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THE NURSE'S INTERVENTION FACING THE PERSON WITH VASCULAR ACCESS FOR HEMODIALYSIS IN THE EMERGENCY SERVICE

A INTERVENÇÃO DO ENFERMEIRO FACE À PESSOA COM ACESSO VASCULAR PARA HEMODIÁLISE NO SERVIÇO DE URGÊNCIA

LA INTERVENCIÓN DE LA ENFERMERA ANTE LA PERSONA CON ACCESO VASCULAR PARA HEMODIÁLISIS EN EL SERVICIO DE URGENCIAS

Pedro Miguel Ramos Figueiras[1], Maria do Céu Marques[2,3].

[1]Nurse at the Nephrology Service, Hospital do Espírito Santo Évora – E.P.E.
[2]Nursing Department, University of Évora,
[3]Comprehensive Health Research Centre.

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ABSTRACT

Introduction: Chronic kidney disease is characterized by progressive and irreversible deterioration of kidney function, where there is a failure in the body's ability to maintain metabolic and hydroelectrolytic homeostasis. Hemodialysis emerges as one of the techniques for replacing kidney function where the filtration process takes place outside the body where the blood is pumped through a vascular access, causing a blood flow from the body to a dialyzer, which filters the blood by removing toxins. In order to carry out hemodialysis, it is essential to have an effective and safe vascular access, which assumes the objective of providing an efficient treatment, with the promotion of maximum comfort for the patient. Thus, the importance of the nurse in approaching the person with vascular access for hemodialysis in the emergency service is increasingly highlighted, ensuring their safety in their correct approach.

Objective: To identify the interventions of the nurse towards the Person with vascular access for hemodialysis in the emergency department.

Methodology: The methodology used was based on a systematic literature review based on the scoping review, which included the development of the review question, scientific database research, methodological analysis and interpretation of selected articles, presentation, discussion and synthesis of results. The PCC methodology was used to formulate the review question and select articles.

Results: After applying the defined methodology, a set of 10 articles was obtained, consisting of 9 quantitative studies and 1 qualitative study, which suggest the importance of the nurse's intervention at the level of prevention in the misuse of vascular access for hemodialysis with its proper identification; the need to carry out a physical examination to assess its patency, and the importance of the nurse's knowledge for the management of existing complications in the context of the emergency service, also directing the need to maintain the Person's self-care related to their vascular access throughout the process.

Conclusion: Vascular access for hemodialysis is considered as the lifeline of the person with chronic kidney disease. Improving knowledge about vascular accesses allows the emergency room nurse to understand the complications related to them. A timely action regarding its identification and appropriate intervention can make all the difference in its survival prognosis, revealing the importance of the nurse in the emergency service in the first contact.

Keywords: ; Chronic Kidney Disease; Emergency Service; Hemodialysis; Nursing; Vascular Access.

RESUMO

Introdução: A doença renal crónica é caracterizada pela deterioração progressiva e irreversível da função renal, onde ocorre uma falha na capacidade do organismo de manter a homeostasia metabólica e hidroeletrolítica. A hemodiálise surge como uma das técnicas de substituição da função renal onde o processo de filtração ocorre fora do organismo onde o sangue é bombeado por um acesso vascular, originando um fluxo sanguíneo do organismo para um dialisador, que filtra o sangue retirando as toxinas. Para a realização de hemodiálise é essencial a existência de um acesso vascular eficaz e seguro, o qual assume o objetivo de facultar um tratamento eficiente, com a promoção do máximo conforto para o doente. É cada vez mais notória a importância do enfermeiro na abordagem à Pessoa com acesso vascular para hemodiálise no serviço de urgência, garantindo a segurança da mesma na sua abordagem correta.

Objetivo: Identificar as intervenções do enfermeiro face à Pessoa com acesso vascular para hemodiálise no serviço de urgência.

Metodologia: A metodologia utilizada baseou-se numa revisão sistemática de literatura a partir da *scoping review*, que incluiu o desenvolvimento da questão de revisão, pesquisa em base de dados científicos, análise metodológica e interpretação dos artigos selecionados, apresentação, discussão e síntese dos resultados. Utilizou-se a metodologia PCC para a formulação da questão de revisão e seleção dos artigos.

Resultados: Obteve-se um conjunto de 10 artigos, constituído por 9 estudos quantitativos e 1 estudo qualitativo, que sugerem a importância da intervenção do enfermeiro ao nível da prevenção do uso indevido do acesso vascular para hemodiálise com a sua devida identificação; a necessidade da realização do exame físico ao mesmo para avaliação da sua patência, e a importância do conhecimento do enfermeiro para uma gestão das complicações existentes em contexto do serviço de urgência, direcionando também a necessidade de manter o autocuidado da Pessoa relacionado com o seu acesso vascular durante todo o processo.

Conclusão: O acesso vascular para hemodiálise é considerado como a linha de vida da Pessoa com doença renal crónica. A melhoria do conhecimento sobre acessos vasculares permite ao enfermeiro do serviço de urgência compreender as complicações relacionadas com os mesmos. Uma atuação atempada relativamente à sua identificação e intervenção apropriada, pode fazer toda a diferença no seu prognóstico de sobrevida, revelando a importância do enfermeiro no serviço de urgência no primeiro contacto.

Palavras-chave: Acesso Vascular; Enfermagem; Hemodiálise; Pessoa com Doença Renal Crónica; Serviço de Urgência.

