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REVIEW ARTICLE

Risk factors for cardiovascular complications in patients undergoing hemodialysis treatment

Factores de riesgo de complicaciones cardiovasculares en pacientes en tratamiento de hemodiálisis

Fatores de risco para complicações cardiovasculares em pacientes em tratamento hemodialítico

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Abstract

The aim was to evaluate in the scientific literature the main risk factors associated with cardiovascular complications in patients undergoing hemodialysis. This is an integrative literature review of the qualitative type. As a result, the articles used as a reference for the search result were extracted from the SciELO, LILACS, BDENF and MEDLINE databases, with a time frame from 2015 to 2019 and arranged in full. A total of 27,111 articles were initially found, after thorough reading, 16 articles were selected to compose the project. The main risk factors for cardiovascular complications in chronic kidney patients evidenced were systemic arterial hypertension, dyslipidemia, diabetes mellitus, anemia, oxidative stress, hypotension, smoking and hyperphosphatemia. It is concluded that in Brazil, there are few researches related to prevention for the development of cardiovascular diseases in patients on hemodialysis therapy, which is a relevant topic due to the increase in patients diagnosed with Kidney Failure.

Descriptors: Renal Insufficiency; Hemodialysis; Cardiovascular Diseases; Hypertension; Diabetes Mellitus.

Resumén

El objetivo fue evaluar en la literatura científica los principales factores de riesgo asociados a las complicaciones cardiovasculares en pacientes en hemodiálisis. Se trata de una revisión integradora de la literatura de tipo cualitativo. Como resultado, los artículos utilizados como referencia para el resultado de la búsqueda fueron extraídos de las bases de datos SciELO, LILACS, BDENF y MEDLINE, con un marco temporal de 2015 a 2019 y ordenados en su totalidad. Inicialmente se encontraron un total de 27.111 artículos, luego de una lectura minuciosa, se seleccionaron 16 artículos para componer el proyecto. Los principales factores de riesgo de complicaciones cardiovasculares en pacientes renales crónicos evidenciados fueron hipertensión arterial sistémica, dislipidemia, diabetes mellitus, anemia, estrés oxidativo, hipotensión, tabaquismo e hiperfosfatemia. Se concluye que en Brasil existen pocas investigaciones relacionadas con la prevención para el desarrollo de enfermedades cardiovasculares en pacientes en terapia de hemodiálisis, tema relevante por el aumento de pacientes diagnosticados de insuficiencia renal.

Descriptores: Insuficiencia Renal; Hemodiálisis; Enfermedades Cardiovasculares; Hipertensión; Diabetes Mellitus.

Resumo

Objetivou-se avaliar na literatura científica quais os principais fatores de risco associados as complicações cardiovasculares em pacientes em tratamento hemodialítico. Trata-se de uma revisão integrativa de literatura do tipo qualitativa. Como resultado, os artigos utilizados como referencial para o resultado da pesquisa foram extraídos das bases de dados SciELO, LILACS, BDENF e MEDLINE, com recorte temporal de 2015 a 2019 e dispostos na íntegra. Foram encontrados um total de 27.111 artigos inicialmente, após leitura minuciosa, foram selecionados para compor o projeto 16 artigos. Os principais fatores de risco para complicações cardiovasculares em pacientes renais crônicas evidenciados foram a hipertensão arterial sistêmica, dislipidemia, diabetes mellitus, anemia, estresse oxidativo, hipotensão arterial, tabagismo e hiperfosfatemia. Conclui-se que no Brasil, poucas são as pesquisas relacionadas a prevenção para desenvolvimento de doenças cardiovasculares em pacientes em terapia de hemodiálise, sendo este um tema relevante devido ao aumento de pacientes diagnosticados com Insuficiência Renal.

Descritores: Insuficiência Renal; Hemodiálise; Doenças Cardiovasculares; Hipertensão; Diabetes Mellitus.

