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ORIGINAL ARTICLE

FACTORS ASSOCIATED WITH CHRONIC KIDNEY DISEASE IN OLDER ADULT CAREGIVERS OF ELDERLY PEOPLE[1]

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ABSTRACT

Objective: to identify factors associated with the development of chronic kidney disease in older adult caregivers of elderly people. **Method:** cross-sectional study, carried out from January to September 2019 with 111 older adult family caregivers of elderly people in primary health care. For data collection, the Sociodemographic, Health and Care Context Characterization Questionnaire, the Screening for Occult Kidney Disease, the Addenbrooke Cognitive Examination - Revised Version, the Geriatric Depression Scale, the Zarit Burden Inventory and the Perceived Stress Scalewere used. Descriptive statistics and multiple logistic regression analysis were performed using the stepwise forward method (p<0.05). All ethical precepts were observed. **Results:** the sample showed a predominance of women, married, who offered care to their spouse. Through screening for chronic kidney disease, it was found that 99.1% of the participants had a high predisposition to the development of chronic kidney disease. Each unit of increase in the number of drugs increased the chance of older adult caregivers developing chronic kidney disease by 1,257 times. **Conclusion:** there was a predominance of high predisposition to chronic kidney disease in the sample of older adult caregivers and the number of drugs in use was the factor associated with this predisposition.

Keywords: Caregivers. Older people. Chronic renal failure. Geriatric Nursing. Primary health care.

INTRODUCTION

With the increase in the number of elderly people in the population brings along an increase in the number of chronic non-communicable diseases (CNCD). Brazilian elderly people have in average 3.1 (± 0.3) chronic diseases. The most frequent multimorbidities are: systemic arterial hypertension (SAH) and high cholesterol (31.3%); SAH and stroke (30.9%); and SAH and diabetes mellitus (DM) (23.3%). Consequently, the impact on the functional capacity of these people results in a greater demand for care[1].

The informal caregiver is characterized by not having an employment bond or any remuneration for the care offered to the individual with some degree of dependence, providing care actions for basic life maintenance such as hygiene and food and financial tasks[2]. The task of caregiving is culturally performed by the family and, in general, care is offered by daughters or wives with few years of schooling, who provide care without help or training for this function[2-4]. Studies have shown the growth in the number of caregivers who are also elderly, and most likely also have some CNCD[3,4].

Regarding the physical and emotional health condition of informal caregivers, the overload

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generated by excessive hours of dedication to care can result in stress and compromise their well-being[5,6]. Comorbidities such as SAH (49.4%), DM (23.2%), arthritis (29.3%), peripheral vascular disease (28.3%), heart disease (12.1%), pain (58.2 %), insomnia (41.4%), and vision problems (39.4%) are reported by people who play the role of caregivers[2]. Among the CNCD, chronic kidney disease (CKD) stands out, notoriously known as an important health problem[6-9].

In Brazil, an epidemiological survey carried out by the National Health Survey with the general population revealed that 1.42% of the 60,202 participants self-reported being affected by CKD, but when referring to the elderly aged 65 years and over, the prevalence rises to 3.13%[9]. CKD is an irreversible and gradual syndrome that interferes with kidney functions, leading to organ failure[7]. The primary diseases most related to CKD are SAH and DM, although studies point to other factors associated with the development of CKD, such as advancing age, female sex, smoking, anemia, dyslipidemia, cardiovascular disease, and presence of protein in the urine[6,8-10].

Among the treatment modalities for CKD, hemodialysis is the most used[11]. CKD and its treatment result in a strong impact on the individuals' life, with physical, emotional and social implications that compromise their functional capacity and reduce their quality of life[7,12]. Furthermore, it generates a high burden for the health system[4,7,9,11]. Data presented by the Brazilian Dialysis Census showed that the estimated global prevalence of patients on chronic dialysis increased from 405 per million of the population (pmp) in 2009 to 640 pmp in 2018, corresponding to an absolute increase of 58%, with a mean growth of 6.4% per year[11].

In this scenario, caregivers of elderly people deal with the overload generated by physical and mental exhaustion, often caused by long hours of care without time for leisure or self-care, and still need to deal with the compromise of their health due to the comorbiditiesassociated to aging, which make them doubly vulnerable[3].

