

EARLY DETECTION OF CHRONIC KIDNEY DISEASE IN AT-RISK POPULATION

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ABSTRACT: The present study aimed to assess the occurrence of kidney disease in the early stages in hypertensive and diabetic individuals who participated in groups of the HiperDia program in the state of Santa Catarina. Cross-sectional study with data collection between July 2015 and July 2016. Kidney disease was classified by glomerular filtration rate (GFR) of less or more than 60 mL/min/1.73m², and calculated by Cockcroft-Gault equation. Of the 1,486 participants, 473 (31.8%) had glomerular filtration under 60 mL/min/1.73 m², 616 in stage two (41.5%), mean age 63.1 (± 11.8) years, 992 subjects (66.8%) were females, and women had higher glomerular filtration rates than men. A significant inverse relationship was found between aging and glomerular filtration rate of 60 mL/min/1.73 m², and a direct relationship was found between age and decrease of serum creatinine. A high prevalence of kidney disease, especially of stage two, was observed, corroborating the importance of guidance and proper monitoring of hypertensive and diabetic patients, in order to stop kidney function impairment, with focus on health prevention and promotion.

DESCRIPTORS: Chronic kidney disease; Hypertension; Diabetes Mellitus; Risk groups.

DETECÇÃO PRECOCE DE DOENÇA RENAL CRÔNICA EM POPULAÇÃO DE RISCO

RESUMO: Objetivou-se verificar a doença renal em estágio inicial em hipertensos e diabéticos de grupos HiperDia de Santa Catarina. Estudo transversal, com coleta de dados entre julho de 2015 e julho de 2016. A doença renal foi classificada pela filtração glomerular maior ou menor que 60 mL/min/1,73m², e calculada pela equação Cockcroft-Gault. Dos 1486 participantes, 473 (31,8%) apresentaram filtração glomerular abaixo de 60 mL/min/1,73m², 616 no estágio dois (41,5%), média de idade 63,1 (±11,8) anos, 992 (66,8%) sexo feminino, mulheres tiveram filtração glomerular menor que os homens. A idade obteve forte associação inversa com a filtração glomerular menor que 60 mL/min/1,73m², e associação direta com a creatinina. Encontramos elevada prevalência de doença renal, especialmente no estágio dois, ratificando a importância de orientação e adequado acompanhamento dos hipertensos e diabéticos, como forma de estagnar a perda da função renal, e trabalhar com foco na prevenção e promoção da saúde..

DESCRIPTORES: Doença renal crônica; Hipertensão; Diabetes Mellitus; Grupos de risco.

DETECCIÓN PRECOZ DE LA ENFERMEDAD RENAL CRÓNICA EN UNA POBLACIÓN DE RIESGO

RESUMEN: Se objetivó verificar la enfermedad renal en etapa inicial en hipertensos y diabéticos de grupos HiperDia de Santa Catarina. Estudio transversal, datos recolectados entre julio de 2015 y julio de 2016. La enfermedad renal fue clasificada por la filtración glomerular inferior o superior a 60 mL/min/1,73m², calculada por ecuación Cockcroft-Gault. Sobre 1486 participantes, 473 (31,8) presentaron filtración glomerular inferior a 60 mL/min/1,73m²; 616 en la etapa dos, media etaria 63,1 (±11,8) años; 992 (66,8%) sexo femenino; las mujeres tuvieron filtración glomerular menor que los hombres. La edad tuvo fuerte asociación inversa con la filtración glomerular inferior a 60 mL/min/1,73m², y asociación directa con creatinina. Encontramos elevada prevalencia de enfermedad renal, particularmente en etapa dos, ratificando la importancia de orientación adecuada y seguimiento de hipertensos y diabéticos como modo de detener la pérdida de la función renal, y trabajar con foco en prevención y promoción de salud.

DESCRIPTORES: Insuficiencia Renal Crónica; Hipertensión; Diabetes Mellitus; Grupos Vulnerables.

