Factors that influence patient safety in hemodialysis: integrative review

Factores que influyen en la seguridad del paciente en hemodiálisis: revisión integrativa

Fatores que influenciam a segurança do paciente em hemodiálise: revisão integrativa

ABSTRACT
Objective: To analyze the scientific evidence on the safety of patients undergoing hemo-dialysis. 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 medi-cation 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 complica-tions.
DESCRIPTORS: Patient safety; Renal dialysis; Nursing care; Adverse events.

RESUMEN
Objetivo: Analizar la evidencia científica sobre la seguridad de los pacientes en hemodiá-lisis. Método: Se trata de una revisi-ón integradora realizada en las bases de datos MEDLINE, LILACS, BDENF e IBECS, a través de la BVS, y SciELO en el período de agosto a septiembre de 2020. Para esta revisión se seleccionaron un total de 14 artículos. Resultados: del análisis de las publicaciones surgieron dos categorías temáticas: Enfer-mería en la atención al paciente en terapia de hemodiálisis y Eventos adversos en uni-dades de hemodiálisis: factores que interfieren en la seguridad del paciente. Los estudios destacan infección, hipotensión, disnea y errores en la administración de medicamentos, eventos que se encuentran con frecuencia en las unidades de hemodiálisis. Conclusión: El análisis de las producciones permitió comprender los principales factores que interfie-ren en la seguridad del paciente en el tratamiento de hemodiálisis, así como la importan-cia del cuidado de enfermería en la implemen-tación de acciones orientadas a la preven-ción y tratamiento de complicaciones.
DESCRIPTORES: Seguridad del paciente; Diálisis renal; Cuidado de enfermera; Eventos adversos.

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 publicações, 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. Os estudos destacam a infecção, hipo-tensão, dispneia e erros na administração de medicamentos, eventos frequentemente encontrados em unidades de hemodiáli-se. Conclusão: A análise das produções permitiu a compreensão dos 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.

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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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diálise", "Hemodialysis Units Hospital", "Cuidados de enfermagem" and "Nursing care", separated by the Boolean operator AND.

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

Figure 1: Flowchart of the selection process of the articles included in the integrative review in accordance with the PRISMA 14 criteria, João Pessoa, Paraíba, Brazil, 2020.
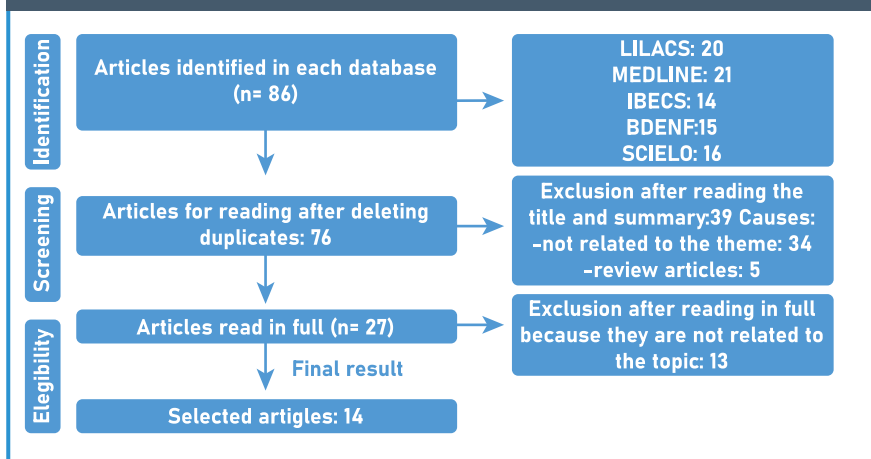
Source: Flowchart prepared by the authors, 2020.

Chart 1: Distribution of articles selected for the integrative review. João Pessoa, Paraíba, Brazil, 2020.

YEAR	AUTHOR/TITLE/JOURNAL
2019	Cuevas-Budhart, MA et al. Design and validation of a new nursing clinical record, for the continuity of care and safety of the patient on hemodialysis Revista Enfermería Nefrológica.
2019	López VEG, Macías CM, Cuestas RC, de Lara MAA, Montero MC. Analysis of corrective measures to reduce adverse events in a hospital hemodialysis unit. Revista de la Sociedad Española de Enfermería Nefrológica.
2019	Cuevas-Budhart, MA et al. Factors associated with the development of adverse events in hemodialysis patients in Guerrero, Mexico. Revista Enfermería Nefrológica.
2018	Pássaro, PG. D'Ávila, R. Nursing educational intervention for the identification of Adverse Events in hemodialysis. Revista Brasileira de Enfermagem.
2018	Lessa SRO, Bezerra JNM, Barbosa SMC, Luz GOA, Borba AKOT. Prevalence and associated factors for the occurrence of adverse events in the hemodialysis service. Revista Texto & Contexto Enfermagem.
2017	Jimenéz MDA, Ferre G, Álvarez-Ude F. Strategies to increase patient safety in hemodialysis: Application of the system of modal analysis of falls and effects [AMFE system]. Revista Enfermería Nefrológica.
2017	Barrios S, Catoni MI, Arechabala MC, Palma E, Ibacache Y, Richard J. Workload of nurses in Chronic Hemodialysis Units according to dependence and risk of the patients. Revista médica de Chile.
2017	Aguiar LL, Guedes MVC, Oliveira RM, Leitão IMTA, Pennafort VPS, Barros AA.Nursing and international safety goals: hemodialysis assessment. Cogitare Enfermagem.
2017	Lima-Aguiar, L. Cavalcante-Guedes, MV. Nursing diagnoses and interventions in the domain of safety and protection of patients on hemodialysis. Enfermería global.