Introduction

Chronic Kidney Failure (CRF) is the progressive and irreversible loss of nephrons, the functional unit of the kidneys. The increase in the number of cases of this disease over the years has been high and tends to increase more and more, as evidenced by the Brazilian Society of Nephrology (SBN), which reports that 7.2% of the world population is older than that. aged 30 years have chronic kidney disease and in individuals over 64 years the average is between 28% and 46%, with an estimate in Brazil of more than 10 million individuals with the disease. We can see that, through these alarming numbers, Chronic Kidney Failure is a public health problem, as this disease is directly associated with complications of Hypertension and Diabetes, pathologies that affect a large part of the population today, and as a characteristic of Kidney Failure Chronic, it has an asymptomatic development and progression, which leads to a late diagnosis[1].

The best form of treatment for these chronic patients is Kidney Replacement Therapy, which corresponds to peritoneal dialysis, hemodialysis, and kidney transplantation. The most used form of therapy is currently Hemodialysis, a therapy in which the blood from the patient's body will be pumped into a machine and a dialyzer, with the objective of removing toxins from the individual's body, which loses this capacity as it is one of its functions. of the kidney. This palliative procedure is necessary due to the irreversibility of chronic kidney disease, and it should generally be performed on average three days a week, varying with the level of severity of each individual[2].

According to a survey by the Ministry of Health in 2018, it was found that the rate of patients undergoing hemodialysis treatment is high, with the highest regional rate of people undergoing any renal therapy in the Southeast region of the country, with 236 people each 100 thousand. Although hemodialysis is the best form of treatment, it is noteworthy that it does not completely replace the function of the kidneys, therefore the patient may present complications related to excess urea in the body, including neurological, integumentary, hematological, gastrointestinal complications, reproductive, pulmonary, musculoskeletal and, as a focus of research, cardiovascular manifestations, associated with the volume changes that affect these individuals[3].

CRF is associated with the development of cardiovascular diseases, which are a potential risk factor for complications for patients who have the disease, being among the main causes of mortality. Among the main risks stand out Systemic Arterial Hypertension, dyslipidemias, diabetes, which can cause cardiovascular complications such as congestive heart failure, uremic cardiomyopathy, anemia, and rhythm disturbances.

It is necessary to pay attention to the risk factors and underlying diseases that the individual may present related to the development of cardiovascular diseases, providing individualized clinical care and continuous monitoring by the multidisciplinary team. The evolution of the disease and the consequent worsening of individuals with chronic diseases is related in many cases to non-adherence to treatment, whether pharmacological or non-pharmacological, with the need for early detection of this factor[4,5].

Hemodialysis treatment causes blood and hematological changes in the patient, the main manifestation being hypotension, hypertension, nausea and vomiting, headache, cramps and back and/or chest pain. Some risk behaviors can also be complicating factors during treatment, such as smoking, sedentary lifestyle and lack of adherence to treatment. The professional team must be aware of these changes during and after the hemodialysis session, intervening in these situations and developing goals for the prevention of these problems, ensuring well-being and quality in patient care[3].

The nurse is the professional who closely monitors the entire treatment and has the autonomy and knowledge to intervene when these complications occur. The removal of excess fluid from the body and volume changes generates these manifestations, and therefore the need to monitor the patient throughout the procedure to quickly identify complications so that interventions and care, selected by the nurse, can be initiated.

The importance of knowing the main risk factors for cardiovascular complications is part of the prevention of these changes to provide an adequate treatment and with the fewest possible complications.

The elaboration of the Nursing Care Systematization must be carried out prioritizing these cares, with the objective of minimizing them, this being a private activity of the nurse, which once again shows the importance of the nurse's role in relation to the interventions and patient care they carry out. hemodialysis therapy. The diagnoses and interventions stipulated by the nurse aim to cover the forms of care, not just looking at the biological, and to provide care in a holistic way, practices carried out based on scientific knowledge that has been improved over the years[6,7].

