are suggested, in which these NDs may be applied in clinical practice and submitted to new analyses.

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