Considering the above, being an older person already increases the predisposition to CKD[6-8,10], and when this predisposition is added to the task of being the caregiver of another elderly person and all the health implications inherent to this care, the chances for the development of CKD may be greater. Given the relevance of this topic and highlighting the scarcity of studies related to the development of CKD in older adult caregivers of the elderly people, the following research question arises: what are the factors associated with the development of CKD in older adult caregivers of elderly people? To answer this question, this study aimed to identify factors associated with the development of CKD in older adult caregivers.

METHODS

This is a descriptive, cross-sectional and quantitative study carried out from January to September 2019, in a municipality in the countryside of São Paulo. The methodology was guided by the guide of observational studies in epidemiology - STROBE.

The sample was selected from a database of older adult caregivers of elderly people built in 2014 by researchers from a Federal University in the countryside of São Paulo, with information from the households identified through lists provided by the Family Health Units (FHU). The bank was composed of 351 older adult caregivers of elderly people registered at the FHU.

The criteria for inclusion in the study were: people aged 60 years or over, registered in the Family Health Units (FHU) of the municipality and who offered care to another elderly person with whom they lived. Exclusion criteria were: place of difficult access, addresses not found, divorce, change of address/not residing in the area covered by the FHU, death of the care recipient/care provider, difficulty in participating due to physical/mental weakness, refusals, and individual not found after three attempts on different days and times.

To identify the older adult caregiver, questionnaires for evaluation ofperformance were used, in which the assisted elderly should be dependent on at least one Basic Activity of Daily Living, identified by the Katz Index and/or Instrumental Activity of Daily Living evaluated by the Scale of Lawton and Brody[13], and the older adult caregiver should be more independent than the elderly person with whom

he lived. In cases of a tie, both were excluded from the survey. The most independent elderly person was referred to as the caregiver.

Data were collected at the home of the older adult caregivers by properly trained researchers. The interview was conducted individually, lasting approximately 40 minutes. A sociodemographic and care context questionnaire developed by the researchers was used, containing information on: gender (female and male), age (in years), education (in years), marital status (married, single, divorced and widowed), degree of kinship (spouse, father/mother, father-in-law/mother-in-law and brother/sister) and time of care (in years), drug use (yes or no), number of drugs per day (quantity) and type of drug (anti -hypertensive, anxiolytics, antidepressants, analgesics and others).

For CKD screening, the Screening for Occult Renal Disease (SCORED) questionnaire was used. This questionnaire has 11 questions, each of which receives a score when the answer is "yes": age in complete years (50-59 years, two points; 60 to 69 years, three points; ≥70 years, four points), sex (female one point), anemia (presence one point), SAH (presence one point), DM (presence one point), history of cardiovascular disease (presence one point), history of congestive heart failure (presence of one point), peripheral vascular disease (presence of one point), proteinuria (presence of one point). The final score ranges from zero to 12 points, categorized as low risk (≤3 points) and high risk (≥4 points), and high risk means a high predisposition to develop CKD[10].

For the assessment of cognition, the Addenbrooke Cognitive Examination - Revised Version (ACE-R) was used, with domains of orientation/attention, memory, verbal fluency, language and visual-constructive ability. The total ACE-R score ranges from zero to 100 points, with higher scores indicating better cognitive performance[14].

Depressive symptoms were assessed using the Geriatric Depression Scale (GDS-15), which aims to strain depressive symptoms in the elderly. The score can range from 0 to 15 points, and scores greater than five suggest the presence of depressive symptoms[15]. Care-related burden was verified by the Zarit Burden Inventory (ZBI), comprising 22 items that assess the perceived impact of the act of caring on the caregiver's physical and emotional health, social activities and financial condition. The total score is obtained by adding up all the responses to the items and can range from zero to 88; the higher the score, the greater the intensity of the burden presented by the caregiver[16]. For the analysis of older adult caregivers, the total score and categories were considered: small burden (0 to 20), moderate burden (21 to 40), and moderate to severe burden (41 to 60).

Stress was assessed using the Perceived Stress Scale (PSS), in which 14 items indicate the level of stress perceived by the elderly, with response options ranging from 0 (never) to 4 (always). Some questions have a positive connotation and others have a negative connotation, which are adjusted at the time of scoring. The final score is the sum of the responses, ranging from 0 to 56, and the higher the score, the higher the level of perceived stress[17]. Continuous scoring was considered for analysis.

