Factors that influence patient safety in hemodialysis: integrative review

ABSTRACT
Objective: To analyze the scientific evidence on the safety of patients undergoing hemodialysis. Method: This is an integrative review carried out in the MEDLINE, LILACS, BDENF and IBECS databases, through the VHL, and SciELO in the period from August to September 2020. A total of 14 articles were selected for this review. Results: From the analysis of the publications, two thematic categories emerged: Nursing in patient care in hemodialysis therapy and Adverse events in hemodialysis units: factors that interfere in the patient’s safety. Studies highlight infection, hypotension, dyspnea and errors in medication administration, events frequently found in hemodialysis units. Conclusion: The analysis of the productions allowed the understanding of the main factors that interfere in the safety of the patient in hemodialysis treatment, as well as the importance of nursing care in the implementation of actions aimed at the prevention and treatment of complications.

DESCRIPTORS: Patient safety; Renal dialysis; Nursing care; Adverse events.

RESUMO
Objetivo: Analisar as evidências científicas sobre a segurança do paciente submetido a hemodiálise. Método: Trata-se de uma revisão integrativa realizada nas bases de dados MEDLINE, LILACS, BDENF e IBECS, por meio da BVS, e SciELO no período de agosto a setembro de 2020. Um total de 14 artigos foi selecionado para integrar esta revisão. Resultados: A partir da análise das produções, emergiram duas categorias temáticas: A enfermagem no cuidado ao paciente em terapia hemodialítica e Eventos adversos em unidades de hemodiálise: fatores que interferem na segurança do paciente. Conclusão: A análise das produções permitiu compreender os principais fatores que interferem na segurança do paciente em tratamento hemodialítico, assim como a importância dos cuidados de enfermagem na implementação de ações voltadas à prevenção e ao tratamento de complicações.

DESCRITORES: Segurança do paciente; Diálise renal; Cuidados de enfermagem; Eventos Adversos.

Anna Cecília dos Santos
Nurse graduated from the Faculty of Nursing Nova Esperança.
ORCID: 0000-0002-2508-53B4
INTRODUCTION

In recent years, discussions about Chronic Kidney Disease (CKD) have arisen, due to the increase in its prevalence among the world population and due to its significant impact on the morbidity and mortality of affected individuals, becoming a public health problem. 1

CKD is defined as an injury to the renal parenchyma, which, in turn, causes structural and functional abnormalities that compromise the functionality of the kidneys for a period equal to or greater than three months. 2 In Brazil, the data reveal that about 12 million people have some degree of renal failure and that the incidence of CRF increases around 8% per year. 3,4

In the advanced stage of the disease, the individual needs a complex treatment that involves the need for Renal Replacement Therapies (RRT), associated with food and water restrictions, in addition to medication administration. 5,6 Hemodialysis, one of the main modalities of RRT, submits the patient to the need for an extracorporeal blood filtration device that, through a semipermeable membrane, promotes the exchange of fluids and electrolytes. 7,8

It is important to highlight that hemodialysis involves complex mechanisms that often favor the development of adverse events (AEs), which are defined as incidents that occur during health care and that result in damage to the patient, which includes illness, injury, suffering, disability or death. 9,11

Supervision of patients undergoing hemodialysis is essential to ensure safe care, and it is essential that professionals are trained to identify and intervene in the face of possible complications in the treatment. The nurse’s participation in the treatment is essential, enabling support and informing the patient, as well as his family, about his pathology and the difficulties that can be encountered.12

In this perspective, studies on patient safety in hospital services, especially in hemodialysis units, become relevant, considering that they represent places susceptible to the occurrence of AEs, based on the interaction of several factors. Such research contributes to the expansion of knowledge on the subject in the field of nursing, assisting in the planning of actions for the identification, prevention and control of AEs associated with treatment with hemodialysis. Therefore, this study aims to analyze scientific publications on the safety of patients undergoing hemodialysis.

METHOD

This is an Integrative Literature Review, in which the following steps were taken to carry out this study: problem identification, with the definition of the research question; establishment of criteria for inclusion and/or exclusion of studies to search for scientific literature; definition of the information to be extracted from the studies; evaluation of studies; interpretation of results and presentation of the review/synthesis of knowledge. 13
In view of the objective previously described, the following research question was defined: “What is the scientific evidence on the safety of patients undergoing hemodialysis?”

The search was carried out in four databases: Medical Literature Analysis and Retrieval System Online (MEDLINE), Latin American Caribbean Literature in Health Sciences (LILACS), Nursing Databases (BDENF) and Spanish Bibliographic Index of Health Sciences (IBECS), through the Virtual Health Library (VHL) Portal. In order to better select the files, the Scientific Electronic Library Online (SciELO) database was also used.