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● INTRODUCTION

Chronic Kidney Disease (CKD) is a silent and worrisome epidemic worldwide. In Brazil, according to the Brazilian Society of Nephrology (SBN), the number of people receiving dialysis between the years 2000 to 2013 increased by 135.15%, with 112,004 individuals receiving this treatment in 2014⁽¹⁾. However, there is scarce information on the prevalence of early-stage, non-dialysis dependent chronic kidney disease⁽²⁾.

Kidney disease involves multiple factors and is particularly associated with diabetes and hypertension, which are the leading causes of kidney failure⁽³⁾ and have high prevalence, high morbidity and mortality. Hypertension has a prevalence rate of approximately 25% in the Brazilian adult population⁽⁴⁾, and diabetes, an incidence rate of 6%⁽⁵⁾.

The major challenge of kidney disease is early detection. The disease may be asymptomatic or oligosymptomatic, with clear manifestation of its signs and symptoms only between the moderate and severe stages of kidney failure, when the kidneys are considerably impaired. Since diabetic and hypertensive individuals are populations at high-risk for CKD, the best way to promote the early identification of the disease is continuous monitoring of these individuals, through periodical tests to assess kidney function and permanent health education⁽⁶⁾.

Due to the social relevance of this theme, the high costs of treatment and the morbimortality associated with the disease, prevention of CKD is crucial. Therefore, disseminating easily accessible scientific knowledge to the population is a way to promote health, improve the prognosis and quality of life of people with CKD⁽⁷⁾. The teams of the Family Health Strategies (ESF) must be well informed about the disease and take actions aimed at the promotion and prevention of CKD, by implementing strategies that allow its early diagnosis.

The present study aimed to verify the frequency of early-stage kidney disease in hypertensive and diabetic individuals who participate in HiperDia program groups in the Midwest region of the state of Santa Catarina.

● METHOD

Cross-sectional epidemiological study with 1,486 hypertensive and diabetic individuals from ten cities in the Midwest of Santa Catarina conducted between July 2015 and July 2016. The Midwest region is composed of 19 cities and all of them were invited to participate in the study. Those that agreed to participate arranged meetings with their HiperDia program groups. On the scheduled day, a lecture on the prevention of kidney disease was held and urea, creatinine and qualitative urine samples were collected from all participants above 18 years of age, of both genders, diagnosed with hypertension and/or diabetes, who attended all lectures, accepted to participate in the study and had not taken these tests within twelve months of the start of the study.

The results obtained were submitted to a nephrologist and a nephrology nurse, for analysis and calculation of Glomerular Filtration Rate (GFR), using the Cockcroft-Gault (CG) equation. These results were returned to the respective municipal health departments (SMS). Creatinine collection was requested and the CG formula was used because it estimates creatinine clearance and is widely accepted for these purposes⁽⁸⁾.

After calculation of the GFR, the subjects were classified into two groups based on their GFRs (above or under 60 mL/min/1.73m²), according to the concept of chronic kidney disease adopted by the National Kidney Foundation (NKF) through the Kidney Disease Outcomes Quality Initiative (K/DOQI), as follows: all individuals with GFR <60 mL/min/1.73 m² for ≥ 3 months, or GFR ≥ 60 mL/min/1.73 m² with markers of kidney damage, are classified as having CKD⁽⁹⁾.

The local Family Health Strategy (FHS) teams assisted the researchers during data collection. The inclusion criteria were hypertensive and/or diabetic individuals registered at the ESF and who attended the HiperDia program meeting on the day of the lecture and collection of samples for the tests, and the exclusion criterion was refusing to submit to the tests. The study was approved by the Research

Ethics Committee of Unoesc under statement no 160.925, and all participants signed the free informed consent form.

Quantitative data were described by means and standard deviation (SD) and categorical data were described by means of counts and percentages. The comparison of quantitative variables between the groups was performed by Student's t test. The association of quantitative variables was obtained by the Pearson's correlation coefficient. Categorical data crossing were analyzed by chi-square test. The level of significance was $\alpha = 0.05$. The data was analyzed using the Statistical Package for Social Sciences (SPSS) 21.0.