Given this, the question is what are the main risk factors for cardiovascular complications in patients undergoing hemodialysis? Chronic Kidney Disease is a potential factor in the development of cardiovascular disease. It is expected to identify the risk factors associated with cardiovascular diseases, endocrine system and other complications related to volume changes. Chronic Kidney Failure is a complication that has affected a large part of the Brazilian population, studies show that the rates of patients undergoing hemodialysis treatment have been growing considerably. Cardiovascular diseases are the main complications for a patient undergoing hemodialysis therapy, with the need to be prevented and treated early.

The nurse, through knowledge of the main risk factors for cardiovascular complications, will be able, through the nursing process, to identify the warning signs, prevent complications and minimize risks. This scientific study aims to assess in the scientific literature which are the main risk factors associated with cardiovascular complications in patients undergoing hemodialysis treatment.

Methodology

This research project is an integrative qualitative literature review. A critical analysis was carried out, based on statistical foundations and reflections, these results were interpreted, and conclusions were generated to justify the guiding question and reach the objectives initially established in the research. Articles with variables of interest that address the topic in question, published in the period from 2015 to 2019, using Microsoft Word® software were included in the research to build a table with the following variables: author in citation format, title of the article, source and sample[8].

Studies published in Portuguese were used, as well as journal articles available in full online, extracted from SciELO (Scientific Electronic Library Online), LILACS (Latin American and Caribbean Literature in Health Sciences), BDENF (Base Nursing Data), and MEDLINE (Medical Literature Analysis and Retrievel System Online). Duplicate works in the databases, which were considered only a single entry, studies published outside the determined time frame and articles published in a foreign language were excluded. Initially, a total of 27,111 articles were found and, after careful reading, 16 articles were selected to compose the project.

Results and Discussion

It is expected to identify the main risk factors for the development of cardiovascular complications that affect and are related to patients who undergo renal replacement therapy so that, in this way, information about these complications and ways to intervene can be added to the field of nursing, so that the elaboration of the Nursing Care Systematization addresses the complications that fit the epidemiological profile of patients under these conditions.

The following table lists the articles selected to compose the discussion of the project and answer the established objectives. It contains the year of publication of the selected articles, authors of the articles, title of the article, source where the article is located. The sample contains a list of the results obtained, after a thorough reading of the articles, showing what will be answered in this research project according to the specific objectives.

Chart 1. Listing of selected articles. São Paulo, SP, Brazil, 2020

Year	Authors	Title	Journal	Sample
2019	Lascasas JM, Fonseca I, Malheiro J, Santos S, Campos A, Castro A et al	Dados demo- gráficos, características clínicas e peso da doença cardiovascular em umacoorte portuguesa de pacientes idosos com doença renal crônica	J. Bras. Nefrol.v.41	Risk Factors, Hemodialysis, Kidney Disease, Cardiovascular Complications, Hypertension, Diabetes Mellitus, Dyslipidemia
2019	Primon LP, Riegel F, Russo DS.	Fibrilação Atrial em Pacientes Submetidos à Hemodiálise Contínua	Rev. Cogitare Enfermagem v.24	Cardiovascular Complications, Kidney Disease, Diabetes Mellitus, Arterial Hypertension, Hemodialysis
2019	Bucharles SG, Wallbach KS, Moraes TP, Filho RP.	Hipertensão em Pacientes em Diálise:diagnóstico, mecanismos e tratamento	J. Bras. Nefrol.v.41	Hypertension, Hemodialysis, Cardiovascular Diseases
2019	Marçal GR, Rêgo AS, Radovanovic, CA.	Qualidade de Vida de Pessoas com Doença Renal crônica emHemodiálise	Rev. Pesqui. Cui. Fund. v.11	Kidney Disease, Hypertension, Diabetes Mellitus
2018	Lucena AF, Magro CZ, Proença MCC, Pires AUB, Moraes VM, AlitiGB.	Validação de intervenções e atividades de enfermagem para pacientes em terapia hemodialítica	Rev. Gaúcha de Enfermagem v.38	Kidney Disease, Nursing Diagnoses, Interventions
2018	Silva AF, Magalhães DM, Rocha PM, Silva RF.	Principais complicações apresentadas durante a hemodiálise em pacientes críticos e propostas de intervenções de enfermagem	Rev. Enferm.Cent. Oeste Min. v.7	Kidney Disease, Cardiovascular Complications, Interventions
2017	Salim A, Benouna MG,Habbal MM.	Síndrome Cardiorrenal Tipo2: Um Forte Fator Prognóstico dá Sobre- vida	Int. J. Cardiovasc. Sci.v.30	Kidney Disease, Cardiovascular Complications, Hypertension, Diabetes Mellitus
2017	Greffin S, Barros AM, Matos JP, Kang HC, Jorge AJ, Garcia RM etal.	Doença renal crônica e síndrome metabólica como fatores de risco para doença cardiovascularem um programa de atenção primária	J. Bras. Nefrol.v.39	Kidney Disease, Cardiovascular Complications, Hypertension, Diabetes Mellitus
2017	Stumm EM, Kirchner RM, Guido LA, Benetti ER, Belasco AG, Sesso RC, et al.	Intervenção educacional de enfermagem para redução da hiperfosfatemia empacientes em hemodiálise	Rev. Bras. Enferm. v.70	Kidney Disease, Interventions, Diseases Cardiovascular
2017	Guimarães GL, Mendozal YQ, Werli Alvarenga, et al.	Diagnóstico, resultadoe intervenção de enfermagem no paciente com cateter para hemodiálise	Rev. Enferm UFPE v.11	Kidney Disease, Nursing Diagnoses, Interventions
2016	Fernandes MI, Lima CF,Frazão CM, Delgado MF, Araujio MG, Lira AL	Alterações cardiovasculares e pulmonares em pacientes submetidosà hemodiálise	Rev Enferm UERJ v.24	Kidney Disease, Cardiovascular Complications, Hypertension, Hemodialysis