RESUMEN

Introducción: La enfermedad renal crónica se caracteriza por un deterioro progresivo e irreversible de la función renal, donde existe una falla en la capacidad del organismo para mantener la homeostasis metabólica e hidroelectrolítica. La hemodiálisis surge como una de las técnicas de sustitución de la función renal donde el proceso de filtración se lleva a cabo fuera del cuerpo donde la sangre es bombeada a través de un acceso vascular, provocando un flujo de sangre del cuerpo a un dializador, el cual filtra la sangre eliminando las toxinas. Para realizar la hemodiálisis es fundamental contar con un acceso vascular eficaz y seguro, lo que asume el objetivo de brindar un tratamiento eficiente, con la promoción del máximo confort para el paciente. Así, se destaca cada vez más la importancia del enfermero en el abordaje de la persona con acceso vascular para hemodiálisis en el servicio de emergencia, velando por su seguridad en su correcto abordaje.

Objetivo: Identificar las intervenciones del enfermero hacia la Persona con acceso vascular para hemodiálisis en el servicio de urgencias.

Metodología: La metodología utilizada se basó en una revisión sistemática de literatura basada en la revisión de alcance, que incluyó el desarrollo de la pregunta de revisión, investigación de bases de datos científicas, análisis metodológico e interpretación de artículos seleccionados, presentación, discusión y síntesis de resultados. Se utilizó la metodología PCC para formular la pregunta de revisión y seleccionar los artículos.

Resultados: Luego de aplicar la metodología definida, se obtuvo un conjunto de 10 artículos, conformado por 9 estudios cuantitativos y 1 estudio cualitativo, que sugieren la importancia de la intervención del enfermero a nivel de prevención en el mal uso del acceso vascular para hemodiálisis con su debida identificación; la necesidad de realizar un examen físico para evaluar su permeabilidad, y la importancia del conocimiento del enfermero para el manejo de las complicaciones existentes en el contexto del servicio de emergencia, orientando también la necesidad de mantener el autocuidado de la Persona relacionado con su acceso vascular durante todo el proceso.

Conclusión: El acceso vascular para hemodiálisis es considerado como el salvavidas de la persona con enfermedad renal crónica. Mejorar el conocimiento sobre los accesos vasculares permite a la enfermera de urgencias comprender las complicaciones relacionadas con ellos. Una actuación oportuna en cuanto a su identificación e intervención adecuada puede marcar la diferencia en su pronóstico de supervivencia, revelando la importancia de la enfermera en el servicio de urgencias en el primer contacto.

Descriptores: Acceso Vascular; Enfermedad Renal Crónica; Enfermería; Hemodiálisis; Servicio de Emergencia.

INTRODUCTION

Currently, we live in a paradigm of demographic and epidemiological transition characterized by more years of average life expectancy, however, there's the increase in the incidence of chronic diseases. In this context, chronic kidney disease [CKD] appears, and when it is in the most advanced level, it requires replacement treatment by performing hemodialysis [HD], peritoneal dialysis [PD] or kidney transplantation. At European level, Portugal has one of the highest rates of incidence and prevalence of CKD under renal function replacement technique, characterized by the predominance of HD – 94% compared to PD – 6%[1].

According to the Report of the National Network of Hospital Specialty and Referral of Nephrology, there are several factors that can justify the high prevalence values of CKD in substitution technique, such as the continuous improvement in the provision of health care, the existence of resources in attending to patients with renal failure reflecting the improvement in survival, the increase in life expectancy and accessibility to dialysis, the high prevalence of diabetes, hypertension and cardiovascular diseases that are directly related to CKD[2].

CKD is characterized by progressive and irreversible deterioration of kidney function, when there is a failure in the body's ability to maintain metabolic and hydroelectrolytic homeostasis, resulting in uremia due to urea retention and accumulation of nitrogenous products in the bloodstream. The kidney's filtration capacity reaches approximately 180 liters of plasma per day, corresponding to a filtration fraction of approximately 15% of the renal plasma flow and 20% of the cardiac output. This normal glomerular fraction is equivalent to a value between 90 and 140 ml/min, which is the sum of the filtration of each glomerulus in the adult kidney, which contains an average of one million glomeruli. CKD is considered when there is a glomerular filtration rate [GFR] below 60 ml/min/1.73 m^2, accompanied by structural alterations in the renal tissue and/or impaired renal function for a period longer than 3 months with inherent implications for health[3].

Hemodialysis emerges as a technique to replace kidney function where the filtration process takes place outside the body. The blood is pumped through a vascular access, resulting in a blood flow from the body to the dialyzer made up of a semipermeable membrane that filters the blood, removing toxins. It is characterized by the existence of three essential physical processes to ensure its effectiveness; diffusion, carried out according to the concentration gradient in which the particles move from the most concentrated medium to the lowest concentration and the diffusion speed that always varies depending on the size of the different molecules; ultrafiltration, which consists of extracting liquids, namely water through

a hydrostatic pressure gradient; and convection, which allows the extraction of particles of medium and high molecular weight by the hydrostatic pressure of ultrafiltration, allowing them to cross the dialyzer membrane in the concentration gradient from blood to dialysate. The latter consists of sodium bicarbonate, sodium chloride, acid concentrate and ultrapure deionized water, being a primordial element for HD[4].

In order to perform HD, it is essential to have an effective and safe vascular access. The main purpose of vascular access for hemodialysis [VAH] is to provide efficient treatment, promoting maximum comfort for the patient. The acquisition of a VAH that is easy to build, practical to use, durable, with a low rate of complications and resistant to infection has been one of the great challenges for health professionals in the field of nephrology and vascular surgery[5].