● RESULTS

A total of 1,486 hypertensive and/or diabetic patients living in ten municipalities of Santa Catarina participated in this study. The mean age was 63.1 years (± 11.8), 992 (66.8%) were female, 473 (31.8%) had GFR <60 ml/min/1.73 m². The distribution of CKD in stages and its association with aging are shown in Table 1, according to the classification of the Kidney Disease Improving Global Outcomes⁽¹⁰⁾.

Table 1 - Chronic Kidney Disease distributed by stages and mean age. Joaçaba, SC, Brazil, 2016

Stage	Reference value*	Classification	n (%)	Mean Age	P
1	> 90 ml / min	Normal or elevated GFR	408 (27.5)	47.63	0.47
2	60-89ml / min	Slightly decreased GFR	616 (41.5)	64.76	0.00
3a	45-59ml / min	Moderately reduced GFR	293 (19.7)	71.56	0.73
3b	30-44ml / min	GFR with moderate to severe decrease	143 (9.6)		
4	15-29ml / min	Severely reduced GFR	23 (1.5)	65.45	0.34
5	<15 ml / min	Kidney failure	01 (0.1)		

The mean glomerular filtration rate was 77.2 ml/min (± 30.7), mean serum creatinine was 1.0 (± 0.2) mg /dl and mean urea was 38.8 (± 13.8) mg / DL. Analysis of the relationship between age and creatinine gave ($r = 0.2$, $p = 0.00$) and between age and GFR, ($r = -0.6$, $p = 0.00$).

The women had lower creatinine and GFR values than men ($p = 0.00$) (Table 2) and had a 10% higher risk of having GFR under 60 ml/min ($p = 0.00$). Among the participants, 665 (44.7%) underwent qualitative urine test for analysis of the presence of proteinuria. Of these, eight (1.2%) had proteinuria, 550 (82.7%) did not have proteinuria and 107 (16.1%) had traces of proteinuria. There was no association between the presence of proteinuria and gender ($p = 0.12$), nor with age ($p = 0.17$).

Table 2 - Kidney function according to gender. Joaçaba, SC, Brazil, 2016

Gender	Mean GFR	SD (\pm)	Mean creatinine	p
Male	80.5	30.2	1.14	0.00
Female	75.6	30.9	0.96	0.00

Table 3 - Glomerular filtration rate distributed by municipalities. Joaçaba, SC, Brazil, 2016

Municipality	n	GFR <60 mL / min / 1.73m ² %
Municipality 1	24	41.6
Municipality 2	141	30.4
Municipality 3	286	35.6
Municipality 4	37	27
Municipality 5	7	57.1
Municipality 6	45	20
Municipality 7	327	23.2
Municipality 8	131	35.8
Municipality 9	434	33.1
Municipality 10	54	51.8
TOTAL	1,486	31.8

● DISCUSSION

The findings of this study reinforce the importance of early diagnosis of chronic kidney disease, since referral to specialist nephrology service is essential to prevent the progression and worsening of CKD: delayed referral to nephrology services is associated with higher mortality rates⁽¹¹⁾. The high number of people with GFR <60ml/min/1.73m² found in this study is a matter of concern, especially because most of them are not monitored by specialists in nephrology, and according to FHS records, they do not take periodical tests, and in the previous tests for measuring serum creatinine levels, glomerular filtration was not estimated.

Most participants in this study are at stage 2 of chronic kidney disease, which reinforces the importance of monitoring these people with conservative treatment, periodic consultations and tests to delay the progression of the disease and eliminate the problems caused by kidney failure. The Hiperdia program, created by the Ministry of Health in 2002, is supposed to monitor and guide hypertensive and diabetic patients, focusing on the treatment, prevention and diagnosis of these pathologies. The program is a safe and effective way to obtain patient adherence to treatment and promote a bond between these patients and the health services organized through Basic Health Unit (UBS), to ensure continuous safe and high quality care⁽¹²⁾.

