

Referral of users with kidney disorders by the Family Health Strategy to the nephrologist: a cross-sectional study

Encaminhamento dos usuários com alterações renais ao nefrologista pela Estratégia Saúde da Família: estudo transversal

Derivación de usuarios con trastornos renales al nefrólogo por la Estrategia Salud de la Familia: estudio transversal

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ABSTRACT

Objective: to examine referrals of users at risk of developing chronic kidney disease by the Family Health Strategy teams to a specialized nephrology service. **Method:** in this cross-sectional study, data were collected in March 2021 from the medical records of users diagnosed with diabetes and high blood pressure, and monitored in primary care in Rio de Janeiro city. The research protocol was approved by the ethics committee. **Results:** serum creatinine was requested in 96% of the medical records, but the situation was different with the other exams. Referral was indicated most often at stage 3B (37% of the sample), followed by stage 4 (33%). **Conclusion:** as the course of this disease is insidious, laboratory monitoring must be carried out continuously. The role of Primary Care is unquestionable, but in view of the challenges highlighted, it is important to consider new strategies for more effective action and comprehensive care in the system.

Descriptors: Primary Health Care; Family Health; Chronic Disease; Renal Insufficiency, Chronic.

RESUMO

Objetivo: analisar os encaminhamentos de usuários de risco ao desenvolvimento da doença renal crônica para serviço especializado de nefrologia pelas equipes da Estratégia de Saúde da Família. **Método:** estudo transversal, com coleta de dados dos prontuários de usuários diagnosticados com diabetes e hipertensão arterial, acompanhados na atenção primária no município do Rio de Janeiro, em março de 2021. O protocolo de pesquisa obteve a aprovação em Comitê de Ética. **Resultados:** a solicitação de creatinina sérica foi identificada em 96% dos prontuários, mas tal realidade foi diferente junto aos demais exames. Quanto aos estágios, o mais indicado para encaminhamento foi o 3B compreendendo 37%, seguido pelo estágio 4 que abrange 33% da amostra. **Conclusão:** sendo uma doença de curso insidioso, o acompanhamento laboratorial deve ser realizado continuamente. É inquestionável o papel da Atenção Primária, porém diante dos desafios evidenciados é importante considerar novas estratégias para melhor efetivação das ações e integralidade do cuidado na rede.

Descritores: Atenção Primária à Saúde; Saúde da Família; Doença Crônica; Insuficiência Renal Crônica.

RESUMEN

Objetivo: analizar la derivación de usuarios con riesgo de desarrollar enfermedad renal crónica a un servicio especializado de nefrología por parte de los equipos de la Estrategia Salud de la Familia. **Método:** estudio transversal, con recolección de datos de las historias clínicas de usuarios con diagnóstico de diabetes e hipertensión arterial, cuyo seguimiento se realizó en la atención primaria de la ciudad de Rio de Janeiro, en marzo de 2021. El protocolo de investigación fue aprobado por el Comité de Ética en Investigación. **Resultados:** la solicitud de creatinina sérica fue identificada en el 96% de las historias clínicas, pero esa realidad fue diferente a los demás análisis. En cuanto a las etapas, la más indicada para la derivación fue la 3B que comprende el 37%, seguida de la etapa 4 que abarca el 33% de la muestra. **Conclusión:** al ser una enfermedad de curso insidioso, el seguimiento de laboratorio debe realizarse de forma continua. El rol de la Atención Primaria es incuestionable, sin embargo, frente a los desafíos señalados, es importante considerar nuevas estrategias para una mejor implementación de las acciones y la atención integral en la red.

Descriptores: Atención Primaria de Salud; Salud de la Familia; Enfermedad Crónica; Insuficiencia Renal Crónica.

INTRODUCTION

Chronic Kidney Disease (CKD) is defined as a decrease in the Glomerular Filtration Rate (GFR) below 60ml/min/1.73m², and/or the presence of kidney damage determined by proteinuria/structural damage, lasting more than three months¹. The main risk factors for CKD are Diabetes Mellitus (DM) and Systemic Arterial Hypertension (SAH)². In addition to these, other factors related to the loss of renal function include glomerulopathies, polycystic kidney disease, autoimmune diseases, systemic infections, recurrent urinary infections, urolithiasis, obstructive uropathies and neoplasms³.