The choice of the type of vascular access always depends on the characteristics of the Person, such as anatomy and vascular heritage, personal history and individual needs, generally requiring a prior evaluation to determine the most appropriate type of vascular access. Thus, the "importance of vascular access in providing care to people in need of replacement therapy for renal function becomes evident, which is recognized by all health professionals and is a determining factor in the success of care and the effectiveness of treatment"[5].

There are three main types of VAH:

- Arteriovenous fistula [AVF], a native arteriovenous access, is considered the preferred option whenever possible. It involves using the patient's own blood vessels through a surgical intervention, performing an anastomosis between an artery and a vein, usually in the non-dominant upper limb. It can generally be used to treat Hd within a period of 6 to 12 weeks after its creation, and in special circumstances it can be used within 4 weeks[6].

- Arteriovenous graft [AVG] is a synthetic tube that connects an artery to a vein through surgery. The material used is inert and normally well tolerated by the person, although there is a higher probability of thrombosis and infection compared to AVG. They can be configured in a straight line or in a loop, implanted in the subcutaneous tissue in the anterior region of the forearm, upper arm or thigh, or even in the chest wall as a last resort. They can be used for hemodialysis between two and three weeks after implantation[6].

- Central venous catheter [CVC] consists of using a silicone catheter, which is inserted into a large-caliber vein, namely the right internal jugular vein or right femoral vein. They can be considered as temporary or long-term accesses, depending on the type of CVC that is implanted, always considering the current health situation of the patient. As it is the only vascular access that can be used immediately after its implantation, it is generally considered in an emergency with an indication for immediate dialysis treatment. On the other hand, it causes more discomfort to the patient and is associated with a higher risk of infection and complications[5].

Vascular access becomes fundamental for the performance of hemodialysis, and it provides the necessary effectiveness of the treatment, allowing the elimination of toxins from the body, ensuring adequate blood flow; the patient's safety, with the reduction of the risk of complications during long-term hemodialysis with a safe and lasting vascular access; and quality of life through performing HD with greater comfort and less interference in the daily routine. A well-established vascular access reduces the need for multiple punctures or invasive procedures, contributing to improved quality of life.

Complications related to vascular access are the main cause of morbidity, with a high percentage of hospitalizations in Portuguese hospitals. The nursing team must be attentive to the identification of signs and symptoms that may suggest problems with access, requiring early identification, recording and effective communication between the different elements of the multidisciplinary teams[5]. In this sense, the importance of nurses' knowledge about VAH is emphasized in order to guarantee the safety and well-being of the person with CKD, recognizing their real or potential complications, in order to also be able to work with the patient on the adoption of behaviors that promote self-care[5]. The educational practice for the person with CKD in a hemodialysis program demonstrates considerable importance, namely regarding self-care with vascular accesses, because with the performance of simple actions acquired through the knowledge of the nurse, it is possible to maintain the functioning vascular access as well as the management of possible complications[7].

Thus, the importance of the nurse in approaching the person with vascular access for hemodialysis in the Emergency Room [ER] is increasingly highlighted, reconsidering the need to perform constant care for the evaluation of the effectiveness of the access and prevention of complications, guaranteeing its safety, in addition to guiding the person towards self-care related to the maintenance of vascular access[3].

Aim

To identify the interventions of the nurse towards the person with vascular access for hemodialysis in the emergency service.

METHODS

Ethical aspects

No opinion was requested from the Ethics Committee because it is a secondary study. In the formulation of the review question, there was a concern with respect for the principles of clarity, objectivity and precision, so that the results obtained assume a growing importance in the body of nursing knowledge regarding the most appropriate interventions for the person with CKD and with vascular access for hemodialysis, in the context of an emergency service. The analysis of the data extracted from the selected studies considered the principle of respect for the results obtained and their researchers. The referencing of the authors complies with the norms of good academic and scientific practices.

Type of study

In the context of nursing, research assumes extreme importance, as the best scientific evidence is needed for decision-making, especially in terms of identifying people's needs and prescribing nursing interventions[8].

The application of the research methodology follows a study design based on a scoping review which is based on a "type of synthesis of evidence available on a given topic, field, concept or issue, often independently of the source, within or across particular contexts"[9].

In preparing the scoping review, the following methodological procedures were considered:

- Formulation of the review question;
- Definition of inclusion criteria for studies;
- Location of records through search;
- Selection of studies, articles, documents for inclusion,
- Assessment of the methodological quality of studies, articles, documents;
- Data extraction;
- Analysis and synthesis of results.

Methodological procedures

The elaboration of the review question is considered the first step in the process, through which the structuring of the adequate methodology is developed. In order to start the methodological procedure, the PCC method – Population, Concept, Context, was recommended for the construction of the review question, having been defined:

P – Chronic kidney disease; C – Vascular access to Hd; C – Emergency service.

Thus, the following review question was elaborated: What is the nurse's intervention towards the person with chronic kidney disease and vascular access for hemodialysis in the emergency department?

The previously elaborated question must gather a set of relevant characteristics so that it can be considered a good research question. These characteristics are known by the acronym FINER"[10]. When applied to the defined question, it was found:

- F (feasible) – has human resources, namely the nursing teams to apply the evidence found and the capacity for future collaboration with various hospital services, increasing the synergy between the ER and the nephrology service;
- I (Interesting) – perceive changes and improvements in nursing interventions applied in the approach to vascular access as an improvement in the quality and safety of care;
- N (novelty) – there are few studies carried out at national level and the lack of a systematized approach to vascular access in the ER context;
- E (ethics) – proposes benefits for users, professionals and the community through improved safety and training for self-care, respecting the individuality of the person and ethical principles;
- R (relevant) – due to the existence of few studies in the context of ER, there is always a need for future research on the subject.