Data were analyzed using the Statistical Package for the Social Sciences (SPSS for Windows), version 22.0. Descriptive statistics were performed. Simple frequencies and percentages were calculated for categorical variables and mean and standard deviationfor continuous variables. Regarding the SCORED instrument, two analyses were performed, one considering age and the other excluding the age item, given that all participants were 60 years of age or older. The normality test indicated that the data are parametric ($p \leq 0.05$). For the selection of variables for the model, initially, univariate logistic regression analyses were performed, adopting $p < 0.20$ as the critical level, and, later, in the multiple model, those that remained significant ($p < 0.05$) were kept. The associations between categorical dependent and categorical independent variables were analyzed using the chi-square test, with odds ratio (OR) statistics and confidence interval at the 95% level (CI95%). To survey the factors associated with the outcome, multiple logistic regression analysis was performed using the stepwise forward method.

The study in question was authorized by the Municipal Health Department and approved by

the Ethics Committee in Research with Human Beings for data collection CAAE: 46431315.3.0000.5504. All participants who agreed to participate in the study signed the Informed Consent Form.

RESULTS

The sample consisted of 111 older adult caregivers, as shown in the flowchart (Figure 1), below.

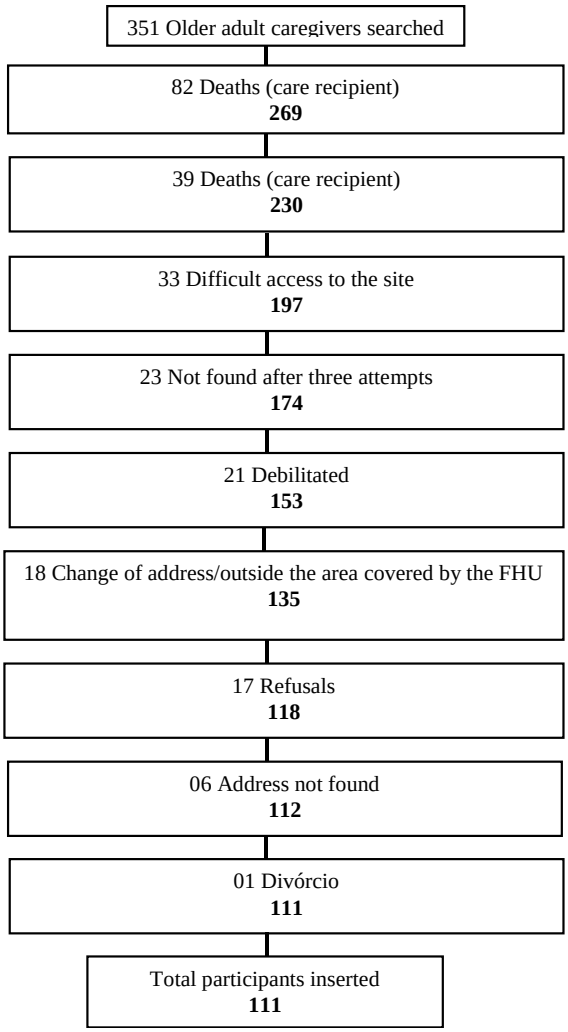

Figure 1. Representative flowchart of the process of insertion ofparticipants of thestudy.

There was a predominance of females (81.1%), married (91%), with a mean age of 72.37 (±5.72) years. As for education, 55% of the participants reported having from one to four years of schooling. Almost the entire sample provided care to the spouse (90.1%), providing care, on average, for 12.20 (±10.60) years, 4.26 (±3.09) hours a day, 6.86 (±0.79) days per week.

Table 1 presents the clinical conditions of the 111 older adult caregivers. Most reported using some drug for health issues, and antihypertensive drugs were the most reported. The majority showed an indication of small overload, without depressive symptoms and with low perceived stress.

Table 1. Distribution of the characterization of health conditions of older adult caregivers (n =111). São Carlos, São Paulo, Brazil, 2019.