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According to data from the Brazilian Society of Nephrology, the estimated number of patients on dialysis in Brazil in 2019 was 139,691. Hemodialysis is the predominant dialysis method (93.2%) and peritoneal dialysis (PD) is a therapy used by 6.8% of patients. In addition, there was an 11% increase in the percentage of dialysis patients enrolled in the transplant queue in Brazil in 2019 compared to 2018, totaling 33,015 patients. The estimated number of patients who started dialysis treatment in 2019 was 45,852, constituting an increase of 7.7% compared to the previous year. The annual crude mortality rate for CKD was 18.2%⁴.

The treatment of chronic kidney disease in Brazil is carried out at different points of the Unified Health System (*Sistema Único de Saúde - SUS*) service network, including private clinics. Actions such as identifying modifiable risk factors, monitoring people with chronic diseases and early detection of CKD stand out in Primary Healthcare (PHC) through the work of the Family Health Strategy (*Estratégia Saúde da Família - ESF*) teams, contributing to better effectiveness of therapeutic actions prevention and/or control of disease progression. In addition, these teams encourage changes in lifestyle habits in relation to food and the inclusion of physical activity, smoking cessation and referral to a specialist as soon as necessary^{5,6}.

The implementation of public policies aimed at treating kidney diseases in the country is relatively recent, and as it is considered an important public health problem in Brazil and in the world, it becomes essential that such policies become increasingly widespread. Pre-dialysis care becomes relevant and involves both PHC and specialized outpatient care, no longer only directing the approach to dialysis or highly complex procedures⁷.

Despite the efforts which have been made to improve care for users predisposed to the development of CKD, the care offered by the PHC teams to these people still needs to be improved. This is evidenced by the inconsistencies in managing these users, as identified in a study carried out with PHC professionals demonstrating a low request level for screening tests, including the GFR⁸. In addition, there is a lack of knowledge regarding the referral criteria to specialized care and prevention, resulting in people in the mild and moderate stages being referred to a specialist, compromising the access of advanced cases⁹⁻¹¹.

Thus, the present study aimed to analyze the referrals of users at risk of developing chronic kidney disease to the specialized nephrology service by the *ESF* teams.

METHOD

This is a descriptive study with a quantitative and cross-sectional approach, in which data are collected at a point in time based on a sample selected to describe a population at that particular moment¹².

A PHC unit located in Complexo da Penha, in the North Zone of the city of Rio de Janeiro, in the programmatic area 3.1 (*área programática 3.1 - AP3.1*), which has 14 Family Health teams covering approximately 52 thousand people, was chosen as the scenario. A total of 55 medical records of users with arterial hypertension and type 2 diabetes mellitus referred to the nephrologist during the years 2019 and 2020 were analyzed in the period of March 2021, excluding medical records of users under 18 years old and with the diagnosis or suspected kidney disease from causes other than those mentioned. Of these, six records were excluded, five of which did not meet the inclusion criteria and one was incomplete, resulting in a final sample of 49 records.

The data collection instrument was elaborated with questions which aimed to identify the user's social profile through questions such as age, gender, declared race, occupation and family income; health history, identifying comorbidities such as: diabetes and/or hypertension, glomerulonephritis and others; the results and dates of the last urea, potassium, and mainly creatinine and urine analysis tests, used to identify patients at risk of developing CKD, as recommended by the Clinical Guidelines for the Care of Patients with Chronic Kidney Disease.

The reference values for analyzing the results of the laboratory tests present in the study were: serum creatinine: between 0.7 and 1.3mg/dL (men) and between 0.6 and 1.2mg/dL (women); Urine: microalbuminuria 30-300mg/day (20 to 200µg/min), albumin: up to 30mg/day and proteinuria up to 150mg/day; potassium: 3.5 to 5.0 mEq/L; and urea: 20 to 40mg/dL¹³.