The present study was carried out through a search in the EBSCOhost search engine, on the Ordem dos Enfermeiros [OE] website, with the definition of descriptors previously validated in Mesh/Desh and inclusion and exclusion criteria for the selection of articles. The descriptors "Chronic Kidney Disease [CKD]", "vascular access", "hemodialysis" and "nursing" were used, which were organized according to the Boolean operators for the search: Chronic Kidney Disease OR hemodialysis AND vascular access AND nursing. The article search was performed on June 9, 2023, in the EBSCOhost search engine with the English language, including the databases CINAHL Complete, MEDLINE Complete, Nursing & Allied Health

Collection: Comprehensive, Cochrane Central Register of Controlled Trials, Cochrane Database of Systematic Reviews, Cochrane Methodology Register, Library Information Science & Technology Abstracts, MedicLatina and Cochrane Clinical Answers.

From the survey carried out, a total of 718 articles were identified, of which 568 were excluded for having a publication date prior to 2018. Then, of the 150 articles, 93 articles were again excluded for not having full text, leaving 57 articles. Of these, 7 articles were excluded after applying the inclusion criteria for analysis by specialists. After reading the title and abstract of the 50 articles and evaluating the relevance of the topic, only 10 articles were selected for evaluation by applying the level of evidence and critical evaluation checklist of the quality criteria defined by the Joanna Briggs Institute [JBI] , for later data extraction and analysis. The research steps are shown in Figure 1↗.

RESULTS

In order to respond to the defined review question, the content and methodological analysis of the selected articles were read. The characteristics and main results obtained are summarized in Chart 1↗.

DISCUSSION

To ensure the safety of patients with CKD with vascular access for hemodialysis in the emergency department, there is a need to intervene in the area of prevention, monitoring and resolution of complications directly related to vascular access.

The VAH is considered the lifeline of the person with CKD, thus revealing its extreme importance in maintaining its patency to carry out effective dialysis treatment. The use of an identification bracelet on the peripheral vascular access limb is considered highly useful in preventing complications such as reducing potential damage or even mutilating it, which is normally associated with its unknown handling[11], or other indirect interventions such as administration of intravenous therapy or assessment of blood pressure in the vascular access limb[7]. The wristband allows correct identification and alerts to the existence of an AVF or AVG[11]. For an effective implementation of this type of intervention, it is necessary to focus on training and awareness programs aimed at health professionals, namely nurses, with the adoption of good practices, as well as the inclusion of the person with VAH in this process through education for self-care with its vascular access[11].

For the optimization of VAH monitoring, the importance of nurses' knowledge about the various types of vascular access currently existing becomes imperative. The articles by Rocha *et al* (2021), Theisen *et al* (2022), Sanchez *et al* (2021) and Fitzpatrick & Dunlap (2022) [7,3,12,13] address this same need, noting the anatomical and hemodynamic differences of AVF, AVG and central venous catheter for hemodialysis [CVC-Hd], with AVF considered as the preferred VAH due to its native nature, the lower risk of complications and its longevity, and its construction should be valued[13]. Knowledge about each VAH allows the nurse to carry out a faster approach in the surveillance of the same through the physical examination, being considered an essential process for the safety and quality of life of the patient[7,3,12]. This is based on a simple, easy and fast execution process, allowing to verify the functionality of the peripheral vascular access through SHF (Seeing, Listening, Feeling). Seeing signs of the presence of bleeding, signs of infection and coloration of the extremities; listening to the murmur using the stethoscope; feeling the thrill, temperature and sensitivity of the extremities and skin temperature[7,12]. The presence of thrill and murmur indicate the presence of patency of the access, indicating that it is in operation. The study by Theisen *et al* (2022)[3] reveals the importance of considering the existence of complications related to the AVF/AVG during the physical examination. This exam assumes relevance in nursing practice due to its applicability and inherent knowledge, in line with Patrícia Benner's theory of clinical wisdom in acute and critical health care, which focuses on the importance of recognizing the clinical situation through the articulation of the clinical reasoning and clinical interventions, always based on the broad acquisition of knowledge and its application in clinical practice[14]. Thus, the correct performance of the physical examination of the peripheral vascular access for hemodialysis requires a base of specific knowledge in VAH, associated with the development of clinical experience, which can be integrated into the habits of thought of understanding and clinical investigation defined by Benner and in the field of practice of nursing related to the promotion of the patient's safety through quality monitoring, prevention and risk management, where clinical judgment and experience are considered fundamental elements for the prevention, intervention and correction of failures[14].

Complications related to peripheral vascular accesses can be considered intrinsic to the access, such as venous stenosis, access thrombosis, steal syndrome, aneurysms, hemorrhage and hematoma, characterized by dynamic circulatory changes that can lead to structural changes that affect the access of various forms, from the mildest, such as controlled aneurysms, to the most serious, such as hematomas on the posterior wall of the arterialized vein or hemorrhage due to aneurysm rupture, which may lead to access failure or even imminent death[7,3,12]. Thus, the importance of surveillance with physical examination, notification of identified alterations and complications and articulation with the specialty area

of nephrology is emphasized. To this end, studies suggest the implementation of protocols suited to the context of each health unit based on the most recent guidelines that guide clinical practice, in order to standardize interventions. A good example are the guidelines recommended by the Kidney Disease Outcomes Quality Intiative[13].

