Factors related to hemodialysis safety culture: integrative literature review

Fatores relacionados à cultura de segurança em hemodiálise: revisão integrativa da literatura

Factores relacionados con la cultura de seguridad en hemodiálisis: revisión de literatura integradora

**ABSTRACT**

Objective: To analyze the factors involved in nursing care that are related to the safety culture of chronic renal patients on hemodialysis. Method: Integrative literature review, carried out through the steps: problem identification, bibliographic research, data evaluation, data analysis, and report. We adopted the guiding question: “What scientific evidence is there about the factors related to the safety culture in hemodialysis clinics, according to the nursing team?” The search was carried out in the LILACS, Medline / PUBMED, Scopus, CINAHL, Cochrane, and Web of Science (WOS) databases. Results: The sample of this review was composed of five studies. The factors found were: 8 predisposing, 13 disabling, 11 precipitating, and 18 reinforcing. Conclusion: The analysis of literary productions allowed an understanding of the main factors linked to nursing practices that influence the safety culture of patients on hemodialysis.

**RESUMO**

Objetivo: Analisar os fatores envolvidos na assistência de enfermagem que estão relacionados à cultura de segurança de pacientes renais crônicos em tratamento hemodialítico. Método: Revisão integrativa da literatura, realizada mediante as etapas: identificação do problema, pesquisa bibliográfica, avaliação dos dados, análise dos dados e relatório. Adotou-se a questão nor-teadora: “Quais evidências científicas existem sobre os fatores relacionados à cultura de segurança em clínicas de hemodiálise, segundo a equipe de enfermagem?” A busca foi realizada nas bases de dados LILACS, Medline/PUBMED, Scopus, CINAHL, Cochrane e Web of Science (WOS). Resultados: A amostra desta revisão foi composta por cinco estudos. Os fatores encontrados foram: 8 predisponentes, 13 incapacitantes, 11 precipitantes e 18 reforçadores. Conclusão: A análise das produções literárias permitiu compreensão dos principais fatores ligados às condutas de enfermagem que influenciam na cultura de segurança do paciente em tratamento hemodialítico.

**RESUMEN**

Objetivo: Analizar los factores involucrados en la asistencia de enfermería que están relacionados a la cultura de seguridad de pacientes renales crónicos en tratamiento hemodialítico. Método: Revisión integrativa de la literatura, realizada mediante las etapas: identificación del problema, investigación bibliográfica, evaluación de los datos, análisis de los datos e informe. Se ha optado la cuestión orientadora: “¿Cuáles evidencias científicas existentes sobre los factores relacionados a la cultura de seguridad en clínicas de hemodiálisis, segundo el equipo de enfermería?” La búsqueda se realizó en las bases de datos LILACS, Medline/PUBMED, Scopus, CINAHL, Cochrane y Web of Science (WOS). Resultados: La muestra de esta revisión ha sido compuesta por cinco estudios. Los factores encontrados han sido: 8 predisponentes, 13 discapacidades, 11 precipitantes y 18 reforzadores. Conclusión: El análisis de las producciones literarias ha permitido comprensión de los principales factores relacionados a las conductas de enfermería que influyen en la cultura de seguridad del paciente en tratamiento hemodialítico.

**Descriptors:** Nephrology Nursing; Patient Safety; Hemodialysis Units, Hospital; Nursing Care; Precipitating Factors.

**Descritores:** Enfermagem em Nefrologia; Segurança do Paciente; Unidades Hospitalares de Hemodiálise; Cuidados de Enfermagem; Fatores Desencadeantes.

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INTRODUCTION

In the last decades, patient safety has become a worldwide concern of health service organizations, as it is considered an essential factor for the quality of care through safe and harm-free care(1).

In this context, aiming to mitigating the damage arising from inadequate practices in care services, some strategies have been instituted, of which the creation of the Programa Nacional de Segurança do Paciente (PNSP- National Patient Safety Program ), through Ordinance No. 529/2013, of Ministério da Saúde (Health department), which aims to promote the implementation of actions aimed at patient safety(2). Some factors hinder the implementation of these strategies, namely: reduced number of professionals in the nursing team, lack of support from senior management, and lack of adherence by healthcare professionals(3).