After collecting the data, they were analyzed according to the Clinical Guidelines for the Care of Patients with Chronic Kidney Disease⁵, which classifies CKD into five stages according to the glomerular filtration rate (GFR). Stage 1: GFR (ml/min/1.73m²) ≥90; Stage 2: GFR (ml/min/1.73m²) 60–89; Stage 3a: GFR (ml/min/1.73 m²) 45–59; Stage 3b: GFR (ml/min/1.73m²) 30–44; Stage 4: GFR (ml/min/1.73m²) 15–29; and Stage 5: GFR (ml/min/1.73m²) <15.

The modified CKD-EPI equation was subsequently used as a basis to estimate the glomerular filtration rate (GFR). The equation is expressed as follows: $eGFR = 141 \times \min(Cre/k, 1) \alpha \times \max(Cre/k, 1) \cdot 1.209 \times 0.993 \text{ Age} \times 1.018$ [if female]

x 1.159 [if black]. In which: Cre= is serum creatinine, κ : is 0.7 for women and 0.9 for men, α : is -0.329 for women and -0.411 for men, min: indicates the minimum Cre/ κ or 1 and max: indicates the maximum Cre/ κ or 1.

The CKD-EPI equation was developed in 2009 and is a variation of the MDRD (Modification of Diet in Renal Disease) formula. The equation uses the same variables as the MDRD (plasma creatinine, age, gender and race), but it presents comparatively better performance and risk prediction, in addition to presenting less bias and greater accuracy, mainly in the ranges of GFR >60 mL/min/1.73m² than the MDRD study. The CKD-EPI equation showed similar accuracy for routine clinical use in the subgroup of patients with GFR <60 mL/min/1.73m², being considered the best standard for estimating renal function by the nephrology community. However, it may overestimate GFR in patients who are extremely underweight and underestimate it in morbidly obese and diabetic patients. It is important to emphasize that the race variable was not used in the calculation in the present study, considering that it is an important variable for the US population, but not equally important for the Brazilian population due to the great miscegenation present in the country.

Descriptive statistics were used through absolute and relative frequency, central tendency (means and medians) and dispersion (standard deviation) measures, and interquartile range, according to the data normality using the software Statistical Package for the Social Sciences (SPSS®) version 23.0 (IBM, 2015) and expressed through tables.

This study is in line with ethical precepts and was registered on the Brazil Platform, obtaining approval of its protocol from the Ethics Committee of the institution involved.

RESULTS

The sociodemographic characteristics of the users found that most of them are female (53%), the age group is predominantly over 60 years old (80%), the most common declared race was brown (61.2%), and no data referring to occupation or family income were found in the medical records. The analysis of clinical and laboratory conditions shows that 87.8% of users have systemic arterial hypertension and 49% have diabetes mellitus. Moreover, the occurrence of coronary diseases predominated among the other comorbidities, being present in 14% of users.

The request for serum creatinine dosage was present in 96% of the medical records regarding laboratory tests, with changes in levels in relation to reference values in 43% of female users and 41% of males. The occurrence of records with regard to the request for urine tests was lower, being present in 57.1% of the medical records, with 35% of this total indicating alteration and their request occurred in a varied way. Changes in levels regarding the urea and potassium dosage were found in 35% and 29% of the sample, respectively.

Table 1 presents the data from the calculations performed by the researchers with regard to the CKD stages.

TABLE 1: Relationship between CKD stages, reference values, classification and referral of users referred by teams. Rio de Janeiro, RJ, Brazil, 2021.

Stages	Reference values	Classification	n	%
1	>90 ml/min	Normal or elevated GFR	0	0
2	89-60ml/min	Slightly low GFR	3	6
3A	59-45ml/min	Moderately low GFR	4	8
3B	44-30ml/min	Moderately to severely low GFR	18	37
4	29-15ml/min	Severely low GFR	16	33
5	<15 ml/min	Kidney failure	7	14
Absent data			1	2

A predominance in stage 3B comprising 37% was found when referral to the specialist was performed, followed by stage 4 covering 33% of the sample.

Analyzes regarding the association between GFR and sociodemographic characteristics are presented in Table 2.

Table 2: Median, mean, standard deviation and confidence index of the association between glomerular filtration rate according to sociodemographic characteristics, Rio de Janeiro, RJ, Brazil, 2021.