2016	Guerrero VM, García GP, Hidalgo CGO, Henández de Arribas V, Penã JR. Level of safety perceived by the chronic hemodialysis patient. Revista Enfermería Nefrológica.
2015	Prezerakos, P. Galanis, P. Moisoglou, I. The work environment of haemodialysis nurses and its impact on patients' outcomes. International Journal of Nursing Practice.
2014	Gu, X. Itoh, K. Suzuki, S. An error taxonomy system for analysis of haemodialysis incidents. Journal of Renal Care.
2013	Sousa MRG, Silva AEBC, Bezerra ALQ. Adverse events in hemodialysis: reports by nursing professionals. Revista da Escola de Enfermagem da USP.
2011	Quori A, Baamonde-Laborda E, García-Cantón C, Lago-Alonso MM, Toledo-Gonzáles A, Monzón-Jiménez E, et al. Surveillance of infections and other adverse events in dialysis patients in the southern area of Gran Canaria. Revista Enfermería Nefrológica.

Source: research data.

from cross-sectional studies (28,5%), with the quantitative approach being the most prevalent (78,5%).

DISCUSSION

From the analysis of the selected studies, two thematic categories emerged: Nursing in patient care in hemodialysis therapy; and Adverse events in hemo-

Chart 2: Distribution of studies on the safety of patients undergoing hemodialysis, according to the characteristics of the articles. João Pessoa (PB), Brazil, 2020.

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

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 [17] 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[18,23,24] dinfection, 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 [28] 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

1. Sesso RC, Lopes AA, Thomé FS, Lugon JR, Martins CT. Inquérito Brasileiro de Diálise Crônica 2014. J Bras Nefrol. 2016;38(1):54-61.

2. Mello MVFA, Menezes KSP, Pires KKC, Angelo M. Panorama da doença renal terminal em um estado da amazônia brasileira.

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REFERENCES

2017;21:e994.

3. Sesso RC, Lopes AA, Thomé FS, Lugon JR, Martins CT. Inquérito Brasileiro de Diálise Crônica 2016. J Bras Nefrol. 2017;39(3):261-266.

4. Oliveira ACR, Vieira DSR, Bündchen DC. Nível de atividade física e capacidade funcional de pacientes com doença renal crônica pré-dialítica e em hemodiálise. Fisioter Pesqui. 2018;25(3):323-329.

5. Dallacosta FM, Dallacosta H, Mistrus L. Detecção precoce de doença renal crônica em população de risco. Cogitare Enferm. 2017;22(2):e48714.

6. Lins SMSB, Leite JL, Godoy S, Fuly PSC, Araújo STC, Silva IR. Adaptação cultural do questionário de adesão do paciente renal crônico em hemodiálise. Rev Bras Enferm. 2017;70(6):1169-75.

7. Debone MC, Pedruncci ESN, Candido MCP, Marques S, Kusumota L. Diagnósticos de enfermagem em idosos com doença renal crônica em hemodiálise. Rev Bras Enferm, 2017;70(4):800-5.

8. Xavier SSM, Germano RM, Silva IP, Lucena SKP, Martins JM, Costa IKF. Na correnteza da vida: a descoberta da doença renal crônica. Interface. 2018: 22(66):841-51.

9. Lessa SRO, Bezerra JNM, Barbosa SMC, Luz GOA, Borba AKOT. Prevalência e fatores associados para a ocorrência de eventos adversos no serviço de hemodiálise. Texto Contexto Enferm. 2018;27(3):e3830017.

10. Xelegati R, Gabriel CS, Dessotte CAM, Zen YP, Évora YDM. Eventos adversos relacionados ao uso de equipamentos e materiais na assistência de enfermagem a pacientes hospitalizados. Rev Esc Enferm USP. 2019; 53:e03503.