Variables	*n(%)	Mean (†±sd)
Health conditions		
Use of drugs for health treatment		
Yes	98 (88.3)	
No	13 (11.7)	
Number of drugs		2.99 (±2.14)
Antihypertensives	78 (70.27)	
Anxiolytics	11 (9.90)	
Antidepressants	14 (12.61)	
Analgesics	20 (18.01)	
Others	59 (53.15)	
Number of diseases		3.73 (±2.41)
Cognition		59.44 (±18.85)
Overload		11.0 (±11.2)
Small	91 (82.0)	
Moderate	15 (13.5)	
From moderate to severe	5 (4.5)	
Stress		22.68 (±9.10)
Depressive symptoms		3.29 (±2.75)
No symptoms	85 (76.6)	
With symptoms	26 (23.4)	

Legend: *absolute number, † standard deviation
Source: the authors

Table 2 presents the items that make up the SCORED. The most reported health problem was SAH (69.4.0%), followed by peripheral vascular disease (38.7%) and DM (27.0%).

Table 2. Distribution of the results of the variables that compose the SCORED among older adult caregivers (N = 111), São Carlos, São Paulo, 2019.

Variable	(*n)	(%)
Age years)		
50 - 59	-	-
60 - 69	39	35.1
≥ 70	72	64.9
Women	90	81.1
Anemia	15	13.5
Systemic arterial hypertension	77	69.4
Diabetes mellitus	30	27.0
History of cardiovascular disease	8	7.2
History of congestive heart failure	10	9.0
Peripheral vascular disease	43	38.7
Proteinuria	2	1.8

Legend:*absolute number.
Source: the authors

Regarding CKD screening, as shown in Table 3, the majority (99.1%) of the older adult caregivers had a score ≥4 points, that is, a high predisposition to the development of CKD. As all caregivers were 60 years of age or older, the variable age was removed for another analysis, and it was identified that 15.3% of older adult caregivers still had a high predisposition to CKD.

Table 3. Screening for CKD in older adult caregivers. São Carlos, São Paulo, 2019.

Variables	*n(%)	Mean (†±sd)	Variation
Screening for occult renal disease		6.12 (±1.32)	3 – 10
Low risk (≤3 points)	1 (0.9)		
High risk (≥4 points)	110 (99.1)		
Screening for occult renal disease without age		2.47 (±1.26)	0 – 6.0
Low risk ≤3 points	94 (84.7)		
High risk ≥4 points	17(15.3)		

Legend: *absolute number, † standard deviation.
Source: the authors

Table 4 presents the results of the variables according to the univariate logistic regression analysis for the predisposition to the development of CKD in older adult caregivers.

Table 4. Univariate logistic regression analysis for predisposition to the development of CKD in older adult caregivers (n=111), São Carlos, São Paulo, Brazil, 2019.

	SCORED	
Care context variable	***OR**	***p*-value**
Time as caregiver	0.001	0.990
Hours of caregiving activity	-0.011	0.902
Days of the week of caregiving activity	0.0340	0.193
‡Number of drugs	**0.228**	**0.037**
Cognition	-0.005	0.720
Attention and orientation	0.050	0.569
Memory	-0.009	0.840
Verbal fluency	0.070	0.424
Language	-0.025	0.601
Visual spatial skill	-0.100	0. 111
Overload	-0.002	0.944
Stress	0.055	0.080
Depressive symptoms	0.087	0.343

Legend: p≤0.05. *odds ratio. ‡ statistical significance
Source: the authors

As for the results of the multiple logistic regression, the predisposition to the development of CKD was a factor associated with the number of drugs in use. With each unit of increase in the number of drugs, the chances of developing CKD in older adult caregivers increased 1,257 times.

Table 5. Final logistic regression model of variables associated with the risk of developing CKD in older adult caregivers (n=111), São Carlos, São Paulo, Brazil, 2019.

Variables	p-value ()	*OR	†95%CI
Number of drugs	0.037	1.257	1.014 – 1.155

Legend: *odds ratio, †95% confidence interval for the odds ratio.
Source: theauthors

DISCUSSION

The sociodemographic characteristics of older adult caregivers are similar to those observed in national and international studies, that is, with a predominance of women, married, with low education and who provide care to their spouse[18,19]. The diseases most reported by older adult caregivers are SAH, peripheral vascular disease and DM. The relationship between advancing age and increased prevalence of comorbidity is reported in the literature[18,20].