Glomerular filtration rate (< 60ml/min/1,73m ²)			
Characteristics	Median	Mean (SD*)	95%CI**
Gender			
Female	30,2	30,55 (±16,17)	23,72;37,38
Male	32,6	34,67 (±15,63)	27,32;42,01
Age (years)			
<60	21,9	24,44 (±17,06)	11,33;37,56
≥60	34,3	34,47 (±15,17)	29,26;39,63
Race			
White	30,5	37,45 (±17,97)	25,7;49,52
Brown/Black	30,6	30,75 (±15,08)	25,4;36,09
HBP***			
No	29,7	27,34 (±14,39)	9,47;45,31
Yes	30,5	33,07 (±16,14)	27,8;38,31
DM****			
No	30,5	31,32 (±15,13)	24,77;37,86
Yes	30,6	33,63 (±17,0)	25,89;41,37

Notes: SD: *standard deviation; **CI: Confidence Interval; ***HBP: high blood pressure; ****DM: diabetes Mellitus

It is noteworthy that the GFR in users under 60 was more compromised on average than in users aged over 60 years (Md = 21.9; M = 24.44; SD = ± 17.06 and CI = 11.33; 37.56); however, this result may be influenced by the number of individuals identified in the age group younger than 60 years in the studied sample. Table 3 presents the results related to the analysis of association between CKD stages and sociodemographic characteristics.

Table 3: Association between CKD stages when referenced and sociodemographic characteristics, Rio de Janeiro, RJ, Brazil, 2021.

Characteristics	Stage I and II		Stage III, IV and V		O.R.*	95%CI**	p-value
	n	%	n	%			
Gender							
Female	01	4	24	9	3,78	0,36;39,41	0,23
Male	03	13,6	19	86,4			
Age (years)							
<60	01	10	09	90	0,79	0,07;8,57	1,00
≥60	03	8,1	34	91,9			
Race							
White	03	27,3	08	72,7	0,08	0,008;0,91	0,04
Brown/Black	01	3	32	97			
HBP***							
No	0	0	06	100	1,10	1,00;1,22	1,00
Yes	04	9,8	37	90,2			
DM****							
No	01	4,2	23	95,8	3,45	0,33;35,85	0,34
Yes	03	13	20	87			

Notes: *OR: odds ratio; **CI: confidence Interval; ***HBP: high blood pressure; ****DM: diabetes Mellitus

The association of creatinine values and sociodemographic variables did not show significance; however, elevated levels were higher in male users, aged over 60 years, self-declared brown or black and affected by systemic arterial hypertension. The race variable obtained a significant association (p-value = 0.04) in the referral of users in stages III, IV and V of CKD.

DISCUSSION

Female users in the present study had a higher number of referrals to specialized care, associated with the occurrence of decreased glomerular filtration rate (GFR). This data points to agreement with the literature that shows that females have a higher prevalence in CKD cases^{14,15}. However, despite the literature indicating a higher prevalence of females, it can be inferred that women more often seek out health services, which can generate a biased sample^{16,17}.

Since older age is a proven risk factor for developing CKD, the study showed the highest number of users who were referred to specialists as being over 60 years of age. However, peculiarities stand out which should receive attention regarding the evaluation of older adult patients in view of the physiological process of renal senescence. Older adults are particularly susceptible to reduced renal function due to the physiological decline in glomerular filtration related to age, but also due to renal impairment from diseases prevalent in this age group, such as diabetes mellitus and arterial hypertension¹⁸. Structural and functional alterations of the kidneys occur in a more complex way in older adults than in young people, and the occurrence of a reduction in the renal cortex per decade from the age of 30 demonstrates a greater need for monitoring the glomerular filtration rate for people in this age group¹⁷.

The main cause of CKD in Brazil is arterial hypertension, followed by diabetes mellitus types 1 and 2. People diagnosed with CKD are at high risk for developing cardiovascular diseases^{19,20}. It is important to point out that 14% of users in the analyzed sample already had coronary impairment at the time of referral to a nephrology specialist. Monitoring and treatment to maintain adequate blood pressure levels and glycemic control are necessary actions to reduce this risk. This in turn implies greater attention and an intensive approach by the teams with these users.