Infection stands out as the most frequent complication related to VAH, with more negative implications in terms of multimorbidity, and in order to carry out effective interventions, the need for physical examination and early identification of inflammatory signs remains. It is important to highlight the effectiveness of infection management and prevention programs directed at VAH, with proven benefits in reducing complications related to hemodialysis through safe nursing interventions for VAH[15].

The CVC-HD is considered the type of vascular access with the highest incidence of infection compared to peripheral vascular accesses, which is related to the increase in inflammatory markers, namely C-reactive protein, albumin and ferritin and micro-inflammation markers characterized by the increase of specific subtypes of monocytes in the circulation, potentiating the inflammatory response to infection and consequent increase in the mortality rate[16]. Therefore, it is imperative to implement bloodstream infection prevention programs related to CVC-HD based on the latest scientific evidence with a strong training component at nursing level in order to provide a reduction in events that enhance infection[17]. Infection prevention programs aimed at the CVC-HD can be designed based on the norm 022/2015 updated on 08/29/2022 by the Directorate General for Health [DGH] – Bundle of Interventions for the Prevention of Infection Related to the Central Vascular Catheter, which aims to standardize specific interventions in order to prevent infection associated with bloodstream health care according to the available evidence[18]. It should be noted that knowledge about the complications related to the CVC-HD are not restricted to the infection alone, there may be others associated with the manipulation of the catheter and the care with its maintenance. The study by Bastos *et al* (2022)[19] highlights the need for a strict aseptic technique when handling it, checking the permeability of the branches, suggesting NANDA nursing diagnoses and interventions related to infection and vascular trauma in order to foster the nursing process[19].

The use of VAH in an emergency context was not directly documented in the selected articles, since there is always a need to preserve it for the proper performance of the dialysis treatment. In a lifesaving situation, its use always depends on the nurse's level of knowledge, the type of vascular access and the person's hemodynamic state, always considering the possibility of using peripheral venous access. However, the use of the CVC-HD in an emergency can be considered with the adoption of correct measures in maintenance and handling, as well as adequate training for health professionals in direct contact with it.

With the analysis of the included articles, it was verified the importance of a transversal element to most of them. The self-care. It is referred to as a process of empowerment and learning of the person facing their illness in order to be able to manage and improve their physical, mental and emotional well-being. In this context, nurses enter the process through education, guidance and help in recognizing care related to vascular access[7,3,12,13]. Self-care--oriented education is perceived by nurses as a fundamental element in the approach to the chronic renal patient with VAH, emerging as a tool that allows the development of self--knowledge and facilitating self-care skills. For this, it is necessary to build an empathetic relationship between Nurse and Person, allowing them to be a facilitator of the continuity of self-care, nursing care based on educational and supportive processes, and a multidisciplinary team for the development of strategies for maintaining health and well-being[20]. Self-care emerges in nursing practice, associated with the standards of quality of care emanating from the OE as a descriptive statement where the nurse maximizes well-being and complements the life activities to which there is dependence[21].

Contributions to nursing

Considering the findings of the review carried out, the need to frame them in the implications for clinical nursing practice in the ER emerges. Physical examination of the peripheral vascular access for hemodialysis should be considered a routine intervention as an implementation proposal. It does not necessarily imply an increase in the workflow of nurses in the ER due to its simplicity and speed of implementation, allowing to assess the patency of the access, identify possible complications, with the articulation of the ER health teams and nephrology. The identification of peripheral vascular access through a wristband in the ER is an implementation proposal also to be considered. It may be carried out upon admission of the Person when carrying out the screening with the placement of the white wristband duly identified with the type of peripheral vascular access on the member. This process follows a basic flowchart, combined with specific training for the ER nursing team in order to promote their adherence to the process, which is considered an important strategy for the prevention of incidents and complications. For the use of the CVC-HD in an emergency context, the importance of designing an action protocol related to the maintenance of the CVC-HD is highlighted, which describes the nursing interventions necessary for the correct maintenance and handling, asepsis care, heparinization and protection of catheter branches and insertion site dressing. This performance protocol and its dissemination in the context of in-service training enables the acquisition of the necessary knowledge for the safe use of the CVC-HD in the ER.

Study limitations

The present scoping review presented some limitations related to the methodological quality of some articles selected after applying the critical analysis checklists provided by the JBI[22]. The study by Theisen *et al* (2022)[3], despite providing good results, its review methodology is not clear, lacking in its description important elements such as the explicit research question, the evaluation criteria of the studies selected for the review, and the methods for the combination of studies is not described although a narrative synthesis was used to present the results. The study by Fitzpatrick & Dunlap (2022)[13] also presented a lower critical analysis compared to the others. It is considered a more complex reading article for its framing at the level of evidence. It establishes an idea about the research question but does not explicitly present it as well as the inclusion criteria for formulating the question. The critical evaluation criteria and the probability of publication bias are considered confusing. The study by Sturdivant & Johnson (2019)[11], classified as a quasi-experimental study, does not have a control group, limiting the certainty of the outcome of the intervention. It specifies in a very summarized way the multiple pre and post intervention assessments making it confusing, as well as the evaluation of the results of the participants which is not specified. Statistical analysis is performed, but the results are not presented in a logical and appropriate way. The remaining articles of quantitative studies showed better JBI critical analysis results, although none obtained the maximum score as specified in Table 1↗. It should be noted that a qualitative study was included with an approach focused essentially on self-care[19]. A study with good methodological quality in which there was only confusion in the description of the investigator's influence on the investigation carried out and vice versa, there seems to be an idea about this point, but without much specification.