The importance of the topic of safety in the different areas of assistance is noteworthy, for example, that of hemodialysis, due to the high number of patients with chronic kidney disease and the probability of incidents related to the assistance provided(2,4). Hemodialysis is a complex procedure, which provides a higher risk to the patient, with an average of 2% to 4% of deaths(5).

In Brazil, in 2016, the percentage of dialysis patients hospitalized per month was 5.2%, and the annual number of dialysis patients who died was 22,337(6). A study analyzed the medical records of 117 patients in the hemodialysis unit and evidenced the prevalence of 80.3% of adverse events (AE). Inadequate blood flow was the most prevalent AE, with the majority of the damage being classified as mild; what justified this value were aspects related to treatment, due to the use of high technology equipment, such as the hemodialysis machine; need for a multidisciplinary team; invasive procedures; administration of potentially dangerous drugs (PDD); and patient turnover(7).

Also, for there to be safety in the treatment of hemodialysis, the nursing staff must be concerned about accessing the bloodstream through an arteriovenous fistula or central access, connecting the dialysis lines, monitoring the patient for complications and hemodynamic stability(8).

Therefore, the high prevalence of AE in hemodialysis has a connection with factors related to the care processes, as well as to the institution’s safety culture. Such factors can be: predisposing, that is, those that lead to an increase in susceptibility to the event; disabling factors, which interfere with insecurity or the promotion of a safety culture; precipitating factors, which start the causal chain; and reinforcing factors, which amplify the effect of an existing clinical condition(9).

These reasons are rooted in complications arising from kidney disease itself, in pre-existing clinical conditions, in the nature of care offered by the health team, and in other peculiarities related to the safety culture promoted by the institution.

In this sense, to reduce the chances and effects of adverse events, it is essential to establish the predisposing, disabling, precipitating and reinforcing factors of the safety culture present in nursing care, in order to understand the aspects that are related to the safety culture of chronic renal patients on hemodialysis.

OBJECTIVE

To analyze the factors involved in nursing care that are related to the safety culture of chronic renal patients on hemodialysis.

METHOD

Study design

An integrative literature review, a method that allows investigation of previous research, systematically and comprehensively, to generate knowledge and identify gaps for the scientific community(10). In order for research to have scientific contributions to clinical practice, it is necessary to use methodological criteria. In this context, the present study followed the steps: identification of the problem (formulation of the question), bibliographic research, data evaluation, data analysis, and report(11).

Data collection period

The survey was conducted between November and December 2017.

Inclusion and exclusion criteria

The established inclusion criteria were: article published in English, Portuguese, or Spanish; address the factors involved in nursing care related to the safety culture of renal patients on hemodialysis, without temporal delimitation. Exclusion criteria: case or experience reports; reviews; articles that were not directly related to the topic or that addressed patient safety in other types of dialysis therapies, such as kidney transplantation and peritoneal dialysis, and that did not bring nursing care in the context of the safety culture. Duplicate articles were excluded.

Study Protocol

The formulation of the question was inspired by the PVO strategy (P = population, V = variables, and O = outcomes), which is an adaptation of the PICO strategy (Patient, Intervention, Comparison, and Outcomes)(12,13), defining as Population - nursing professionals; Variables - factors related to safety culture in hemodialysis clinics; Outcome - safety of renal patients on hemodialysis.

The guiding question was adopted to identify the problem: “What scientific evidence is there about the factors related to the safety culture in hemodialysis clinics, according to the nursing team?”

The databases for mobilizing primary sources were selected: LILACS (Latin American and Caribbean Health Sciences Literature), Medline / PUBMED (National Library of Medicine and National Institutes of Health), Scopus, CINAHL (Cumulative Index of Nursing and Allied Health Literature), Cochrane, Web of Science (WOS).

First, from the question and the research objectives, the keywords were obtained and translated into documentary language or descriptors based on the Descriptors em Ciências da Saúde (DeCS- Health Sciences Descriptors) and Medical Subject Headings (Mesh). Ee selected the terms Patient Safety, Nephrology Nursing, and Renal Dialysis as root or primary descriptors, and
the combination was established with the Boolean operators: “Patient safety” AND “Nephrology nursing” AND “Renal dialysis.” We carried out the second search in order to complete the selection of articles. For that, some citations used by authors of the selected studies that were relevant to the present study were located and incorporated.