In a study which outlined the panorama of care for people with CKD, serum creatinine levels are requested by most *ESF* professionals to monitor patients with risk factors or established CKD. However, urine tests with the aim of investigating albuminuria/microalbuminuria and the calculation of GFR, which are important markers for assessing the progression of kidney disease, are not requested with the same frequency⁸. These data corroborate what was identified in the present study, in which 96% of the medical records present records of creatinine results compared to only 57% of records of urine tests.

Furthermore, changes in albuminuria may occur earlier in the course of the disease than changes in GFR because creatinine is a late marker of kidney damage. In view of this, it is important to have a urine test frequently requested, as well as an evaluation of creatinine dosage so that kidney alterations can be identified earlier and measures to delay kidney disease progression can be implemented.

Requests and records of the urine test results in the medical records were carried out in a variety of ways. They were expressed through the measurement units relevant to the type of request made, such as proteinuria with the result recorded in milligrams/24 (mg), but the occurrence of records made using crosses (++) was also identified, indicating the urine evaluation performed through the use of an immersion reagent strip. Although the use of this method is useful as a screening method, it only detects the presence of albumin and not total proteins, and may present divergent results in quantitative analyses, and is not used to evaluate the effects of therapeutic interventions or to control kidney disease progression. This test presents false-positive results in several situations: concentrated or very diluted urine, containing ammonia compounds, vaginal secretion and when the urinary pH is alkaline (pH > 7.5)^{21,22}. Registering as "within normality" without a numerical range implies that the professional who evaluates that exam later does not have an understanding if the user is within a comfortable range or within the limit of the tolerated protein concentration, and this can delay implementing measures. Considering that care for these users is shared by a multidisciplinary team in the *ESF*, adequate records become even more relevant to ensure continuity and longitudinality of care²³.

All patients belonging to the so-called risk groups, even if asymptomatic, must be evaluated annually by the *ESF* teams and have their laboratory tests evaluated. These are low-cost and effective in screening for CKD¹¹. However, there are no records of such follow-up in the present study, which negatively impacts the care management for users belonging to the risk group who often have changes in their exams identified late.

Another important data elucidated in the present study, and which corroborates the literature¹⁰, is the lack of calculating the GFR estimate by the professionals. GFR measurement is fundamental in clinical practice, as all renal functions are progressively affected with a reduction in GFR. GFR measurement contributes to defining diagnosis, assessing disease progression and establishing prevention and treatment measures²².

Users were referred to specialized care mostly in stage 3B, corresponding to a GFR estimate with a moderate to severe decrease, followed by an estimate of a severely reduced GFR. This result is in accordance with the stages recommended by the guidelines^{5,24}. However, it is important to highlight that the identified stages are from the moment the referral was made and that there are no periodic records of calculating the GFR estimate of the users during the follow-up carried out in the unit, which implies a lack of knowledge of how the GFR has been behaving over time.

In addition, most of the analyzed medical records did not contain the GFR estimate used to support the referral, which has implications for the follow-up of this user who in the future may be attended by another professional, guaranteeing informational continuity²⁵.

According to the Clinical Guidelines for the care of patients with Chronic Kidney Disease⁵, follow-up in stages 1 to 3 must be maintained in the Basic Health Units (*Unidades Básicas de Saúde - UBS*), aiming at treating modifiable risk factors for CKD progression. At this point, the importance of monitoring the user by the multidisciplinary team composed of professionals who will support the needs of this patient in face of a progressive loss of renal function and possible initiation of renal replacement therapy (RRT) is highlighted.

Conservative treatment aims at establishing measures with the aim to reduce the disease progression rate, contributing to improve the clinical, physical and psychological conditions of patients²⁶. In this sense, the important role of the Expanded Family Health Center (*Núcleo Ampliado de Saúde da Família - NASF-AB*) is highlighted, which increases the repertoire of actions, making it more comprehensive and closer to the needs of users and providing specific/individualized actions to delay renal function worsening in the early stages. However, no referral records of users in the early stages for follow-up by NASF professionals were found during the analysis of the medical records.

