

## Patient safety in hemodialysis clinics: perception of the nursing team



*Segurança do paciente em clínicas de hemodiálise: percepção da equipe de enfermagem*

*Seguridad del paciente en clínicas de hemodiálisis: percepción del equipo de enfermería*

Magda Milleyde de Sousa Lima<sup>a</sup>   
 Francisca Geisa Silvestre Rocha<sup>a</sup>   
 Cristina da Silva Fernandes<sup>a</sup>   
 Lívia Moreira Barros<sup>d</sup>   
 Nelson Miguel Galindo Neto<sup>e</sup>   
 Joselany Áfio Caetano<sup>a</sup>

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### ABSTRACT

**Objective:** To analyze the perception of the nursing team regarding patient safety in hemodialysis clinics.

**Method:** Descriptive-exploratory study with a qualitative approach, conducted with 37 professionals from the nursing team of five hemodialysis clinics, located in the cities of Sobral and Fortaleza, in Ceará, Brazil. Data were collected from October to December 2021, through semi-structured interviews recorded and analyzed by Descending Hierarchical Classification.

**Results:** Four classes emerged: operation of hemodialysis clinics; role of companions and patients in their safety in hemodialysis clinics; role of the nursing team in the safe care of patients undergoing hemodialysis; international patient safety goals in hemodialysis clinics.

**Conclusion:** The participants recognize the existence of shortcomings in international patient safety goals, mainly errors in patient identification and medication administration.

**Descriptors:** Nursing. Patient safety. Renal dialysis. Patient participation.

### RESUMO

**Objetivo:** Analisar a percepção da equipe de enfermagem sobre a segurança do paciente em clínicas de hemodiálise.

**Método:** Estudo descritivo-exploratório com abordagem qualitativa, realizado com 37 profissionais da equipe de enfermagem de cinco clínicas de hemodiálise, localizadas nos municípios de Sobral e Fortaleza, no Ceará, Brasil. Os dados foram coletados no período de outubro a dezembro de 2021, por meio de entrevistas semiestruturadas gravadas e analisados por Classificação Hierárquica Descendente.

**Resultados:** Emergiram quatro classes: funcionamento das clínicas de hemodiálise; papel do acompanhante e do paciente na sua segurança em clínicas de hemodiálise; atuação da equipe de enfermagem no cuidado seguro do paciente em tratamento hemodialítico; metas internacionais de segurança do paciente nas clínicas de hemodiálise.

**Conclusão:** Os participantes reconhecem a existência de falhas nas metas internacionais de segurança do paciente, principalmente a ocorrência de erros na identificação dos pacientes e administração de medicamentos.

**Descritores:** Enfermagem. Segurança do paciente. Diálise renal. Participação do paciente.

### RESUMEN

**Objetivo:** Analizar la percepción del equipo de enfermería sobre la seguridad del paciente en clínicas de hemodiálisis.

**Método:** Estudio descriptivo-exploratorio con abordaje cualitativo, realizado con 37 profesionales del equipo de enfermería de cinco clínicas de hemodiálisis, ubicadas en las ciudades de Sobral y Fortaleza, en Ceará, Brasil. Los datos fueron recolectados de octubre a diciembre de 2021, a través de entrevistas semiestructuradas grabadas y analizadas por Clasificación Jerárquica Descendente.

**Resultados:** Surgieron cuatro clases: operación de clínicas de hemodiálisis; papel del acompañante y del paciente en su seguridad en las clínicas de hemodiálisis; actuación del equipo de enfermería en el cuidado seguro de los pacientes en hemodiálisis; objetivos internacionales para la seguridad del paciente en las clínicas de hemodiálisis.

**Conclusión:** Los participantes reconocen la existencia de fallas en las metas internacionales de seguridad del paciente, principalmente la ocurrencia de errores en la identificación de pacientes y administración de medicamentos.