The terms identified in the vocabulary were used on the basis of the Health Sciences Descriptors (DeCS) and in the Medical Subject Headings (MeSH). Thus, the combined descriptors were: “Segurança do paciente”, “Patient Safety”, “Unidades Hospitalares de Hemo-
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Data collection took place from August to September 2020. To select the sample, the following eligibility criteria were adopted: publications in article mode, full text, published between 2010 and 2020, in Portuguese, Spanish and English. Publications such as: theses, dissertations, monographs, course completion papers, case reports, experience reports, literature review, manuals, reviews, previous notes and articles that did not address the proposed theme were excluded.

For the selection of studies, we follow the recommendations of the Preferred Reporting Items for Systematic reviews and Meta-Analyses – PRISMA 14 method (Figure 1). Thus, the articles were initially selected by title and abstract and later read in full, including those that contained relevant information about the safety of patients undergoing hemodialysis. Initially, a total of 86 publications were identified. After the identification, screening and eligibility steps, the sample consisted of 14 articles.

For the collection and analysis of the data, a standardized form was used that addressed the following variables: title of the article, authors, year of publication, design and objective of the study.

RESULTS

Of the 14 articles that made up the final sample, 10 (71.4%) were published in international journals and 4 (28.5%) in national journals. Regarding the year of publication, it is identified that there was greater production in the years 2017 (28.5%) and 2019 (21.4%). It should be noted that no article published in the years 2010 and 2012 was found, as shown in Chart 1.

In Table 2, it can be seen that in relation to the methodological design, most of the analyzed publications originated...
from cross-sectional studies (28.5%), with
the quantitative approach being the most
prevalent (78.5%).

**DISCUSSION**

From the analysis of the selected stu-
dies, two thematic categories emerged:
Nursing in patient care in hemo-
dialysis therapy; and Adverse events in hemo-
dialysis.

<table>
<thead>
<tr>
<th>COD.</th>
<th>TYPE OF STUDY AND APPROACH</th>
<th>OBJECTIVE</th>
</tr>
</thead>
<tbody>
<tr>
<td>E1</td>
<td>Methodological study / mixed approach</td>
<td>Conceive and validate an instrument to improve the nursing care process in a hemodialysis unit in a mid-level hospital.</td>
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<tr>
<td>E2</td>
<td>Retrospective study with a quantitative approach</td>
<td>Evaluate the effectiveness of corrective measures in a patient safety plan on hemodialysis to reduce adverse events.</td>
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<tr>
<td>E3</td>
<td>Retrospective study with a quantitative approach</td>
<td>Determine the most prevalent adverse events and factors associated with their development in hemodialysis patients in Guerrero, Mexico.</td>
</tr>
<tr>
<td>E4</td>
<td>Quasi-experimental, prospective study with a quantitative approach</td>
<td>Build an educational program aimed at training Nursing technicians, which enables the understanding of adverse events.</td>
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<tr>
<td>E5</td>
<td>Longitudinal descriptive study with a quantitative approach</td>
<td>Analyze the prevalence and associated factors for the occurrence of adverse events in the hemodialysis service.</td>
</tr>
<tr>
<td>E6</td>
<td>Retrospective study with a quantitative approach</td>
<td>Show a work system, reproducible in any hemodialysis unit, which consists of recording the complications and failures that occurred during the session.</td>
</tr>
<tr>
<td>E7</td>
<td>Cross-sectional study with a quantitative approach</td>
<td>Determine the workload of nurses according to the dependence and risk profiles of patients on chronic hemodialysis.</td>
</tr>
<tr>
<td>E8</td>
<td>Descriptive study with a qualitative approach</td>
<td>Describe the nursing care provided in a hemodialysis hospital service based on international patient safety goals.</td>
</tr>
<tr>
<td>E9</td>
<td>Descriptive study with a quantitative approach</td>
<td>Identify nursing diagnoses in the security and protection domain of NANDA-I Taxonomy II and propose nursing interventions and activities based on the Classification of Nursing Interventions.</td>
</tr>
<tr>
<td>E10</td>
<td>Cross-sectional study with mixed approach</td>
<td>Assess the level of safety perceived by the patient during the hemodialysis session.</td>
</tr>
<tr>
<td>E11</td>
<td>Cross-sectional study with a quantitative approach</td>
<td>Evaluate the work environment of nurses on hemodialysis and investigate the correlation between work environment and patient outcomes in Greece.</td>
</tr>
<tr>
<td>E12</td>
<td>Descriptive study with a quantitative approach</td>
<td>Describe the development of a hemodialysis error taxonomy system to analyze incidents and predict the security status of a dialysis organization in Japan.</td>
</tr>
<tr>
<td>E13</td>
<td>Cross-sectional study with a quantitative approach</td>
<td>To analyze the knowledge of nursing professionals about adverse events in a hemodialysis unit in a teaching hospital.</td>
</tr>
<tr>
<td>E14</td>
<td>Prospective study with a quantitative approach</td>
<td>Analyze and know the epidemiological characteristics of adverse events (infectious and non-infectious) and identify potential opportunities for improvement.</td>
</tr>
</tbody>
</table>