11. Brasil. Agência Nacional de Vigilância Sanitária (ANVISA), Cirurgias seguras salvam vidas. Brasília (DF);2008.

12. Frazão CM, Medeiros AB, Silva FB, Sá JD, Lira AL. Diagnósticos de enfermagem em pacientes renais crônicos em hemodiálise. Acta Paul Enferm. 2014;27(1):40-3.

13. Souza MT, Silva MD, Carvalho R. Revisão integrativa: o que é e como fazer. Rev Einstein. 2010;8(1):102-6.

14. Moher D, Liberati A, Tetzlaff J, Altman DG; PRISMA Group. Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement. Int J Surg. 2010;8(5):336–41.

15. Barrios S, Catoni MI, Arechabala MC, Palma E, Ibacache Y, Richard J. Carga laboral de las enfermeras en Unidades de Hemodiálisis Crónica según dependencia y riesgo de los pacientes. Rev Med Chile. 2017;145:888-895.

16. Sousa MRG, Silva AEBC, Bezerra ALQ, Freitas JS, Miasso AI. Eventos adversos em hemodiálise: relatos de profissionais de enfermagem. Rev Esc Enferm USP. 2013;47(1):76-83.

17. Prezerakos P, Galanis P, Moisoglou I. The work environment of haemodialysis nurses and its impact on patients' outcomes. Int J Nurs Pract. 2014;40(4):239-48.

18. Lucena AF, Magro CZ, Proença MCC, Pires AUB, Moraes VM, Aliti GB. Validação de intervenções e atividades de enfermagem para pacientes em terapia hemodialítica. Rev Gaúcha Enferm. 2017;38(3):e66789

19. Oliveira ACF, Vieira DSR, Bündchen DC. Nível de atividade física e capacidade funcional de pacientes com doença renal crônica pré-dialítica e em hemodiálise. Fisioter Pesqui. 2018;25(3):323-329.

20. Lima-Aguiar L, Cavalcante-Guedes MV. Diagnósticos e intervenciones de enfermería del dominio seguridad y protección de los pacientes en hemodiálisis. Enferm glob. 2017;16(47):1-12.

21. Costa RHS, Dantas ALM, Leite EMD, Lira ALBC, Vitor AF, Silva RAR. Complicações em pacientes renais durante sessões hemodialíticas e intervenções de enfermagem. J res: fundam care online. 2015;7(1):2137-2146.

22. Sousa MRG, Silva AEBC, Bezerra ALQ. Prevalência de eventos adversos em uma unidade de hemodiálise. Rev enferm UERJ. 2016;24(6):e18237.

23. Aguiar LL, Guedes MVC, Oliveira RM, Leitão IMTA, Pennafort VPS, Barros AA. Enfermagem e metas internacionais de segurança: avaliação em hemodiálise. Cogitare enferm. 2017;22(3):01-09.

24. Quori A, Baamonde-Laborda E, García-Cantón C, Lago-Alonso MM, Toledo-Gonzáles A, Monzón-Jiménez E, et al. Vigilancia de infecciones y otros eventos adversos en pa-cientes en diálisis en el área sur de Gran Canaria. Nefrología (Madr.). 2011;31(4):457-463.

25. López VEG, Macías CM, Cuestas RC, de Lara MAA, Montero MC. Análisis de las me-didas correctoras para la disminución de los eventos adversos en una unidad de hemo-diálisis hospitalaria. Enferm nefrol. 2019;22(1):27-33.

26. Cuevas-Budhart MAC, Martínez BRG, Bolaños EA, García MJB, Souza AA, Jurado MAG, et al. Diseño y validación de un nuevo registro clínico de enfermería, para la conti-nuidad de los cuidados y seguridad del paciente en hemodiálisis. Enferm nefrol. 2019;22(2):168-175.

27. Jimenéz MDA, Ferre G, Álvarez-Ude F. Estrategias para aumentar la seguridad del paciente en hemodiálisis: Aplicación del sistema de análisis modal de fallos y efectos (sistema AMFE). Nefrología (Madr.). 2017;37(6):608-621.

28. Cuevas-Budhart MAC, García RPS, Larumbe JAG, Bolaños EA, del Cerro EP, Monroy AM, et al. Factores asociados al desarrollo de eventos adversos en pacientes con hemo-diálisis en Guerrero, México. Enferm nefrol. 2019;22(1):42-50.

29. Pássaro PG, D'Ávila R. Nursing educational intervention for the identification of Ad-verse Events in hemodialysis. Rev bras enferm. 2018;71(4):1507-1513.

30. Gu X, Itoh K, Suzuki S. An error taxonomy system for analysis of haemodialysis inci-dents. J Ren Care. 2014;40(4):239-48.

31. Guerrero VM, García GP, Hidalgo CGO, Henández de Arribas V, Penã JR. Nivel de seguri-dad percibida por el paciente de hemodiálisis crónica. Enferm nefrol. 2016;19(3):255-263.