In the present study, the elderly had a low mean score in cognitive performance. Impaired

cognitive performance in older adult caregivers can have a negative impact on their health, as well as on the task of providing care[21]. Although the majority of the participantsshowed little burden and low level of stress, depressive symptoms were identified in almost a quarter of them. These data confirm a study carried out in the countryside of São Paulo with elderly family caregivers, which showed a mean of 64.6% (±17.4) of participants with cognitive impairment, 59.1% with small overload, mean stress of 20.4(±10.1) and 29.6% with depressive symptoms[19].

According to the SCORED instrument, used to perform CKD screening, the diseases most related to the predisposition to the development of CKD are SAH, peripheral vascular disease and DM. According to the literature, these comorbidities are directly related to the development of CKD[6,8,10,20]. The data of this study are similar to the research carried out with caregivers in rural areas in the countryside of São Paulo, which showed rates of 49.4% for SAH, 28.3% for peripheral vascular disease and 23.2% for DM, these being lower when compared to the reports of this study. This result may be associated with the fact that the sample is composed of younger participants, thus less susceptible to comorbidities[4]. In this scenario, it is the role of the nursing professional, with the implementation of interventions for the maintenance of health and prevention of diseases through the monitoring of modifiable factors, articulating with the health network, ensuring that the gateway is primary care and avoiding further health complications.

It is worth mentioning that advancing age in caregivers contributes to the development of diseases such as DM[18] and SAH, and these, added to the stress of the act of caring, can negatively impact the independence of these caregivers[3-6] with an increase in the financial burden[6,7,9,11]. As highlighted by a study developed with caregivers in Japan, which showed a higher prevalence of SAH and lower Glomerular Filtration Rate (GFR) compared to non-caregivers. From this perspective, the stress caused by the act of caring proves to be capable of raising blood pressure and reducing GFR, contributing to the loss of kidney function and, consequently, with implications that can compromise the caregiver's independence[6]. The psychological and physical implications are perceived as a result of the act of caring and the need for a comprehensive assessment by the health team. The screening instruments used in this study are easy to apply by the health team and can help in the development of early detection strategies, preventing further harm to the life of the elderly caregiver.

Regarding the predisposition to CKD in older adult caregivers of the elderly, it was found that most of the sample showed a high predisposition to the development of the disease. However, due to the characteristics of the participants in this study, in a new analysis disregarding the age variable, 15.3% of the older adult caregivers were identified with a high predisposition to the development of CKD. Thus, the importance of the age variable for the development of CKD among the elderly is confirmed, and, added to the care task, the predisposition to CKD is presented as a common factor with advancing age[6,8,21]. It is alarming to note that almost the entire sample of caregivers was highly predisposed to CKD. This data draws attention to the need for a broader assessment of older adult caregivers by primary care, articulating with the health network, with the aim of diagnostic tests and referral for treatment of the disease.

A survey carried out with the elderly in northeastern Brazil found an overall prevalence of CKD in 21.4% of the sample and when the elderly were octogenarians, the prevalence almost doubled, reaching 40%[20]. However, a literature review showed that the prevalence of CKD varies from 7.0 to 60.3%, depending on the variables and the type of screening used[22]. This reality reflects the fragility of the health system in terms of early detection and monitoring methods, which makes it impossible to stop the progression of the disease to more advanced stages[23]. Due to the advance of the aging population, the elaboration of public policies with the objective of screening/monitoring CKD becomes essential to support more assertive actions.

The multivariate logistic regression analysis showed that with each increase in the number of drugs in use, the chance of developing CKD in older adult caregivers increases 1,257 times. It is

worth mentioning that the physical and mental implications due to the act of caring[1,4,5,21], when added to age-associated multicomorbidities, culminate in greater implications for the health condition of the elderly[1,6,18]. Although this health condition of the older adult caregivers make them more susceptible to the need for drugs, the lack of time to take care of their health cause their needs to be neglected, which can lead them to self-drug[5]. Thus, it is necessary to include new methods of approach by the health team with a view to self-care, considering the implementation of measures of educational interventions such as changing lifestyle, dietary reeducation and physical exercise, which can help in the control of glycemic levels and blood pressure[24,25], among others, consequently enabling the reduction of the number of drugs used and the risk of CKD.