**Descritores:** Enfermería. Seguridad del paciente. Diálisis renal. Participación del paciente.

<sup>a</sup> Universidade Federal do Ceará (UFC). Fortaleza, Ceará, Brasil.

<sup>b</sup> Universidade da Integração Internacional da Lusofonia Afro-Brasileira (Unilab). Redenção, Ceará, Brasil.

<sup>c</sup> Instituto Federal de Pernambuco (IFPE). Pesqueira, Pernambuco, Brasil.

## ■ INTRODUCTION

Patient Safety is a healthcare science that aims to study and apply methods of prevention and risk reduction, as well as the prevention of errors and harms that may occur to patients during the provision of care<sup>(1)</sup>. It is understood as reducing the risk of unnecessary harm, in healthcare, to an acceptable minimum, being a fundamental element for guaranteeing the quality of healthcare<sup>(2)</sup>.

Within the context of hemodialysis clinics, it is identified that patients with chronic kidney disease undergoing hemodialysis treatment are susceptible to several risks and harms that compromise their safety, whether related to invasive procedures, the treatment, the patients' clinical condition and administration of potentially dangerous medications<sup>(3)</sup>.

National and international literature shows relevant data on the subject. A study conducted in Taiwan, an island in China, with the highest prevalence of end-stage kidney disease in the world, highlights that 9.6% of deaths in patients with Chronic Kidney Disease (CKD) are caused by infections and 3.5% % related to organizational and human errors, such as inadequate medical decisions<sup>(4)</sup>. In turn, Brazilian researchers identified that the most prevalent events are related to inadequate blood flow, bleeding through venous access and clotting of the Extracorporeal System (ES). From these adverse events, 0.9% were serious and 0.8% resulted in death<sup>(5)</sup>.

Healthcare professionals who work in hemodialysis clinics must be able to identify factors that may harm patient safety and that raise concerns when recognizing or becoming aware of unsafe or unsatisfactory actions, as this means they can prevent episodes of adverse events, improve team performance and promote a learning environment<sup>(6)</sup>. When professionals don't speak about problems, the organizations miss opportunities for improvement and learning. To create these opportunities, organizations need to encourage cultures that remove barriers to speaking up.

Given the intense routine and numerous responsibilities faced by nursing professionals in hemodialysis clinics, it is necessary to understand how these professionals view the topic of patient safety, considering that the identification of adverse events in the stages of care and organizational structure contribute for developing strategies that promote a culture of patient safety<sup>(7)</sup>.

Therefore, the question arises: what is the perception of the nursing team in hemodialysis clinics regarding aspects related to patient safety? Therefore, this study aims to analyze

the perception of the nursing team regarding patient safety in hemodialysis clinics.

## ■ METHOD

This is a descriptive-exploratory study with a qualitative approach, with a narrative methodology based on constructivism. It is noteworthy that the methodological guidelines complied with the Consolidated criteria for reporting qualitative research (COREQ)<sup>(8)</sup>.

The study was conducted in five hemodialysis clinics linked to the Unified Health System (*Sistema Único de Saúde* – SUS), two located in the city of Sobral/CE and three in Fortaleza/CE. The clinics were selected intentionally because they are the main reference centers in two macro-regions of the state of Ceará. It is important to note that the researchers had no affiliations with the institutions.

Nursing professionals from the selected clinics participated in the study, with the study sample being non-probabilistic and intentional, made upon invitation, thus the participants' selection was made by convenience. The inclusion criterion adopted was working at the institution for more than six months. Professionals absent from work or on vacation during the data collection period, October to December 2021, were excluded.

After applying the eligibility criteria, 37 professionals from the nursing team participated in the study, seven nurses and 30 nursing technicians. All individuals invited agreed to participate in the study.

A semi-structured script was used, submitted to pilot testing with three nurses who work in patient safety centers and three nurses who work in hemodialysis units in an institution different from the studied setting. The script was evaluated regarding understanding and the ability to achieve the research objectives, consisting of two parts. The first consisted of sociodemographic and work characterization. The second part was represented by the triggering questions: "Talk about patient safety in this hemodialysis clinic"; "What difficulties are encountered on a daily basis in the patient safety process?" and "What measures can be implemented to improve patient safety?"