There are few studies on the prevalence of CKD in the early stages. The identified studies found that the current preventive measures are ineffective, creating a serious public health issue, since patients are only aware of CKD at advanced stages⁽⁸⁾. In this regard, we cite a study in Chile that obtained a prevalence of GFR<60ml/min/1.73m² in 12.1% of the sample and in Spain, 21.3% of the sample⁽²⁾.

Given the reference values of urea (20 to 40 mg/dL) and creatinine (0.6 to 1.3 mg/dL), in our study, the participants showed normal values for these markers, but creatinine level will rise only after GFR has fallen to 50-60% of its normal level. As for urea levels, they are more susceptible to changes for reasons not related to GFR. Therefore, in this study, creatinine levels are used as complementary evidence in the assessment of kidney function⁽⁸⁾.

The results of the 665 persons who took urine tests showed a small percentage of proteinuria, possibly because this test only detects the presence of macroalbuminuria (> 300 mg/day). For the detection of microalbuminuria all urine produced over a 24-hour period must be collected. Albuminuria is the main marker of parenchymal kidney damage, and microalbuminuria is recommended for people at risk for CKD⁽⁸⁾. Based on the concept of kidney disease adopted by the KKF, according to which CKD is present when GFR <60ml/min/1.73m² for ≥ 3 months or GFR ≥60ml/min/1.73m², with markers of kidney damage, repeat testing is recommended for individuals at risk for CKD to investigate the presence of the disease at an early stage, as well as taking microalbuminuria tests to make sure that CKD at earlier stages can be detected in more individuals⁽⁹⁾.

In this study, women had a lower mean GFR than men, and there were more women than men in the group with filtration rate under 60 mL/min/1.73 m², corroborating other studies^(3,6) in which women had greater probability of developing CKD (odds ratio 2.3), values similar to those found in this study (odds ratio 1.5), but the association of CKD and gender remains a controversial issue.

Old age has proven to be a risk factor for CKD, either due to age-related physiological decline of the body or the high incidence of chronic diseases among the elderly (7), which was also in the present study where age had a moderate correlation with creatinine levels and a strong inverse correlation with GFR. Other studies also corroborate these findings, stressing the greater prevalence of CKD in people over 60 years^(2-3,13), which explains the importance of taking tests to assess kidney function in the population over 60 years.

A study conducted in Mato Grosso that analyzed GFR values of 50 patients, obtained 44% of patients with GFR between 60 and 89 mL/min (stage 2) and 46% with GFR between 30 and 59 mL/min (stages 3a and 3b)⁽¹⁴⁾. A similar result was obtained in this study, particularly for mild or functional kidney failure (stage 2), in 41.3% of the individuals.

For the implementation of strategies of CKD early detection and treatment, appropriate scaling of CKD is required, which is not yet adequately addressed. The few population surveys in Brazil diverge both in the method of identification of the disease and in the results, and concern specific groups or regions⁽¹⁵⁾. Population aging and increased life expectancy have generated greater concern of health services with chronic diseases, including CKD, and early referral to nephrology services is a measure that must be effectively implemented to ensure a better quality of life and reduce morbidity and mortality associated with kidney disease.

● CONCLUSION

This study found a high prevalence of chronic kidney disease in the early stages among the population assisted by the teams of Family Health Strategies (FHS) in several cities, and is associated with age and female gender.

The lack of early detection strategies prevents the diagnosis of CKD in its early stages and delays in treatment. Therefore, actions targeted to the health education of the population at higher risk of kidney failure are essential, as well as the implementation of measures of health promotion and periodic monitoring of hypertensive and diabetic patients such as tests to assess the kidney function.

One limitation of this study was the reduced number of people attending the HiperDia groups, which varied in the different municipalities. In some of them, these groups are well structured, but in others, the population of hypertensive and diabetic patients is not properly represented.