2016	Barberato SH, Bucharles SG, Barberato MF, Pecoits-Filho R.	Associação entre Parâmetros Clínicos e Ecodopplercardiográficos com Morte Súbita em Pacientes de Hemodiálise	Arq. Bras. Cardiol. v.107	Kidney Disease, Cardiovascular Complications, Hypertension, Hemodialysis
2016	Silva BC, Sanjuan A, Costa VH, Reis L, Graciolli F, Consolim FC, et al.	Fatores associados aorisco de isquemia subendocárdica em pacientes em hemodiálise	J. Bras. Nefrol.v.38	Kidney Disease, Cardiovascular Complications, Hemodialysis
2016	Lemes MM, Bachion MM	Enfermeiros atuantesem hemodiálise indicam diagnósticos de enfermagem relevantes na prática clínica	Acta Paul Enferm. v. 29	Kidney Disease, Nursing Diagnoses, Hemodialysis
2016	Soltani A, Argani H, Rahimipour H, Soleimani F, Rahimi F, Kazerouni F.	LDL oxidada: Como umfator de risco para doença cardiovascularno transplante renal	J. Bras. Nefrol.v.38	Kidney Disease, Cardiovascular Complications, Hemodialysis

The results obtained, after reading the selected articles, showed Systemic Arterial Hypertension as the main risk factors for cardiovascular complications in patients undergoing renal replacement therapy, which is the risk factor with the highest probability index according to the search, followed by Dyslipidemia, Diabetes Mellitus, anemia, oxidative stress, hypotension, smoking and hyperphosphatemia.

After a study carried out in patients with end-stage renal disease, it was shown that the prevalence of chronic kidney disease is higher in elderly people over 65 years of age and is generally associated with comorbidities, such as systemic arterial hypertension, diabetes mellitus, dyslipidemia, and anemia. Of the research participants, 96% had systemic arterial hypertension and all underwent drug treatment. Diabetic nephropathy was the major cause of the development of chronic kidney disease in more than half of the population evaluated, this data correlating with the prevalence of diabetes in patients. It is evident that decreased glomerular filtration rate is associated with cardiovascular complications, having shown that cardiovascular diseases are associated with the progression of chronic kidney disease[9].