Previous contact was made, via telephone, with the nursing teams and presentation of the study objective, its risks and benefits. After agreeing to participate, the interviews were scheduled and conducted in a private room at the researched institution with individual interviews, lasting an average of 20 minutes, mediated by two nurses, one

a doctoral student and the other a master's student, who research about patient safety in hemodialysis clinics and had no work-related, academic or interpersonal affiliation with the interviewees. Furthermore, the researchers were previously trained on the study and its method, and they have experience with collecting data from qualitative research.

For data collection, audio recordings were used. The interviews were recorded using an MP4 recorder. It was used the sampling technique by theoretical data saturation, which consists of interrupting data collection based on the observation that no new elements will emerge to support the desired theorization<sup>(9)</sup>.

Subsequently, the interviews were fully transcribed in Microsoft Word® with double checking on the transcribed content and processed by the software *Interface de R pour les Analyses Multidimensionnelles de Textes et de Questionnaires* (IRAMUTEQ)® 0.7 Alfa 2.3.3.1 and analyzed by Descending Hierarchical Classification (DHC). Then, the data was coded by three researchers. It should be noted that it was not possible to send the transcribed texts for comments and suggestions from participants.

It is important to note that there was no conflict of interest during the interviews and that the study complied with the aspects of Resolution 466/2012 of the National Health Council (*Conselho Nacional de Saúde – CNS*). It should be noted that this study is part of a project entitled "Evaluation of patient safety for chronic kidney disease patients undergoing hemodialysis in Ceará: multiphase mixed methods research", approved, in 2021, by the Research Ethics Committee of the *Universidade Federal do Ceará*, under opinion 4,542,075, CAAE: 38707520,1,0000,5054 and aims to respond to one of the secondary objectives of this research. Before the start of the interview, the Informed Consent Form was made available and, upon agreement to participate in the research, signature of the term and authorization to use the audio was requested. To ensure anonymity, the statements were identified by the letter N, according to the order of the interviews.

## ■ RESULTS

The findings identified that among the 37 study participants, there was a predominance of females (86.5%), brown color (59.5%), married marital status (48.6%), with family income between one and two minimum wages (62.9%) and Catholic religion (70.3%). The age ranged from 21 to 57 years old, with a mean of 35.7 years old. Nursing technicians

cared for an average of four patients per shift, while nurses cared for 35 patients.

The IRAMUTEQ® software set the text into 449 textual segments, 1505 forms, 19,698 occurrences, using 83.15% of the text. The sizing of the Elementary Context Units (ECU) distributed the participants' statements into four classes, detailed in Figure 1.

### **Class 1 – Safe operation of hemodialysis clinics (26.6%)**

Class 1 is the first class with the highest number of ECU (26.6%). This category revealed how professionals relate the operation of hemodialysis clinics looking forward patient safety. Among the statements, the influence of legislation and regulations, machines and equipment and professional culture on the safe operation of hemodialysis clinics was observed.

In this context, regarding legislation and guidelines, the nursing team professionals agreed on the importance of work guided by protocols, as well as emphasizing that regulations on patient safety in hemodialysis clinics are recent, according to the statements:

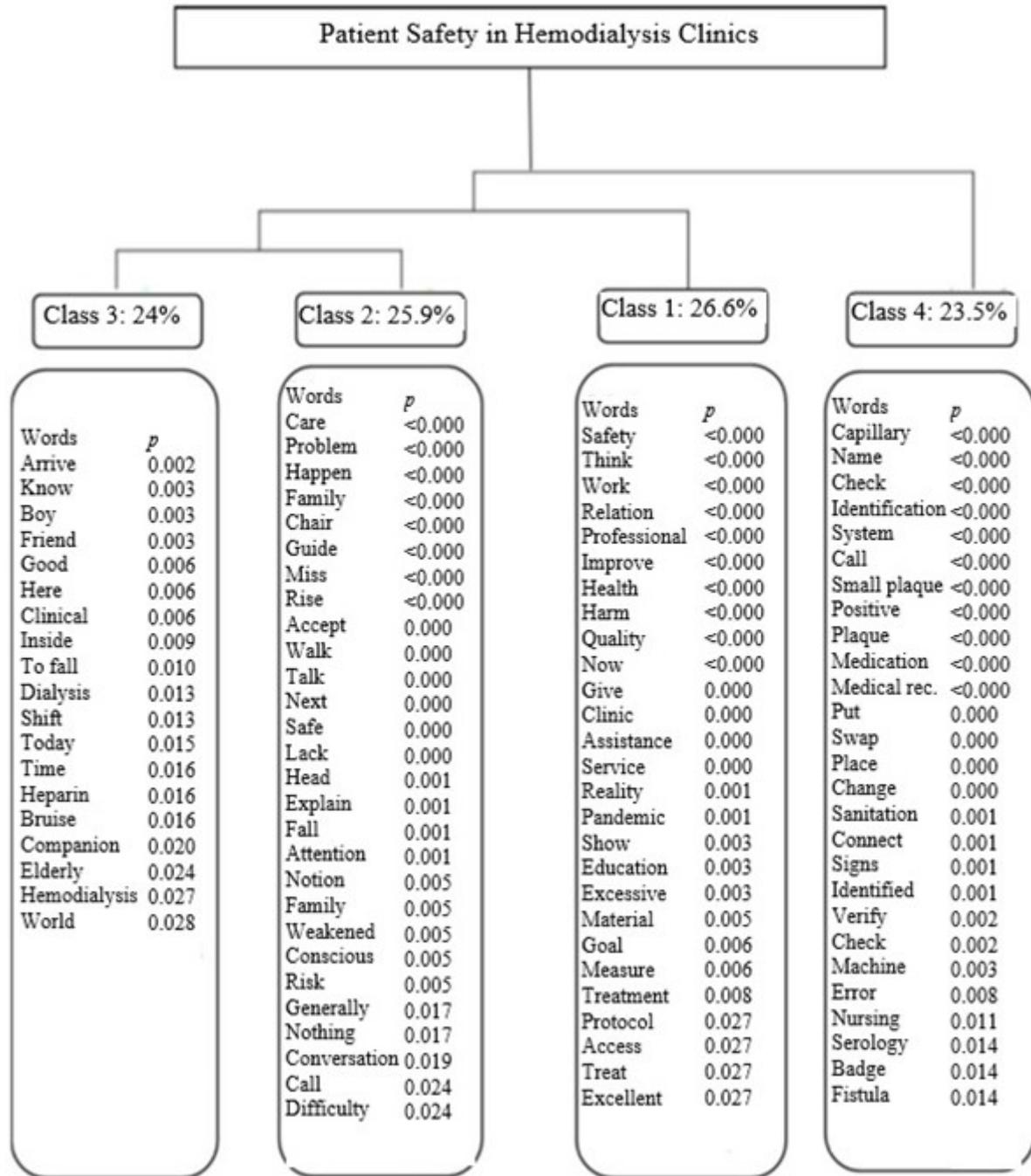
*We always try to do things correctly in compliance with what the law requires, thinking about patient safety. (N5)*

*We have always tried to improve, we have implemented the protocols that we can achieve with what is requested by the ministry. (N20)*

*We have now few regulations that support this. Today, regarding safety, the only thing we have in chronic cases are infection indicators, catheter replacement, death, however little is explained about adverse events and there is still a lot of doubt about what an adverse event actually is. (N30)*

Furthermore, for safe operation, in addition to the implementation of legislation and guidelines, nursing team professionals highlighted the influence of machines, materials and equipment in the patient care process, since old and scarce equipment are barriers during the safe care, according to the following statements:

*A lot has improved, I already got a very old machine here. Safety here was our eyes. Not today, the machine does everything, it's safer. But if it were more modern machines, then it would be even safer. (N1)*



**Figure 1** – Dendrogram of words distributed into four classes. Fortaleza, Ceará, Brazil, 2022  
Source: Research data, 2022.