Source: research data.
dialysis units: factors that interfere with patient safety.

Nursing in patient care in hemodialysis therapy

A study carried out in Chile showed that, during a hemodialysis session, which lasts an average of 4 hours, the nurse spends 60% of the time providing direct assistance to the patient, including care for vascular access, emotional support and medication administration. There was a need to distribute patients during the shift, in order to avoid overload and stress for professionals, which can favor the occurrence of adverse events. 15,16

When assessing the work environment in the hemodialysis sectors, a survey carried out in Greece described the nurse as the most eligible team member to judge the effectiveness and efficiency of patient safety programs. Other studies 18,19 emphasize that the role of nurses in relation to patients with CKD undergoing hemodialysis, must include encouraging self-care, including the family in the health-disease process, in addition to guidance on infection prevention.

Risk of infection, risk of bleeding, risk of contamination and risk of hypothermia were the main nursing diagnoses related to the domain of Safety and Protection of NANDA-I, present in a hemodialysis service in Fortaleza-CE. The main nursing interventions listed included infection control, bleeding precautions, hemodialysis therapy, anaphylaxis control and temperature regulation. 20

Adverse events in hemodialysis units: factors that interfere with patient safety

Dialysis units are complex organizations, involving multidisciplinary teams and using advanced technology to care for patients with multiple and severe pathologies. The event of AEs in hemodialysis centers is worrying, since any mistake can have serious consequences for the health of the patient, who is already vulnerable and in unfavorable clinical conditions. 21,22

Several studies 14,23,24 emphasize that infection, hypotension, dyspnea, errors during medication administration and headache are the most common events found in patients during hemodialysis. Such complications are associated with a high risk of morbidity and mortality, requiring the team to continuously monitor, detect and intervene early in the face of complications.

In-service training and continuing education activities are essential to promote discussion on the subject of patient safety and best practices in health care. In the context of hemodialysis, the implementation of strategies aimed at creating protocols for care during anticoagulation of the extracorporeal circuit, encouraging the recording of AE during hemodialysis in specific medical records, as well as updates regarding the management of vascular accesses, obtained positive results in reducing the incidence of adverse events. 9,25-28

When investigating the most prevalent adverse events in patients undergoing hemodialysis, research conducted in Mexico concluded that infection related to vascular access is a determining factor in the number of hospitalizations. Factors such as obesity, malnutrition, hyperkalemia and diabetes were highlighted as predictors of mortality in renal patients who, when undergoing hemodialysis, may present a greater degree of inflammatory response. 29

In Japan, a study was also carried out with the creation of a system called “Error Taxonomy” and it was observed that more than 70% of hemodialysis incidents were reported as problems or complications related to the dialyzer, circuit or medication, and that approximately 70% of errors occurred immediately before and after four hours of therapy. 30

Given the above, it is important to emphasize the need for investigations, notifications and analysis of occurrences that assist in planning interventions to reduce the incidence of AE, thus making care safe and with less risk to the patient. 31 Measures such as notifications, implementation of protocols and continuing education must be adopted for the prevention of AE, adopting strategies to improve the care processes developed in daily practice.

CONCLUSION

In view of the proposed objective, it is concluded that hemodialysis units have a great risk potential for the occurrence of adverse events, and it is necessary to encourage a culture of patient safety in these sectors. In this scenario, the importance of systematizing nursing care is emphasized, providing continuous care for these individuals, with organization and planning aimed at the prevention and treatment of complications associated with the procedure.

As limitations of the study, it is evident the small number of publications selected for the sample belonging to international databases, in addition to the use of descriptors, which may have excluded research on the theme. Thus, it is suggested the development of new investigations that can contribute to the creation of institutional protocols that assist in the organization of care for patients on hemodialysis, as well as in the practice of permanent education of professionals working in care.

REFERENCES

REFERENCES


2. artigo