Study[10] discusses about Atrial Fibrillation as a very susceptible and common cardiovascular complication in clinical practice, being associated with predisposing factors such as hypertension and diabetes, and with a significant mortality rate in patients with chronic renal failure. It shows that cardiovascular diseases have a high prevalence in patients with chronic renal failure, evidenced by abnormal findings on the electrocardiogram of these patients, who are predisposed to developing stroke, thromboembolism, and acute myocardial infarction.

High blood pressure is common in patients on renal replacement therapy due to elevated sodium levels and volume overload due to impaired renal filtration. Chronic kidney patients have constant blood pressure fluctuations due to the volume changes that renal replacement therapy provides, and these changes are related to cardiovascular complications, with a prevalence of hypertension. Monitoring blood pressure levels is essential to prevent cardiovascular complications, according to the authors, and inter-dialysis blood pressure is recorded at home or in the clinic, as the greatest evidence for cardiovascular complications. The advancement of chronic kidney disease associated with systemic arterial hypertension implies pathophysiological changes such as vascular resistance, increased cardiac output and increased extracellular volume, increasing the risk of cardiovascular complications[11].

Study[12] addresses the issue of quality of life of patients undergoing RRT, noting that these patients' lifestyle habits are entirely related to the progression of kidney disease, identifying systemic arterial hypertension and diabetes as frequent comorbidities associated with chronic kidney patients. In the study carried out by the authors, a prevalence of hyperphosphatemia was also identified in the interviewed patients, resulting from poor glomerular filtration and evidenced in excess in chronic renal patients, which may cause cardiovascular changes.

The evidence that hypertension and diabetes are risk factors for Cardiorenal Syndrome, which causes kidney damage and dysfunction due to chronic changes in cardiac function. Cardiovascular changes, such as heart failure, can lead to renal hypoperfusion and thus further impair renal function. Furthermore, a correlation between chronic renal failure and metabolic syndrome, characterized by increased waist circumference, hyperglycemia, and dyslipidemia, with the development of cardiovascular disease. Since the early stages of chronic kidney disease, it is possible to identify cardiovascular alterations in individuals, mostly with comorbidities such as hypertension, diabetes, and the oxidative stress that these individuals have, due to their low efficiency in filtering toxins. The authors point out that these risk factors that characterize the metabolic syndrome associated with chronic renal failure increase the chances of developing cardiovascular disease[13,14].

Hyperphosphatemia as an important risk factor for the development of cardiovascular complications in individuals with chronic renal impairment, a risk for an increase in the mortality rate in this population. The increase in phosphorus in the body is associated with a drop in the glomerular filtration rate, which prevents the excretion of phosphorus and the body from maintaining its levels at normal levels, thus causing hyperphosphatemia. The hemodialysis process, despite its proven effectiveness, does not replace the efficiency of the kidneys, and is not capable of reducing the necessary levels of phosphorus and other toxins, being necessary to intervene to reduce hyperphosphatemia through adjustments in the individual's diet[15].

Study[16] brings that hypertension is still a factor commonly identified in these patients, however, during hemodialysis sessions the tendency of blood pressure is to reduce hypotension as a potential risk factor for complications during the hemodialysis session. Renal replacement therapy causes volume changes in the patient due to the removal of excess fluids in the body, however this removal can cause hypovolemia causing an increase in heart rate. Nurses working during the hemodialysis process must be aware of signs of hypovolemia, thus preventing the patient from developing hypovolemic shock. Complications such as pulmonary edema, jugular vein distension and anasarca were identified in the research, which may be associated with potential manifestations of heart failure in patients undergoing renal replacement therapy.

Sudden cardiovascular death is evidenced as the most common cause of death in patients on renal replacement therapy. The clinical characteristics and risk factors for cardiovascular alterations involve arterial hypertension, diabetes mellitus, dyslipidemia and estimated time spent on hemodialysis with an average of two years. Sudden cardiovascular death would be related to sudden volume changes during hemodialysis sessions, which can generate circulatory collapse, triggering cardiac arrest. Diabetes mellitus was identified as predominant in these patients, and even in patients with stable parameters at the beginning of the session, this sudden change can occur during the session[17].