*Buying new machines, it would be good for us employees to work with the material, it would be good for everyone, more efficient machines. (N2)*

*You don't provide adequate care to the patient because you can't spend material... I think it's excessive control of supplies. We do not have access to the material to provide adequate care to the patient. (N32)*

In addition, professionals highlighted that the professional culture influences the safe operation of hemodialysis clinics, as mentioned:

*But what I think makes it even more difficult is culture of the professionals. (N9)*

*Patient safety depends a lot on the professionals, on their training, whether they are prepared for complications. (N36)*

Although professional culture influences the level of patient safety, professionals also emphasized the influence of patients with chronic kidney disease on their own safety, according to Class 2 described below.

### **Class 2 – Role of the patient in their safety in hemodialysis clinics (25.9%)**

Class 2 emphasizes how much patients need to know the topic “patient safety”, since their attitudes influence the care provided by the nursing team. Thus, among the statements, the following stood out: patient knowledge, the barriers imposed by patients in the daily life of hemodialysis clinics and the external influence on safe care in hemodialysis clinics.

Patient knowledge was cited as an essential point, since patients who received previous orientation have greater self-care. However, hemodialysis clinics do not have a standard in the patients’ profile, according to the following statements:

*There are patients who watch everything you do. He even checks whether it really belongs to him, but there are others who sit in a chair like that and don't even pay attention to whether it's his system or anything. (N1)*

*Some patients are quite aware. They arrive and look to see if it's his dialyzer, if the name on the plaque is correct. There are patients who pay attention to everything, there are some who are sitting here and are already paying attention to the other patient in front of them. (N11)*

*There are patients who are collaborative, disciplined because they know they cannot use the other patient's material to avoid taking the risk, they have this look. Sometimes I notice there are patients who, sitting in the armchair, forgot to look after sitting down and get up and look, it's still not turned on, there's still time, this really is a matter of culture. (N14)*

*A well-informed patient, well-guided in fistula care... will not put weight on the fistula, he will wash it well to avoid infection, he will not put on a watch, he will not let anyone squeeze his arm, this contributes a lot for his quality of life. (N18)*

Moreover, nurses and nursing technicians spoke clearly about the barriers imposed by patients in the daily routine of hemodialysis clinics, especially regarding the use of identification badges, adherence, and hurry to leave, as mentioned:

*The elderly are much more difficult. Sometimes they want to do things they can't do, for example, sometimes they want to get up and walk to the scale alone, sometimes we say: no, you can't. They are very stubborn. (N5)*

*Sometimes there are patients who are a little more difficult to accept things, to put on a badge, to identify themselves, because they say they are not even working in hemodialysis... the medication, sometimes they accept it, sometimes they say they don't want. (N8)*

*We have an example here of a patient who refuses to use identification, to sign a consent form, there are people who have this kind of problem. (N9)*

*The problem is the lack of adherence in the treatment itself. Sometimes the patient doesn't respond well, sometimes the social issues they experience, from family. (N18)*

*There is also difficulty in accepting treatment because many do not accept it, they miss it for no reason. (N24)*

*The main difficulty is when the patient is stubborn, we try to explain things to him/her and he doesn't want to understand. (N27)*

*There are patients who are very nervous, who sometimes want to pull out the needles, want to leave early, but we try to talk to the patient. (N28)*

*There are some who are very stubborn, resistant. There are some who, when they give the time, say I'll do 3 hours, 4 hours and they want to leave immediately. There are some who want to remove the needles, so I say pull it, it will bleed, let's think about it, it's your life at risk, let's talk about it, sometimes I manage, but sometimes it's difficult to manage. (N24)*

Besides the patient’s influence on the daily routine of hemodialysis clinics, the interviewed professionals spoke about the service routine and the measures adopted to prevent adverse events, according to Class 3.