Peer research was carried out, which also involved the final decision to include or exclude studies. Six studies were identified in Medline / PUBMED, 50 in Scopus, and 83 in CINAHL, totaling 139 studies in primary research. Among them, seven were duplicated, and 107 studies were eliminated because they did not focus on the safety culture, but safety in the development of new drugs and devices; because they were summaries presented at conferences, or editorials and a letter to the president of the Association of North American Nephrologist Nurses; and because they only address peritoneal dialysis.

**Results analysis and statistics**

In evaluating the data, we verified whether the article included nursing care that influenced the patient’s safety culture. Therefore, we eliminated studies that discussed the nurses’ perception of safety culture or patients facing safety - e.g., puncture technique, use of devices, water treatment, and quality parameters inherent to HD treatment -, but that did not focus on nursing care or safety as a broad concept. Four studies were excluded because they were reviews, one being integrative, and three narratives. The selection and eligibility process of the studies followed the recommendations of PRISMA 10, shown in Figure 1.

The researchers constructed an instrument to extract the data, which included: study title, authorship, journal, year of publication, study location (country), research objective(s), methodological details, main results and conclusions found. The presentation of the results was organized in a framework of characterization of the studies, which contain authors/year, main objective, and results.

**Chart 1 - Characterization data of the included articles, 2018**

<table>
<thead>
<tr>
<th>Titles</th>
<th>Years</th>
<th>Designs / samples</th>
<th>Interventions</th>
<th>Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nurse Manager Safety Practices in Outpatient Hemodialysis Units(1)</td>
<td>2015</td>
<td>Cross-sectional</td>
<td></td>
<td>The safety practices designed to reduce safety risk included: monitoring patient risk behaviors, enforce security policies and procedures, provide informal and formal education, manage patient flow, and involve patients in their care. Some practices relevant to the nursing team were: monitoring and observing staff; conduct formal audits; resolve security flaws in personnel care practices; and advise, train and take disciplinary action when necessary.</td>
</tr>
<tr>
<td>RN Staffing and Workload, Dialysis Work Environment, Processes of Nursing Care and Patient Safety Culture in Outpatient Hemodialysis Facilities(4)</td>
<td>2013</td>
<td>Cross-sectional</td>
<td></td>
<td>Nurses reported at least monthly the occurrences of hypotension, patients’ falls in the unit, and hospitalizations. The study observed significant associations between nurses’ reports about patient transition and the increased probability of occurrences of ignored and shortened dialysis treatments; infiltration, infection, thrombosis and vascular access hemorrhage; family/patient complaints; medication error and use of the emergency room. There was also a significant association between the negative safety scores attributed by nurses and the greater probability of the occurrence of adverse events, such as inadequate staff levels, lack of procedural guidance, training, patient education, or application of policies.</td>
</tr>
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</table>

**RESULTS**

The sample of this review included five studies; of these, three (60%) were from the United States of America (USA), and the rest were from Spain and Greece, one study from each country. As for the methodological design and database, the five were cross-sectional, being four from Scopus and one from CINAHL.

Two cross-sectional studies used a qualitative approach, with an interview about the practices and processes used to improve patient safety and quality of care in the unit, as well as to explore the manager’s safety practices before, during, and after the HD procedure.

To be continued
Factors related to hemodialysis safety culture: integrative literature review

Aguiar LL, Silva RA, Melo GAA, Pereira FGF, Lima MMS, Caetano JA.

The studies assessed the nurses’ work environment using the instruments: Practice Environment Scale of the Nursing Work Index (PES-NWI), Questionnaire on Hospitals Patient Safety Culture (HSOPSC), and Research Instrument of the Medical Office on Patient Safety Culture (MOSPSC).

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The following are the factors of nursing care related to the safety culture of the studies included in the review, according to classification: predisposing, disabling, precipitating, and reinforcing.