Study[18] addresses metabolic bone and mineral changes, such as increased calcium and phosphorus, resulting from CKD and cardiovascular changes that can compromise the individual, including atherosclerosis. Vascular calcifications can occur more frequently in these individuals, who are exposed to suffering ischemic events. When associated with the patient's clinical history, underlying diseases such as dyslipidemia can detrimentally accelerate these events and cause complications for these patients. In addition, low-density lipoproteins, and their potential risk for adverse events, such as atherosclerosis, and mentions that these lipoproteins can suffer from the oxidative stress present in these patients due to the increase in toxins in the body and become oxidized low-density lipoproteins, with potential atherogenic factor[19].

The NANDA-I taxonomy Nursing Diagnoses most associated with these patients, according to a study[20], is Excessive Fluid Volume (00026). This nursing diagnosis is since the glomerular filtration rate of a patient with chronic kidney disease is low and consequently retains fluids and toxins. For Nursing Interventions, the NIC (Nursing Interventions Classification) taxonomy was used through the NANDA-NIC link, and it was observed that the prevalent interventions for this diagnosis were Water Control (4120), Hypervolemia Control (4170), Electrolyte Monitoring (2020) and Water Monitoring (4130). After analyzing the research, it was established as a priority intervention for Water Control (4120), because its approach is broad in relation to the care that would be provided to patients, and the other interventions classified as complementary to the priority[20].

Hypotension, already evidenced as a risk factor, is described in a study[21], as a recurrent and severe complication, commonly occurring during hemodialysis sessions. The dose of dialysis that will be offered to a patient suffering from this complication will be lower, and it may be related to the ultrafiltration rate and also patient characteristics, such as cardiac dysfunction. For patients with these conditions, the best form of renal replacement therapy would be extended continuous therapy, which would offer a lower ultrafiltration rate.

The diagnosis commonly associated with chronic kidney patients is the Risk of Shock diagnosis (00205), with conditions associated with hypotension and hypovolemia, as described above. The care provided during hemodialysis sessions to prevent shock can be described in the NIC Cardiac Care Intervention (4040), which describe cardiac monitoring and the need to constantly assess vital signs and cardiovascular changes. Bleeding Risk (00206) is a frequently used nursing diagnosis, due to its relationship with platelet disorder that in many cases of chronic kidney disease can be evidenced. The NIC intervention that may be associated with this diagnosis is Precautions Against Bleeding (4010), which establishes care to reduce stimuli that can induce bleeding. Chronic kidney disease can lead the patient to develop anemia, a risk factor for cardiovascular complications, resulting in the prevention of bleeding risk should be stipulated[22].

The diagnosis of Risk for Vascular Trauma (00213) is common among patients undergoing hemodialysis due to the use of vascular access, whether central venous catheter or arteriovenous fistula. The care provided for the prevention of vascular trauma must emphasize both hygiene care to prevent infection and care so that there is no obstruction in the lumen, as it can cause vascular injury and lead to serious complications such as thromboembolism and even vascular disruption. Regarding this, the intervention Maintenance of Access for Dialysis (4240) emphasizes care with vascular access specific to patients undergoing hemodialysis treatment. The table below contains the highlighted diagnoses and the corresponding nursing interventions[23].

Chart 2. Nursing Diagnoses and Interventions. São Paulo, SP, Brazil, 2020

NANDA-I Diagnoses	NIC Interventions
Excessive Liquid Volume (00026)	Water Control (4120)
Risk of Shock (00205)	Cardiac Care (440)
Bleeding Risk (00206)	Precautions Against Bleeding (4010)
Risk of Vascular Trauma (00213)	Dialysis Access Maintenance (4240)

Conclusion

Scientific researches prove that chronic kidney patients have a higher risk of developing cardiovascular complications, with an estimated 8 to 10 times higher probability compared to the general population, being the main cause of mortality in patients with chronic kidney disease. Many of these patients are referred to hemodialysis therapy underdiagnosed with diseases such as high blood pressure, diabetes, dyslipidemia, risk factors for the development of cardiovascular disease.