The underreporting of data records regarding the health status of users can lead to delays in diagnoses, leading to discovering the disease in the final stages and making it impossible for the user to receive guidance and care to delay the disease and learn about possible treatment options. Information recording regarding the progress of referrals made, such as obtaining an appointment with a specialist, waiting time or starting dialysis treatment was identified in only two medical records during data analysis, evidencing the gap in the counter-referral of these patients and loss of information that implies care, considering that the user should not lose ties with the unit in their territory when referred to specialized care¹¹.

As already mentioned, advancing age is a risk factor for developing chronic kidney disease. However, it was highlighted in the study that users aged less than 60 years (20% of the sample analyzed) presented significant impairment of renal function. Among them, the involvement of systemic arterial hypertension stands out, which accelerates the loss of renal function when present. This fact reinforces the need to implement strategies to prevent and control arterial hypertension, considering that it is one of the main causes of CKD development and its worsening.

Due to the great ethnic miscegenation that exists in Brazil, the use of the race variable in the evaluation of renal function is currently no longer encouraged. However, the present study indicates that race was a significant variable in referring users to a specialist in stages III, IV and V of kidney disease ($P=0.04$, $RC=0.08$ and $CI=0.008; 0.91$). This data can be understood by the fact that blacks and browns have a higher risk of developing arterial hypertension^{17,19}, and this is one of the main causes of developing and worsening kidney disease.

Study limitations

As it is a cross-sectional study, it is not possible to determine the causality of the variables and the sample was reduced, being restricted to a single ESF unit analyzed. However, this limitation did not affect the statistical analyzes according to the proposed objectives.

The absence of records by the service professionals is recognized, especially regarding the results of laboratory tests and GFR estimation, which determines the disease stage and in turn referral to the nephrologist. This indicates inconsistencies in relation to the notes and in the information system; however, this limitation contributed to showing the relevance of studies like this one which may indicate the need for changes in order to qualify the records.

CONCLUSION

As CKD is a disease with a silent and asymptomatic course, it is essential that laboratory monitoring of individuals predisposed to develop the disease be conducted as recommended by the guidelines.

Guidelines and lines of care have been developed over the last few years aimed at improving care for patients predisposed to develop CKD, however, conducting this care still remains a challenge in view of the lack of completeness in carrying out the actions which are required.

The relevant role of PHC in terms of health promotion, disease prevention and early recognition of illnesses is unquestionable. However, in view of the evidenced gaps, it is important to consider that new strategies need to be devised so that PHC is effective in the specific management actions of users predisposed to CKD and guarantees care continuity and comprehensiveness.

Nurses play an important role in monitoring and actively participating in the care of users predisposed to CKD. From this perspective, it is reinforced that the nurse is able to implement clinical knowledge, and thus request the tests required by the guidelines, evaluate the GFR estimate and monitor evolution. In addition, they need to implement all actions to promote lifestyle changes and encourage self-care, as these actions compose the scope of primary care professionals with this population group. This study aims to promote knowledge about implementing policies aimed at care for the prevention, treatment and monitoring of people with CKD so that the interventions described in the protocols are effectively established.