CONCLUSION

As this is a cross-sectional study with a specific sample, the data should not be generalized. Likewise, it is not possible to establish a cause and effect relationship. Due to the absence of a specific screening instrument for CKD in the elderly, another limitation was the use of a screening instrument for CKD that counts age as a variable factor in screening for CKD in a sample of elderly people. The importance to carry out future research with older adult caregivers is highlighted, including other factors not addressed in this study, as well as longitudinal studies. As this is a sample with older elderly people, it is relevant to develop studies with younger individuals, given the importance of the age factor for the decline in kidney function.

Based on the results obtained, it was identified that almost all the older adult caregivers in this sample had a high predisposition to the development of CKD according to the classification of the SCORED screening instrument, and the number of drugs in use was a factor associated with this predisposition. Considering the fact that they are elderly people who abdicate from caring for their own health due to the provision of care to another elderly person, the worsening in theirhealth reflects negatively on the care provided. In this perspective, for public health, it is essential to provide adequate assistance for the early identification of modifiable health problems and the development of interventions based on healthy practices to reduce the progression of CKD.

FATORES ASSOCIADOS À DOENÇA RENAL CRÔNICA EM IDOSOS CUIDADORES DE IDOSOS

Objetivo: identificar os fatores associados ao desenvolvimento de doença renal crônica em idosos cuidadores de idosos. **Método:** estudo transversal, realizado no período de janeiro a setembro de 2019 com 111 idosos cuidadores familiares de idosos da atenção primária à saúde. Para a coleta de dados, foram utilizados o Questionário de Caracterização Sociodemográfica, de Saúde e do Contexto do Cuidado, a Triagem para Doença Renal Oculta, o Exame Cognitivo de Addenbrooke - Versão Revisada, a Escala de Depressão Geriátrica, o Inventário de Sobrecarga de Zarit e a Escala de Estresse Percebido. Foi realizada estatística descritiva e análise múltipla de regressão logística pelo método *stepwise forward* (p<0,05). Todos os preceitos éticos foram observados. **Resultados:** a amostra apresentou predomínio de mulheres, casadas, que ofertavam o cuidado ao cônjuge. Através da triagem para doença renal crônica, constatou-se que 99,1% dos participantes apresentaram alta predisposição para o desenvolvimento da doença renal crônica. Cada acréscimo no número de medicamento aumenta 1,257 vezes a chance de os idosos cuidadores desenvolverem doença renal crônica. **Conclusão:** houve predominância de alta predisposição para doença renal crônica na amostra de idosos cuidadores, e o número de medicamentos em uso foi o fator associado a esta predisposição.

Palavras-chave: Cuidadores. Idoso. Insuficiência renal crónica. Enfermagem geriátrica. Atenção primária à saúde.

FACTORES ASOCIADOS CON LA ENFERMEDAD RENAL CRÓNICA EN ANCIANOS CUIDADORES DE ANCIANOS

RESUMEN

Objetivo: identificar los factores asociados al desarrollo de enfermedad renal crónica en ancianos cuidadores de ancianos. **Método**: estudio transversal, realizado en el período de enero a septiembre de 2019 con 111 ancianos cuidadores familiares de ancianos de la atención primaria de salud. Para la recolección de datos, fueron

utilizados el Cuestionario de Caracterización Sociodemográfica, de Salud y del Contexto del Cuidado; la Detección de Enfermedad Renal Crónica Oculta; el Test Cognitivo de *Addenbrooke* - Versión Revisada; la Escala de Depresión Geriátrica; la Escala de Sobrecarga del Cuidador de Zarit y la Escala de Estrés Percibido. Se realizaron estadística descriptiva y análisis múltiple de regresión logística por el método *stepwise forward* ($p<0,05$). Todos los preceptos éticos fueron observados. **Resultados**: la muestra presentó predominio de mujeres, casadas, que ofrecían el cuidado al cónyuge. A través de la clasificación de enfermedad renal crónica, se constató que el 99,1% de los participantes presentó alta predisposición para el desarrollo de la enfermedad renal crónica. Cada aumento en el número de medicamentos aumenta 1,257 veces la probabilidad de que los cuidadores mayores desarrollen enfermedad renal crónica. **Conclusión**: hubo predominancia de alta predisposición para enfermedad renal crónica en la muestra de ancianos cuidadores, y el número de medicamentos en uso fue el factor asociado a esta predisposición.

Palabras clave: Cuidadores. Anciano. Insuficiencia renal crônica. Enfermería geriátrica. Atención primaria de salud.

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