The knowledge of the history of these patients is necessary by the multidisciplinary team. The nurse is the professional who monitors the hemodialysis process, being with the patient, and has the autonomy and knowledge to prevent when knowledge about the risk factors associated with the patient is obtained and intervene when there are complications. It is necessary to monitor these patients, both during hemodialysis sessions and at the primary care level, integrating them into basic health units. It is essential that there is the implementation of public policies aimed at the prevention of underlying diseases evidenced with the development of kidney damage, such as arterial hypertension and diabetes. Primary health care is the gateway to the health system, having an exceptional role within the care network, working with prevention, as it is the closest care network to the population, and monitoring of patients diagnosed with the diseases already mentioned and that present potential risk factors for the development of chronic kidney disease.

References

1. Sociedade Brasileira de Nefrologia (SBN), Associação Brasileira dos Centros de Diálise (ABCDT) e Federação Nacional de Associações de Pacientes Renais e Transplantados do Brasil (FENAPAR). Carta para: Deputada Carmen Zanotto. 1 carta. [acesso em 19 fev 2020] Disponível em: http://www.abcdt.org.br/wp-content/uplo- ads/20-03-2019-Carta- Dep-Carmen-Zanotto.pdf
2. Santos GLC, Alves TF, Quadros DCR, Giorgi MDM, Paula DM. A percepção da pessoa sobre sua condição enquanto doente renal crônico em hemodiálise. Rev. Fun Care Online. 2020;12:636-641. DOI: 10.9789/2175-5361.rpcfo.v12.9086
3. Ministério da Saúde (MS). Dia Mundial do Rim 2019: Saúde dos Rins Para Todos [Internet]. Brasília (DF): MS; 2019 [acesso em 25 mar 2020]. Disponível em: http://bvsms.saude.gov.br/ultimas-noticias/2913-14-3-dia- mundial-do-rim-2019-saude-dos-rins-para-todos
4. Marinho AWGB, Penha AP, Silva MT, Galvão TF. Prevalência de doença renal crônica em adultos no Brasil: revisão sistemática da literatura. 2017;379-388. DOI 10.1590/1414-462X201700030134
5. Fabricio RD, Brancalhião LD, Ribeiro BBC, Koeppe GBO, Jesus PBR, Pereira BWS, Cerqueira LCN. Caracterização de pacientes hipertensos resistentes frente adesão terapêutica na baixada litorânea do Rio de Janeiro. Glob Acad Nurs. 2021;2(1):e72. DOI: 10.5935/2675-5602.20200072
6. Aguiar LL, Guedes MVC. Diagnósticos e intervenciones de enfermería del dominio seguridad y protección de los pacientes en hemodiálisis. Enferm. Glob. 2017;16(47):1-37. DOI: 10.6018/eglo-bal.16.3.248291
7. Frota O, Borges N. Tratamento de Hemodiálise- Relato de complicações em pessoas hipertensas. Revista de Pesquisa: Cuidado é Fundamental [Internet]. 2013 [acesso em 23 mar 2020]. Disponível em: http://www.seer.unirio.br/index.php/cui-dadofundamental/article/view/2098/pdf_770
8. Mendes KS, Silveira RCCP, Galvão CM. Revisão integrativa: método de pesquisa para a incorporação de evidências na saúde e na enfermagem. Texto contexto – enferm. 2008;14(4). DOI: 10.1590/S0104- 07072008000400018
9. Lascasas JMSS, Fonseca I, Malheiro J, Santos S, Campos A, Moreira A, et al. Dados demográficos, características clínicas e peso da doença cardiovascular em uma coorte portuguesa de pacientes idosos com doença renal crônica. J. Bras. Nefrol. 2019;41(1):29-37. DOI: 10.1590/2175-8239-jbn-2018-0120