### **Class 3 – Role of the nursing team in the safe care of patients undergoing hemodialysis (24%)**

In Class 3, the professionals started talking about the routine of hemodialysis clinics, with emphasis on operation hours, service shifts and the care provided, as mentioned:

*Here it works from 6 am to 10 pm, during this period we have to do three shifts. (N16)*

*The shift begins, the nurse will check the patients' schedule on the board and go through all the machines to see*

*if the board is in line with the programming of each machine. (N19)*

*Here, we generally try to keep updating things and everything is always well explained, from the administration to when they go inside. (N35)*

*We receive the patient on hemodialysis, we will take all precautions, check the pressure, lowering, hypotension, the risks, to be careful when puncturing so as not to cause an injury. (N24)*

The professionals also reported the measures adopted to prevent adverse events in hemodialysis clinics and the importance of checklists in this process, according to the following statements:

*I think it would be useful to have a shift handover checklist, because we see here that the girls only hand over that patient who today is going to undergo hemodialysis without heparin, a patient who has reduced hours. (N9)*

*We didn't have the checklist here before that we have now and it's better. (N36)*

*We also have to pay more attention... The physician gives an antibiotic regimen, we only put 5 doses of antibiotics there, we just put in the medical record the day he took the first one and then we put in the days that they are taking it, but there is no checklist. (N17)*

Finally, complementing the statements about the prevention of adverse events, Class 4 presents information about the implementation of international patient safety goals in hemodialysis clinics.

#### **Class 4 – International patient safety goals in hemodialysis clinics(23.4%)**

In Class 4, nursing team professionals spoke about the measures adopted for implementation of patient safety and the shortcomings in international patient safety goals. Regarding the measures adopted in the daily routine of hemodialysis clinics, there were reports related to: Patient identification, identification of lines and capillaries and care related to the patient's serology, as their statements:

*When the serology comes out, they go to other machines, if it's positive they don't stay here (they go to a specific room), positive for something else, like hepatitis or something else, they don't stay. (N4)*

*The patient's name is identified on the capillary and on each line for later when they come here for reprocessing. (N7)*

*We have the patient's identification plaque, we have the capillary itself identified and we have the badge. (N14)*

*We identify the capillary, identify the plaque that is also the badge, there is the entire process of cleaning the capillary. (N16)*

*Safety itself is checking the capillary, checking the lines. The capillary itself has the patient's name, his pathology, whether he is positive or negative for that pathology, the venous and arterial system itself is identified, the plaque is identified, medication is only given if it is necessary. (N17)*

*You have to check the medical record, check the patient's name, dilute it, identify it. (N18)*

Beyond the care provided in routine services, the professionals interviewed cited failures in international patient safety goals related to capillary and medication changes, as stated:

*We often make mistakes, it always happens that we change a capillary, sometimes the puncture doesn't work, it causes an injury... when these things happen, we get upset, but there's no way, we're human beings, it happens. (N7)*

*If a person puts a capillary from another patient, then they go there and change the patient, this complicates things a lot... this is a mistake, connecting it and not checking whether it is their capillary. (N12)*

Such results emphasize the challenges experienced by the nursing team in maintaining patient safety in hemodialysis clinics.

#### **■ DISCUSSION**

Within Class 1, related to the safe operation of hemodialysis clinics, from the statements made, it becomes evident the aspects that suitable work environments and appropriate medical equipment are related to the reduction of adverse events, patient length of stay and healthcare-associated deaths<sup>(10)</sup>.

Advancements in hemodialysis technology have been gaining significant attention. The conformation of hemodialysis machines is linked to improving the provision of patient care, making treatment more satisfactory, providing pertinent data for the professionals involved in the procedure<sup>(11)</sup>.