It is hoped that this study will contribute to the implementation of new actions for the assessment of kidney function within the scope of the FHS, so that more people are encouraged to attend the HiperDia programs and the kidney function assessment becomes a permanent and effective measure in these groups.

● REFERENCES

1. Sesso RC, Lopes AA, Thomé FS, Lugon JR, Martins CT. Brazilian Chronic Dialysis Census 2014. *J. Bras. Nefrol.* 2016;38(1):54-61.
2. Pereira ERS, Pereira AC, de Andrade GB, Naghettini AV, Pinto FKMS, Batista SR, et al. Prevalence of chronic renal disease in adults attended by the family health strategy. *J. Bras. Nefrol.* 2016;38(1):22-30.
3. Bastos RMR, Bastos MG, Ribeiro LC, Bastos RV, Teixeira MTB. Prevalência da doença renal crônica nos estágios 3, 4 e 5 em adultos. *Rev. Assoc. Med. Bras.* 2009;55(1):40-4.
4. Burgos PFM, da Costa W, Bombig MTN, Bianco T. A obesidade como fator de risco para a hipertensão. *Rev Bras Hipertens.* 2014;21(2):68-74.

5. Iser BPM, Stopa SR, Chueiri PS, Szwarcwald CL, Malta DC, Monteiro HOC, et al. Prevalência de diabetes autorreferido no Brasil: resultados da Pesquisa Nacional de Saúde 2013. *Epidemiol. Serv. Saúde*. 2015;24(2):305-14.
6. Schaefer JCF, Pereira MS, de Jesus CR, Schuelter-Trevisol F, Trevisol DJ. Estimativa da função renal na população de 18 a 59 anos da cidade de Tubarão-SC: um estudo de base populacional. *J. Bras. Nefrol*. 2015;37(2):185-91.
7. Bastos MG, Bregman R, Kirsztajn GM. Doença renal crônica: frequente e grave, mas também prevenível e tratável. *Rev. Assoc. Med. Bras*. 2010;56(2):248–53.
8. Bastos MG, Kirsztajn GM. Doença renal crônica: importância do diagnóstico precoce, encaminhamento imediato e abordagem interdisciplinar estruturada para melhora do desfecho em pacientes ainda não submetidos à diálise. *J. Bras. Nefrol*. 2011;33(1):93-108.
9. National Kidney Foundation. K/DOQI clinical practice guidelines for chronic kidney disease: evaluation, classification and stratification. *Am J Kidney Dis*. 2002;39(2 Suppl 1):S1-S266.
10. Kidney Disease: Improving Global Outcomes (KDIGO). CKD Work Group. KDIGO 2012 Clinical Practice Guideline for the Evaluation and Management of Chronic Kidney Disease. *Kidney Int (Suppl)*. 2013;3(1):1-150.
11. Diegoli H, Silva MCG, Machado DSB, Nova Cruz CER. Encaminhamento tardio ao nefrologista e a associação com mortalidade em pacientes em hemodiálise. *J. Bras. Nefrol*. 2015;37(1):32-7.
12. Lima AS, Gaia ESM, Ferreira MA. A importância do Programa Hiperdia em uma Unidade de Saúde da Família do município de Serra Talhada - PE, para adesão dos hipertensos e diabéticos ao tratamento medicamentoso e dietético. *Saúde Coletiva em Debate*. 2012;2(1):9-17.
13. Pinho CPS, Carvalho BSS, Araújo MLD. Sensibilidade da creatinina sérica como marcador da função renal em pacientes coronariopatas. *Rev Bras Clin Med*. 2011;9(5):343-9.
14. Silva MMH, Brune MFSS. Importância do cálculo da taxa de filtração glomerular na avaliação da função renal de adultos. *Rev. Bras. Farm*. 2011;92(3):160-5.
15. Matos JPS, Lugon JR. Hora de conhecer a dimensão da doença renal crônica no Brasil. *J. Bras. Nefrol*. 2014;36(3):267-8.