10. Primon LP, Riegel F, Russo DS. Fibrilação atrial em pacientes submetidos à hemodiálise contínua. Cogitare enferm. 2019;24:e60386. DOI: 10.5380/ce.v24i0.60386
11. Bucharles SGE, Wallbach KKS, Moraes TP, Filho RP. Hipertensão em pacientes em diálise: diagnóstico, mecanismos e tratamento. J. Bras. Nefrol. 2019;41(3):400-411. DOI: 10.1590/2175-8239-jbn-2018-0155
12. Marçal GR, Rêgo AS, Paiano M, Radovanovic CAT. Qualidade de vida de pessoas com doença renal crônica em hemodiálise. Rev Fun Care Online. 2019;11(4):908-913. DOI: 10.9789/2175-5361.2019.v11i4.908-913
13. Salim A, Benouna MEG, Mourid ME, Habbal R. Síndrome Cardiorrenal Tipo 2: Um Forte Fator Prognóstico da Sobrevida. Int J Cardiovasc. 2017;30(5):425-432. DOI: 10.5935/2359-4802.20170072
14. Greffin S, André MB, Matos JPS, Kang HC, Jorge AJL, Rosa MLG, Lugon JR. Doença renal crônica e síndrome metabólica como fatores de risco para doença cardiovascular em um programa de atenção primária. Braz. J. Nephrol [Internet]. 2017 [acesso em 15 out 2020];39(3):246-52. Disponível em: https://www.scielo.br/j/jbn/a/gxqrwz5Nxw8N4vYB4TjBG7m/?lang=pt&format=pdf
15. Stumm EMF, Kirchner RM, Guido LA, Benetti ERR, Belasco AGS, Sesso RCC, et al. Intervenção educacional de enfermagem para redução da hiperfosfatemia em pacientes em hemodiálise. Rev. Bras. Enferm. 2017;70(1):31-38. DOI: 10.1590/0034-7167-2016-0015
16. Fernandes MICD, Lima CF, Frazão CMFQ, Delgado MF, Araújo MGA, Lira ALBC. Alterações cardiovasculares e pulmonares em pacientes submetidos à hemodiálise. Rev enferm UERJ. 2016;24(3):1-7. DOI: 10.12957/reuerj.2016.8634
17. Barberato SH, Bucharles SGE, Barberato MFA, Filho RP. Associação entre Parâmetros Clínicos e Ecodopplercardiográficos com Morte Súbita em Pacientes de Hemodiálise. Arq. Bras. Cardiol. 2016;107(2): 124-130. DOI: 10.5935/abc.20160098
18. Silva BC, Sanjuan A, Costa-Hong V, Reis L, Graciolli F, Consolim CF, et al. Fatores associados ao risco de isquemia subendocárdica em pacientes em hemodiálise. J. Bras. Nefrol. 2016;38(3):320-326. DOI: 10.5935/0101-2800.20160049
19. Soltani A, Argani H, Rahimipour H, Soleimani F, Rahimi F, Kazerouni F. LDL oxidada: Como um fator de risco para doença cardiovascular no transplante renal. J. Bras. Nefrol. 2016;38(2):147-152. DOI: 10.5935/0101-2800.20160023

20. 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. DOI: 10.1590/19831447.2017.03.66789
21. Silva AFS, Magalhães DM, Rocha PRS, Silva RF. Intervenções de Enfermagem Para Complicações Apresentadas Durante a Hemodiálise em Pacientes Críticos. RECOM. 2018;8:e2327. DOI: 10.19175/recom.v7i0.2327
22. Lemes MMDD, Bachion MM. Enfermeiros atuantes em hemodiálise indicam diagnósticos de enfermagem relevante na prática clínica. Acta paul. enferm. 2016;29(2):185-190. DOI: 10.1590/1982- 0194201600026
23. Guimarães GL, Mendoza IYQ, Alvarenga AW, Barbosa JAG, Corrêa AR, Guimarães JO, Guimarães MO, Chianca TCM. Diagnóstico, resultado e intervenção de enfermagem no paciente com cateter para hemodiálise. Rev enferm UFPE. 2017;11(11):4334-4342. DOI: 10.5205/reuol.23542-49901-1-ED.1111201709