REFERENCES

1. Kirsztajn GM astroian., Filho NS algad., Draibe SA, Netto MV início. de P, Thomé FS aldanh., Souza E, et al. Fast reading of the KDIGO 2012: guidelines for evaluation and management of chronic kidney disease in clinical practice. *J Bras Nefrol of Soc Bras e Latino-Americana Nefrol.* 2014;36(1):63–73. DOI: <https://doi.org/10.5935/0101-2800.20140012>.
2. Gordan, PA. Grupos de risco para doença renal crônica. *Braz. J. Nephrol.* 2006 [cited 2021-08-20]; 28(2 suppl. 1):8-11. Available from: <https://www.bjnephrology.org/article/grupos-de-risco-para-doenca-renal-cronica>.
3. Brasil. Ministério da Saúde. Secretaria de Atenção à Saúde. Prevenção Clínica de Doença Cardiovascular, Cerebrovascular e Renal Crônica [Internet]. *Caderno de Atenção Básica vol. 14.* 2006. 23–25 p. [cited 2021 Aug 20]. Available from: http://189.28.128.100/dab/docs/publicacoes/cadernos_ab/abcad14.pdf.
4. Neves PDMM, Sesso RCC, Thomé FS, Lugon JR, Nascimento MM. Brazilian dialysis survey 2019. *Braz. J. Nephrol.* 2021 [cited 2022 Jan 25]; 43(2): 217-27. Available from: <https://www.bjnephrology.org/article/inquerito-brasileiro-de-dialise-2019/>.
5. Ministério da Saúde (Br). Diretrizes Clínicas para o Cuidado ao Paciente com Doença Renal Crônica no Sistema Único de Saúde. 2014 [cited 2021 Aug 20]; (1):1–37. Available from: https://bvsms.saude.gov.br/bvs/publicacoes/diretrizes_clinicas_cuidado_paciente_renal.pdf.
6. Lima WL de, Paula LB de, Duarte TT da P, Magro MC da S. Knowledge of primary health care nurses about risk factors of acute kidney injury. *Esc Anna Nery.* 2020 [cited 2021 Aug 20]; 24(2):e20190280. DOI: <https://doi.org/10.1590/2177-9465-EAN-2019-0280>.
7. Brasil. Ministério da Saúde. Secretaria de Atenção à Saúde. Portaria nº. 1.675, de 07 de junho de 2018. Altera a Portaria de Consolidação nº 3/GM/MS, de 28 de setembro de 2017, e a Portaria de Consolidação nº 6/GM/MS, de 28 de setembro de 2017, para dispor sobre os critérios para a organização, funcionamento e financiamento do cuidado da pessoa com Doença Renal Crônica - DRC no âmbito do Sistema Único de Saúde - SUS. [portaria na internet]. *Diário Oficial da União* 08 de junho 2018 [cited 2021 Sep 10]; Seção1, (148). Available from: https://bvsms.saude.gov.br/bvs/saudelegis/gm/2018/prt1675_08_06_2018.html#:~:text=Ficam%20mantidas%20as%20classificac%3%A7%20as%20de%20seguinte%20a%20de%20sua%20publicac%3%A7%20a%30.
8. Delatorre T, Romão EA, Mattos ATR, Ferreira JBB. Management of chronic kidney disease: perspectives of Brazilian primary care physicians. *Prim Heal Care Res Dev.* 2022 [cited 2022 May 10]; 22:E8. DOI: <https://doi.org/10.1017/S1463423621000074>.
9. De Paula EA, Costa MB, Colugnati FAB, Bastos RMR, Vanelli CP, Leite CCA, et al. Strengths of primary healthcare regarding care provided for chronic kidney disease. *Rev Lat Am Enfermagem.* 2016 [cited 2021 Aug 20]. 24:e2801. DOI: <https://doi.org/10.1590/1518-8345.1234.2801>.
10. Castro TLB, Oliveira RH, Sousa JAG, Romano MCC, Guedes JVM, Otoni A. Impaired kidney function: prevalence and associated factors in risk patients. *Rev Cuid.* 2020. 11(2):e1019. DOI: <https://doi.org/10.15649/cuidarte.1019>.
11. Cortez EN, Rocha FH, Gontijo TL, Otoni A. A assistance to patients with chronic kidney disease in primary health care: a systematic literature review. *Res Soc Dev.* 2022 [cited 2022 May 10]; 11(4):e35011427389. DOI: <http://dx.doi.org/10.33448/rsd-v11i4.27389>.
12. Richardson RJ e colaboradores. *Pesquisa Social Métodos e Técnicas.* 3ª Ed. São Paulo: Editora Atlas SA.; 1999.
13. Abensur H. Biomarcadores na Nefrologia [livro eletrônico]. São Paulo. Roche; 2011 [cited 2021 Sep 10]. p. 81–92. Available from: <https://arquivos.sbn.org.br/pdf/biomarcadores.pdf>.
14. Dallacosta FM, Dallacosta H, Mitrus L. Early detection of chronic kidney disease in at-risk population. *Cogit Enferm.* 2017 [cited 2021 Sep 10]; 22(1):e48714. DOI: <http://dx.doi.org/10.5380/ce.v22i1.48714>.
15. Marinho AWGB, Penha A da P, Silva MT, Galvão TF. Prevalência de doença renal crônica em adultos no Brasil: revisão sistemática da literatura. *Cad Saúde Colet.* 2017 [cited 2021 Sep 10]; 25(3):379–88. DOI: <http://10.1590/1414-462X201700030134>.
16. Piccolli AP, Nascimento MM do, Riella MC. Prevalence of chronic kidney disease in a population in southern Brazil (Pro-Renal Study). *J Bras Nefrol.* 2017 [cited 2021 Sep 10]; 39(4):384–90. DOI: <https://doi.org/10.5935/0101-2800.20170070>.
17. Aguiar LK de, Ladeira RM, Machado ÍE, Bernal RTI, Moura L de, Malta DC. Factors associated with chronic kidney disease, according to laboratory criteria of the National Health Survey. *Rev Bras Epidemiol.* 2020 [cited 2022 May 22]; 23:e200101. DOI:

<https://doi.org/10.1590/1980-549720200101>.

18. Kirsztajn GM. Diagnóstico Laboratorial em Nefrologia. 1ª Ed. São Paulo: Sarvier; 2009.
19. Bravo-Zúñiga J, Gálvez-Inga J, Carrillo-Onofre P, Chávez-Gómez R, Castro-Monteverde P. Detecção precoce da doença renal crônica: trabalho coordenado entre atenção primária especializada em uma rede renal ambulatorial do Peru. *Braz. J. Nephrol.* 2019 [cited 2021 Abr 13]; 41(2):176-84. Available from: <https://www.bjnephrology.org/en/article/early-detection-of-chronic-renal-disease-coordinated-work-betweenprimary-and-specialized-care-in-an-ambulatory-renal-network-ofperu/>.
20. Leite LP, Cordeiro GP, Monteiro BC, Oliveira PGA de, Spinetti PP de M, Magalhães MEC, et al. Hypertension in chronic kidney disease under conservative treatment. *Rev Bras Hipertens.* 2020 [cited 2021 Apr 13]; 7(4):115–21. DOI: <http://dx.doi.org/10.47870/1519-7522/20202704115-21>.
21. Dusse LMS, Rios DRA, Sousa LPN, Moraes RMM e S, Domingueti CP, Gomes KB. Biomarkers of renal function: what is currently available? *Rev Bras Análises Clínicas.* 2017 Jun [cited 2021 Sep 16]; 49(1):41–51. Available from: <http://www.rbac.org.br/artigos/biomarcadores-da-funcao-renal-do-que-dispomos-atualmente/>.
22. Kirsztajn GM. Avaliação Laboratorial em Nefrologia. 1ª Ed. Piracicaba, SP: Balieiro; 2021.
23. Saúde BM da, Einstein SBIBA. Nota técnica para organização da rede de atenção à saúde com foco na atenção primária à saúde e na atenção ambulatorial especializada: saúde da pessoa com diabetes mellitus e hipertensão arterial sistêmica. 2020 [cited 2022 May 23]; 88. Available from: <https://www.conass.org.br/biblioteca/download/8023/>.
24. Ministério da Saúde (Br). Endocrinologia e Nefrologia. Protocolo encaminhamento da atenção básica para atenção especializada. 2015 [cited 2021 Aug 20]; (1):1–22. Available from: https://bvsms.saude.gov.br/bvs/publicacoes/protocolos_atencao_basica_atencao_especializada_endocrinologia.pdf.
25. Bousquat A, Giovanella L, Campos EMS, De Almeida PF, Martins CL, Mota PHDS, et al. Primary health care and the coordination of care in health regions: managers' and users' perspective. *Cienc e Saude Coletiva.* 2017 [cited 2021 dec 10]; 22(4):1141–54. DOI: <https://doi.org/10.1590/1413-81232017224.28632016>.
26. Santos JRF de M, Luz MF de S, Lima S da R, Aguiar V, Moura IH de, Silva P de S e. Estratégias Da Atenção Básica Na Doença Renal Crônica: A Importância Do Diagnóstico Precoce. *Saúde.com.* 2017-06-30 [cited 2022 Mar 18]; 13(2):863–70. DOI: <http://dx.doi.org/10.22481/rsc.v13i2.433>.