Still in this perspective of safe operation of hemodialysis clinics, safety culture also stands out, as it involves the individual attitudes and perceptions of professionals, how they feel about the organization, the behaviors and actions that people take in the organization<sup>(12)</sup>.

Among the aspects related to safety culture reported by professionals, a significant challenge is the differentiation between adverse events and complications. According to international researchers, patient safety is a multifactorial process related to non-modifiable factors (associated with the patient) and modifiable factors (incidents during the procedure)<sup>(13)</sup>.

It is worth highlighting that complications during hemodialysis sessions may be associated with issues related to the artificial blood filtration process or comorbidities inherent to renal failure<sup>(14)</sup>. As for adverse events, they are accidental injuries caused and/or increased by poor care practices during diagnosis, treatment or hospitalization and not by the disease itself<sup>(15)</sup>.

In this regard, it is up to professionals to maintain both technical and scientific knowledge, as this will enable them to have a meticulous look at dealing with and differentiating situations that may arise during sessions, whether complications or adverse events in hemodialysis, to adopt a series of measures, considering the specificities of each patient and the ongoing complication<sup>(16)</sup>.

Regarding the problem of mechanical actions, it is in line with the literature on the subject, that shows that this is something present in hemodialysis treatment and that it leads professionals to present automatic behaviors and generates aspects of fragility in routines marked by time pressure and repetition of tasks<sup>(17)</sup>.

Professionals struggle in converging training and performance with discourse and practice, they judge the length of service in the sector, self-confidence, experience and resistance as factors that hinder not to use Personal Protective Equipment (PPE) or incomplete use, and adhering to hand hygiene at the appropriate times<sup>(18)</sup>.

Changes in organizational culture and in the individual culture of healthcare professionals can positively influence patient safety culture, becoming essential for safe and quality care, as they impact motivation and safe behaviors, with consequences for daily practice<sup>(19)</sup>.

According to Class 2 regarding the role of the patient in their safety in hemodialysis clinics, it is confirmed through the professionals' emphasis that patient participation is increasingly considered a constituent of healthcare and a critical component of safe services. A study published in 2019 by the Lancet Global Health Commission reinforced the idea

that healthcare professionals should discern that patient safety is a two-way street. Patients should be involved and be the center of their own care<sup>(20)</sup>. Researchers from Spain have also showed that patient participation is diverse and ranges from education about risks to monitoring professionals' safety practices<sup>(21)</sup>.

Therefore, the patient must always be the focus of care. In view of this, health institutions have adopted patient safety guidelines and principles to improve the care provided, one of these principles is related to "Patients for patient safety in healthcare services". At a national level, ANVISA states that "the patient must collaborate with the prevention of errors, paying attention to the most critical stages of the work, in order to participate in these stages proactively"<sup>(2)</sup>.

Encouraging patient participation should not simply occur with the intention of warning healthcare professionals about possible careless attitudes, but also of creating means to address failures or errors with patients to not occur again. It is necessary for the patient to be a collaborator so that the system can evolve, therefore, it is up to professionals to validate, rather than repress, the user's speech, preventing him, as a victim, from assuming a position of conflict<sup>(22)</sup>.

In Class 3, regarding the role of the nursing team in the safe care of patients undergoing hemodialysis, there is a list of the main practices for safe care in hemodialysis. The following precautions stood out in the statements: observing the programming of the machines, checking vital signs and using a checklist to guide care. All of these practices mentioned corroborate the findings of other studies and continue to be essential<sup>(3,23)</sup>.

As a means of improving the care provided and safety of sessions, the use of a checklist was also mentioned. The high rates of bloodstream infections related to hemodialysis catheters in an institution in Qatar led international researchers to implement a new protocol to guide care procedures. This measure reduced the infection rate from 1.4/1,000 in 2011 to 0.014/1,000 in 2017, reaching a reduction of 99% ( $p < 0.001$ )<sup>(23)</sup>. The use of protocols and checklists assists in the usual procedures that optimizes time, standardizes records and continues the care provided to the patient<sup>(24)</sup>.