There is also a growing need to carry out future primary studies on the subject of people with VAH inserted in the context of an emergency service, in order to be able to carry out a more realistic approach, with the verification of the implications for clinical practice described in this article and its pertinence, in order to truly guarantee the security of the patient.

FINAL CONSIDERATIONS

Vascular access for hemodialysis is considered the lifeline of the person with chronic kidney disease. Thus, in education for patient's and professionals' self-care, maximum preservation is valued, and without a functioning vascular access there is no possible dialysis treatment, seriously compromising life.

To maintain access patency, it is important to update the knowledge of health professionals, particularly nurses, about the different types of vascular accesses; arteriovenous fistula, arteriovenous graft and central venous catheter for hemodialysis, their anatomy and physiology, the advantages and disadvantages inherent to each one, always considering that there is no perfect access and that it must be adequate to the needs and characteristics of each patient. This knowledge is fundamental for carrying out the best possible approach in the context of the emergency service with its specific characteristics.

It also highlights the relevance in clinical practice of evaluating the peripheral vascular access through physical examination, allowing an easy, quick and safe approach to the access, in the search for signs of infection or poor perfusion in the limb, as well as the presence of thrill and murmur, with objective results that allow the verification of patency and the early detection of possible complications.

The identification of the vascular access member through the use of a paper wristband is considered extremely important in the context of the emergency service, being a preponderant factor for promoting the person's safety, with the prevention of adverse events related to the peripheral vascular access when carrying out other interventions.

Improving knowledge about vascular accesses allows the emergency service nurse to understand the complications related to them, from the anatomical and hemodynamic complications intrinsic to the access, those that are instigated by the handling of the access and infection, the latter being directly related to the increase of multimorbidity. A timely action regarding the identification and intervention can make all the difference in your prognosis, revealing the importance of the nurse in the emergency service in the first contact.

The use of vascular access for hemodialysis in an emergency context must be seriously considered, always considering the experience and knowledge of the nurse about vascular access for hemodialysis, the hemodynamic state of the person in a critical situation and the extreme need for its use, always considering other available venous access option. In the event of the existence of CVC-HD, it can be used as an emergency access allowing more effective results in the administration of therapy, always considering the need for its correct main-

tenance and handling, implying constant training of the team and the implementation of a protocol action targeting the CVC-HD.

The person's self-care is always associated with the need and importance of the nurse in the implementation and follow-up process, requiring constant updating of the body of knowledge.

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Authors
Pedro Miguel Ramos Figueiras
https://orcid.org/0009-0003-2758-5483
Maria do Céu Marques
https://orcid.org/0000-0003-2658-3550

Corresponding Author/Autor Correspondente:
Pedro Figueiras – Hospital do Espírito Santo Évora – E.P.E, Évora, Portugal.
pedromiguel.figueiras@gmail.com

Authors' contributions/Contributos dos autores
PF: Coordenação do estudo, desenho do estudo, recolha, armazenamento e análise de dados, revisão e discussão dos resultados.
MCM: Desenho do estudo, análise de dados, revisão e discussão dos resultados.
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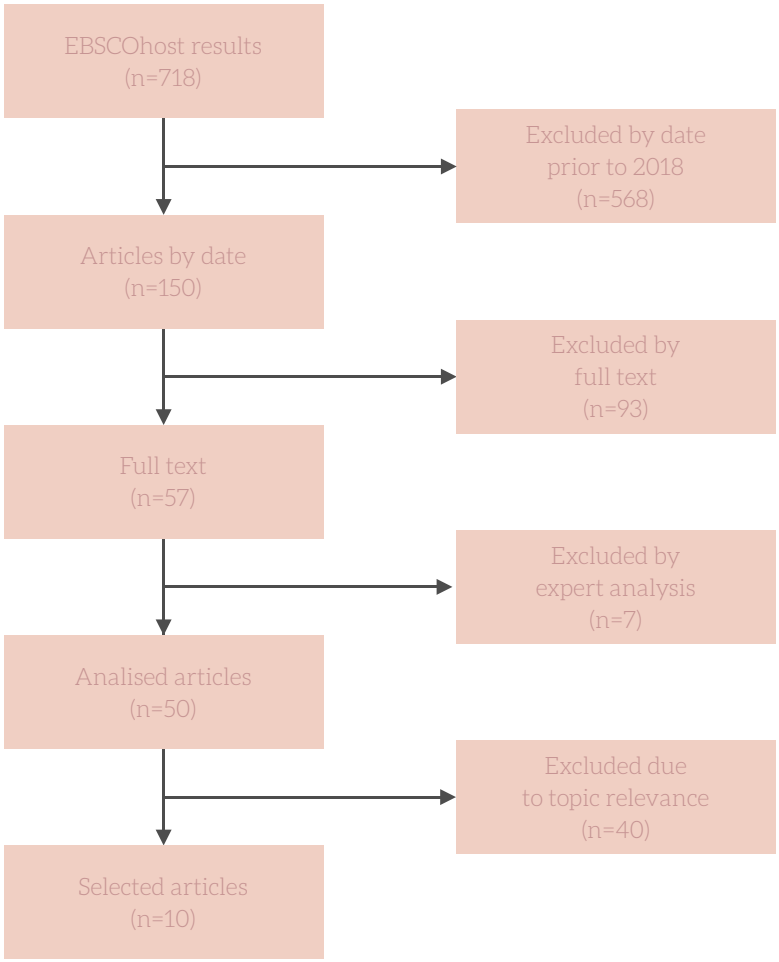

Figure 1 – PRISMA 2020 flowchart for presenting the article selection process.