Table 1 - Factors related to nursing care that interfere in the safety culture of chronic renal patients on hemodialysis, 2018

<table>
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</tr>
</thead>
<tbody>
<tr>
<td>The work environment of hemodialysis nurses and their impact on patients’ outcomes(15)</td>
<td>2015</td>
<td>Greece</td>
<td>Cross-sectional n = 133 nurses</td>
<td>-</td>
<td>The disconnection of the venous needle from the fistula or graft was statistically significant when correlated with the work environment. Nurses who declared falls as frequent / very frequent scored low scores for the work environment (Mean = 2.1; SD = 2.2). Medication errors were reported as frequent (8.3%) to rare (64.7%). Catheter-associated infection and hypoglycemia were reported as frequent / very frequent adverse events - 39.8% and 26.4% respectively.</td>
</tr>
<tr>
<td>Patient safety culture in nephrology nurse practice settings: Initial findings. Nephrology(16)</td>
<td>2014</td>
<td>US</td>
<td>Cross-sectional n = 979 Nurses</td>
<td>-</td>
<td>The study noted the most common safety-related concern in the underreporting of events and near misses, including lack of time, heavy documentation systems, absence of managerial support or monitoring of reported events, and actual or perceived punishment for the employee reporting an event. Focus on productivity was mentioned, weakening the focus on the patient. Nurses reported having many responsibilities and little time available to care for and verify the technicians’ work. Events such as incorrect weights and lack of communication were also mentioned. The risk of infection was largely attributed to the lack of knowledge, time, and attention to protocols.</td>
</tr>
<tr>
<td>Relationships between registered nurse staffing, processes of nursing care, and nurse-reported patient outcomes in chronic hemodialysis units(17)</td>
<td>2008</td>
<td>US</td>
<td>Cross-sectional n = 422 nurses</td>
<td>-</td>
<td>the study has shown significant relationships between the occurrence of adverse events, such as volume overload; pneumonia hospitalizations, infection, infiltration, thrombosis, and bleeding in vascular access; fall with and without injury; medication errors; hypotension, shortened and ignored dialysis treatments; and patient complaints. The patient-nurse ratio of 12 or more was significantly associated with a higher probability of shortened dialysis times, just as patient complaints were ignored compared to the proportion of 4.61 or fewer patients per nurse.</td>
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| Predisposing factors
| Fall risk reduction 100 |
| The decrease in patients hospitalization rate 40 |
| The nursing team focus on patients and not on machines 40 |
| Do not eat during treatment 20 |
| Do not allow covering the patients’ faces and access devices during treatment 20 |
| Event and near miss notification 20 |
| Volume overload reduction 20 |
| Use of personal protective equipment in patients with hepatitis B 20 |
| Disabling factors
| Vascular access infection 100 |
| Drug Errors 80 |
| Hypotension 60 |
| Vascular access thrombosis 40 |
| Shortened dialysis times 40 |
| Unexpected bleeding from vascular access 40 |
| Vascular access infiltration 40 |
| Failure to adhere to security procedures 40 |
| Non-compliance in the waste disposal 20 |
| Hypoglycemia 20 |
| Failure of patients to clean their access sites before HD starts 20 |
| Errors concerning dilution of the dialysis solution 20 |
| Needle disconnection 20 |

To be continued
DISCUSSION

The safe hemodialysis treatment is complex and multi-causal, and the nursing team should be concerned with factors related to the patient’s safety culture, among which the most relevant ones are defined as predisposing, disabling, precipitating and reinforcing(9).

The factors classified as predisposing make a phenomenon prone to happen(9), in this case, the safety culture. In this context, we identified eight factors in the published studies, with “risk of falling reduction” being the predisposing factor, with a frequency of 100% in articles. This result is justified since chronic renal patients on hemodialysis treatment are prone to the risk of falling since the patient’s balance is altered after a hemodialysis treatment session, regardless of the age group(18).

Besides, the factors “decreased patients hospitalization rate” and “focus of the nursing team on patients and not on machines” can be highlighted, both present in 40% of the sample. They influence the patient’s safety culture, because, despite the advanced technology, hemodialysis is a substitute therapy that can cause complications, due to the patients’ hemodynamic instability, and the hemodialysis machine is an essential technology for the life of patients with chronic kidney disease(19). Thus, the nursing team must present clinical knowledge to carry out systematic and planned care, focusing on the patient and independently of the care provided in the routine of the sector(20).