Consequently, it is understood that the hemodialysis procedure requires specific and high-quality care, with the support of tools to guide this care with the aim of providing safe, effective and high-quality patient care.

In Class 4, regarding international patient safety goals in hemodialysis clinics, it is noticed that the knowledge of nursing professionals about patient safety has a positive impact on this process and that the adoption of individual and collective behaviors contributes to satisfaction and

quality of the services provided. In line with these findings, Brazilian researchers identified that the main behaviors to promote patient safety are related to teaching, assistance and management. All strategies are interconnected and must be used together to improve the safety of patients with kidney disease<sup>(25)</sup>.

It was possible to notice that the understanding of most statements can be framed in aspects related to international patient safety goals<sup>(26)</sup>, focusing mainly on: correct patient identification, improvement in effective communication, improvement in the safety of high-risk prescribed medications, and reduction in the risk of associated infections. Among all the goals, there was a better fluidity in understanding aspects related to the correct identification of patients.

Professionals mentioned the strategies used by clinics to identify patients. The existence of patient identification badges, verbal identification and standardized plaques that are affixed to the hemodialysis systems during the session so that the patient could double check were mentioned. The use of identification is established in most hospitals, but it must be adapted in specialized care units such as hemodialysis clinics.

According to the professionals' perception, patient safety was considered important by everyone, and its implementation involves more than complying goals, but requires from the professional, in addition to knowledge of the sequence of safe healthcare practices that the dialysis process demands a systematic view of the work process and sensitivity to align the patient's needs with working conditions<sup>(27)</sup>.

Despite these findings, a study conducted in a reference hemodialysis clinic in the State of Ceará identified that only the patient's name was checked before replacement therapy, and the use of bracelets as a form of identification was not adopted. Such factors contribute to the occurrence of adverse events<sup>(28)</sup>.

According to a study conducted in Canada, the low staffing levels and high weekly workload of nursing team professionals are associated with non-compliance with safety standards in hemodialysis institutions, making it necessary for managers and politicians to be aware to such factors<sup>(29)</sup>.

As limitations, stands out the non-compliance with one of the COREQ items, the subject of which deals with the need to return the transcriptions of the speeches to the participants to confirm what was stated during the interviews, however the transcriptions were reviewed by three researchers.

## ■ CONCLUSION

Professionals perceive patient safety as compromised and challenging, since machines/equipment, supplies and

professional culture directly influence the safe operation of hemodialysis clinics. Participants also recognize the presence of failures in patient safety goals, mainly the lack of patient identification, which leads to capillary swaps, as well as medication administration errors.

The way professionals perceive the issue of patient safety and the main factors that contribute to the occurrence of adverse events, offers insights for healthcare service managers to seek the acquisition of more up-to-date machines and supplies, as well as conduct ongoing education and implement protocols to prevent errors related to safety goals, especially in the process of patient identification and medication administration.

Furthermore, it is suggested new studies in other Brazilian states, with professionals from the private system and the development of educational technologies aimed at training patients with chronic kidney disease on the subject of patient safety in hemodialysis clinics.

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■ **Authorship contribution:**

Project administration: Joselany Áfio Caetano.

Formal analysis: Joselany Áfio Caetano.

Conceptualization: Joselany Áfio Caetano.

Writing – original draft: Francisca Geisa Silvestre Rocha, Magda Milleyde de Sousa Lima, Cristina da Silva Fernandes.

Writing – review & editing: Livia Moreira Barros, Joselany Áfio Caetano.

Investigation: Magda Milleyde de Sousa Lima, Francisca Geisa Silvestre Rocha, Cristina da Silva Fernandes.

Methodology: Magda Milleyde de Sousa Lima, Francisca Geisa Silvestre Rocha, Cristina da Silva Fernandes.

Software: Nelson Miguel Galindo Neto.

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■ **Corresponding author:**

Cristina da Silva Fernandes

E-mail: cristina.sednanref@gmail.com

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