Chart 1 – Identification of studies and main results.

Author/Year	Type of study/ JBI Analysis	Aims	Results
Araújo Rocha, G; Oliveira, A; Rodrigues, V; Moura, A; Sousa, E; Machado, A. (2021)[7]	Systematic review of descriptive studies. Evidence level: 4.A Critical analysis: 82%	To analyze the scientific evidence about care for vascular accesses used in hemodialysis to create educational content aimed at patient self-care.	• There is a need for correct user education regarding vascular access care for the prevention of complications; • The CVC requires specific care regarding its handling in order to prevent infection, with the need for early recognition of inflammatory signs; • The importance of rapid assessment of the AVF and AVG, namely in the presence of thrills and murmurs, as well as the recognition of inflammatory signs or bleeding; • Observe the situations in which the AVF/AVG should not be used, such as administration of intravenous medication, blood pressure assessment, blood collection; • The nurse must train the patient through guidance in recognizing the necessary care with vascular access.
Theisen, J; Breitsameter, R; Breitsameter, G. (2022)[3]	Integrative literature review. Evidence level: 3.B Critical analysis: 55%	To identify scientific evidence about nursing care with AVF and AVG. To establish the inherent or specific care that helps in the maintenance and reduction of risks for the user.	• The importance of nurses in health education and promotion of self-care for people with vascular access; • Knowledge of anatomy and physiology of the AVF in order to acquire skills in assessing it; • Need to consider the periods of maturation of the AVF (at least 120 days); • Consider during the assessment of vascular access possible complications (stenosis, thrombosis, ischemia, edema, aneurysm, infection, hemorrhage), factors that compromise safety and quality of life; • The importance of self-care with the revalidation of knowledge.

Chart 1 – Identification of studies and main results.

Author/Year	Type of study/ JBI Analysis	Aims	Results
Bastos, C; Cordoba, L; Silva, E. (2022)[19]	Systematic review of expert opinion. Evidence level: 5.A Critical analysis: 64%	To investigate complications related to the central venous catheter. To investigate good practices for promoting user safety.	• Factors related to complications in central venous access identified: hypertension, diabetes, hypoalbuminemia, infection. • Existence of characteristics that increase the risk of infection with CVC: diabetes, malnutrition, obesity, bad hygiene habits, old age. • CVCs implanted in the internal jugular vein show lower infection rates than those implanted in the femoral vein; • The importance of CVC maintenance and handling care; • NANDA diagnostics: Risk of infection/risk control – infectious process/vascular device care; Risk of vascular trauma/HD access/maintenance of vascular access; • Need for strict aseptic technique in the handling and maintenance of the CVC; • Assessment of CVC permeability before use, with the need to report CVC mechanical problems.
Sánchez, I; Leon, B; Pérez, D; Fernandez, M; González, F. (2021)[12]	Case study. Evidence level: 4.D Critical analysis: 88%	To know the correct procedure regarding the use of vascular access for hemodialysis by nurses as well as self-care by the patient.	• The importance of having professionals (nurses) with specialized knowledge regarding vascular accesses for HD; • Complete examination of the AVF for Hd (observation + palpation + auscultation) is essential, quick to perform and effective; • Self-care is essential for maintaining AVF survival, monitoring for signs of inflammation, hemorrhage, risk of aneurysm rupture, signs of poor perfusion of the ends of the AVF limb.

Chart 1 – Identification of studies and main results.

Author/Year	Type of study/ JBI Analysis	Aims	Results
Fitzpatrick, S; Dunlap, E. (2022)[13]	Systematic review of expert opinion. Evidence level: 5.A Critical analysis: 55%	To provide a literature review on the types of access for hemodialysis and what are the best indications for promoting good practices with them.	• The development of guidelines for approaching the various types of vascular accesses for HD developed by the National Kidney Foundation, namely the KDOQI (Kidney disease outcomes Quality Initiative) allows a holistic approach regarding vascular access; • Valuing the creation of an AVF as early as possible in order to avoid the implantation of a CVC for HD due to complications associated with the procedure and follow-up. • Base the practice on patient education with vascular access to HD for self-care; • Need for continuous training of nurses about best practices for a correct approach to vascular access.
Wan, H; Tang, D. (2022)[15]	Observational cohort study with a control group. Evidence level: 3.C Critical analysis: 64%	To explore the validity of applying a nursing intervention protocol related to the management and prevention of vascular access infection in patients on a regular hemodialysis program.	• Applied a risk management program associated with vascular accesses for HD with defined evaluation indicators (effect of nursing interventions, mental health status, incidence of infection in vascular access) each indicator with its own evaluation scale; • Nursing interventions are directly related to patient safety and may even affect vascular access survival time; • The implementation of the risk management program associated with VAH becomes of high importance, allowing the reduction of complications related to hemodialysis, improving the patient's quality of life and reducing adverse effects on vascular access. • After the intervention of the risk management program in the target group, there was an improvement in terms of analytical results (biochemicals), nutritional status, anxiety, depression and the incidence of infection in the vascular access compared to the group of control. • The need for nurses to acquire specific knowledge in order to acquire skills for the best approach to vascular access for HD.