Also, the studies point out the following factors: reduction in volume overload, use of personal protective equipment in patients with hepatitis B; event and near miss notification; and not allowing to cover patients’ faces and access devices during treatment, in addition to not eating during treatment. All of these factors were present in 20% of the studies found in the literature.

In turn, the factor classified as disabling has a connection with situations that interfere in the event(9). This study identified 13 situations that influence safety culture. The factor “vascular access infection” was present in 100% of the studies analyzed, given that the venous catheter is a risk factor for the development of infections, mainly when it is associated with the length of time using the device(21).

Then, there was a predominance of the factor “medication error,” present in 80% of the studies. This adverse event leads to failures in prescription, dispensation, and administration. Multiprofessional work, effective communication, and the use of educational and organizational strategies are required to reduce medication errors(22).

Another predominant factor was “hypotension,” found in 60% of the analyzed articles. According to another study, carried out with chronic kidney patients, hypotension is one of the most severe complications that occur most frequently during the hemodialysis session, representing 85.7% of the cases. Intradialytic hypotension is related to filtration volume, plasma osmolality, hypovolemia, and vasodilation(23).

A study suggests that some measures should be adopted to reduce the hypotension index during hemodialysis sessions, which include: increasing the sodium rate, reducing the dialysate temperature, and reducing ultrafiltration rates(24).

In turn, the precipitating factors are related to the process of causation(9). In the present study, there were 11 types of factors, with a predominance of subjects: effective communication during patient transfers and transitions in dialysis centers; and providing...
knowledge, skills, and guidance needed by the nursing team - both factors were in 40% of the studies analyzed.

The following actions are emphasized to improve communication strategies: recognizing team failures, improving dialogue, holding meetings with the multiprofessional team with performance evaluation and feedback[26].

Finally, reinforcing factors refer to situations that enhance existing situations[26]. This study identified 18 factors. The adequate staffing was the main reinforcement item, found in 80% of the studies analyzed.

These data corroborate international research carried out in 243 hospitals in Europe, which shows the correlation between the culture of patient safety and team staffing[26]. The quality and the correct number of professionals is an indispensable resource for organizing the work environment and providing effective patient care according to the patient’s needs, requiring effective planning to generate safe and comprehensive care for the patient[27-28].

Therefore, in order to organize health services, the Conselho Federal de enfermagem (Federal Nursing Council) published Resolution 0527/2016 (12) in Brazil, which establishes criteria for the staffing of nursing professionals[26].

**Study Limitations**

The study had as a limitation the invisibility of nephrology nursing in Brazil and Latin America, considering that the publications found were restricted to the United States of America and Greece. Thus, in order to seek new scientific evidence, it is necessary to invest in future research on the safety culture of chronic kidney patients and the development of effective analysis tools that work with influencing factors, especially in hospital practice during hemodialysis treatment.

**Contributions to nursing, health, or public policy fields**

The present study demonstrated the predisposing, disabling, precipitating, and reinforcing factors related to the safety culture of patients with chronic kidney disease on hemodialysis, in order to enable nurses and health professionals to provide assistance based on the safety culture, aiming to reduce the occurrence of adverse events. Also, with the results of the study, it is possible to design effective interventions in the short and long term, to make the care safe and with lower risks to the patient in hemodialysis clinics.

**CONCLUSION**

The analysis of literary productions on factors related to the safety culture of patients undergoing hemodialysis allowed, above all, the establishment and division of the main predisposing, disabling, precipitating, and reinforcing factors present in nursing care.

Thus, “causal factors” were chosen as those with the most considerable risks, reported with a percentage higher than 50% in the selected productions. Thus, the “risk of falls reduction” was identified as a predisposing factor; “vascular access infections”, “medication errors”, “hypotension” as disabling factors; and “adequate staffing” and “providing security policies, procedures, and guidelines” as reinforcing factors of the safety culture.

With that, it becomes possible to understand the main aspects related to the usual routine behaviors that influence patient safety.

**REFERENCES**