Chart 1 – Identification of studies and main results.

Author/Year	Type of study/ JBI Analysis	Aims	Results
Conwell, P; Ghidini, J; Perazella, M; Aniskiewicz, M; DeVaux, L; Giullian, J. (2019)[17]	Pre-post test observational design study. Evidence level: 2.D Critical analysis: 67%	To study the results from the implementation of a training program for the prevention of bloodstream infection applied to patients with a central venous catheter for hemodialysis.	• Applied a training program based on the best evidence related to CVC care, focusing on electronic recording and improving health communication; • There was a significant reduction in events that enhance bloodstream infection directly related to CVC maintenance care; • The bloodstream infection prevention program was strongly adopted by nurses, achieving a very low bloodstream infection rate due to CVC-related care.
Sturdivant, T; Johnson, P. (2019)[11]	Pre-post test observational design study. Evidence level: 2.D Critical analysis: 56%	To know the importance of implementing the vascular access identification bracelet. To evaluate the adherence of nurses after the implementation of a training program on the protection and identification of vascular access.	• The use of identification bracelet for vascular access reveals an important utility, in terms of reducing potential damage and mutilation of the same. • It is currently considered a strategy in the field of prevention related to vascular access, which is being increasingly adopted nationally in the US and Canada with the implementation of associated standards; • It is necessary to invest in training health teams about the implementation of bracelet; • Nurses' adherence to this process does not necessarily imply an increase in their workload. It is considered a simple intervention, but one that can have a very positive impact in terms of preventing adverse effects.
Montero, R; López, V; Pavón, F; Munoz, A; Saldana, M; Sanchez, A; Garcia, P. (2021)[16]	Observational cohort study with a control group. Evidence level: 3.C Critical analysis: 64%	To analyze the impact of tunneled central venous catheter for hemodialysis on the inflammatory process and mortality in hemodialysis patients.	• Patients with CVC for Hd have higher parameters for measuring inflammation and micro-inflammation compared to patients with AVF; • The study data reveal that the inflammatory parameters are not directly related to the bloodstream infection from the CVC, but interfere in the inflammatory response to the infection; • There is a relationship between mortality and the increase in inflammatory parameters in patients with CVC. There was a higher mortality rate in patients with CVC compared to AVF.

Chart 1 – Identification of studies and main results.

Author/Year	Type of study/ JBI Analysis	Aims	Results
Romero, J; Quintana, L; Martinez, C. (2020)[20]	Single qualitative study. Evidence level: 3 Critical analysis: 90%	To describe the elements that guide self-care education for patients with vascular access undergoing hemodialysis treatment from a nursing perspective.	• Three fields of action were identified that guide education for self-care: nursing care as an educational support system for self-care, the empathic nurse-patient relationship as a facilitating element for the continuity of self-care, and multidisciplinary teamwork as a strategy fundamental to maintaining health and well-being; • The previously described fields of action have direct application to the patient with vascular access for HD; • Education is an essential tool allowing the improvement and increase of the patient's adherence to the therapeutic regime, facilitating its continuous adaptation; • Education for self-care can generate major transformations in the approach to the chronic kidney patient, being essential to have continuity of the process.

Table 1 – Methodological evaluation of selected articles according to the JBI checklist.

Author/Year	JBI Critical Assessment Checklist	JBI checklist evaluation parameters											Result
		P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11	
Araújo Rocha, G; Oliveira, A; Rodrigues, V; Moura, A; Sousa, E; Machado, A. (2021)[7]	Checklist for systematic reviews and research syntheses.	Y	Y	Y	Y	Y	C	Y	Y	N	Y	Y	82%
Theisen, J; Breitsameter, R; Breitsameter, G. (2022)[3]	Checklist for systematic reviews and research syntheses.	N	Y	Y	Y	C	C	Y	N	C	Y	Y	55%
Bastos, C; Cordoba, L; Silva, E. (2022)[19]	Checklist for systematic reviews and research syntheses.	Y	Y	Y	Y	C	C	Y	Y	N	Y	Y	64%
Sánchez, I; Leon, B; Pérez, D; Fernandez, M; González, F. (2021)[12]	Checklist for case reports.	Y	Y	Y	N	Y	Y	Y	Y	–	–	–	88%
Fitzpatrick, S; Dunlap, E. (2022)[13]	Checklist for systematic reviews and research syntheses.	C	C	Y	Y	C	Y	N	Y	C	Y	Y	55%
Wan, H; Tang, D. (2022)[15]	Checklist for cohort studies.	Y	Y	Y	N	N	Y	Y	Y	C	C	Y	64%
Conwell, P; Ghidini, J; Perazella, M; Aniskiewicz, M; DeVaux, L; Giullian, J. (2019)[17]	Checklist for quasi-experimental studies.	Y	Y	Y	N	Y	C	Y	C	Y	–	–	67%
Sturdivant, T; Johnson, P. (2019)[11]	Checklist for quasi-experimental studies.	Y	Y	Y	N	C	Y	C	Y	C	–	–	56%
Montero, R; López, V; Pavón, F; Munoz, A; Saldana, M; Sanchez, A; Garcia, P. (2021)[16]	Checklist for cohort studies.	Y	Y	Y	C	C	Y	Y	Y	C	C	Y	64%
Romero, J; Quintana, L; Martinez, C. (2020)[20]	Checklist for qualitative research.	Y	Y	Y	Y	Y	Y	C	Y	Y	Y	–	90%

Subtitle: Y – Yes; N – No; C – Confusing.