MENTAL STATUS OF ELDERLY UNDERGOING HEMODIALYSIS IN THE NEPHROLOGY SERVICE

ESTADO MENTAL DOS IDOSOS EM HEMODIÁLISE NO SERVIÇO DE NEFROLOGIA ESTADO MENTAL DE LOS ANCIANOS EN HEMODIÁLISIS EN EL SERVICIO DE NEFROLOGÍA

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ABSTRACT

Objective: to characterize sociodemographic, economic and clinical aspects and to analyze the mental state of the elderly on hemodialysis. **Method:** this is a quantitative, analytical, descriptive, cross-sectional study. The sample was composed of 94 elderly patients, aged 65 years or more, undergoing treatment at the hemodialysis service. The study was carried out by means of an instrument of characterization of the subjects and minixame questionnaire of the mental state. In the statistical analysis, the difference between the number of individuals with and without mental status change was tested using a binomial test, using the Akaike criterion (AIC) and logistic regression. Results were presented in the form of tables and figures. **Results:** 78% presented cognitive deficits, showing a significant difference ($p < 0.01$). We presented the variables "age" and "origin" (urban or rural) relevance with the presence and absence of cognitive deficit. It was verified that the age presented a 62% increase in the chances of deficit for each one year of age of the patient. **Conclusion:** it was concluded that the majority of the elderly presented cognitive deficit independent of treatment time, which may be an indication of momentary effect of hemodialysis in patients. **Descriptors:** Geriatrics; Cognitive Aging; Hemodialysis; Cognition; Chronic Kidney Disease; Nursing.

RESUMO

Objetivo: caracterizar os aspectos sociodemográficos, econômicos e clínicos e analisar o estado mental dos idosos em hemodiálise. **Método:** trata-se de um estudo quantitativo, analítico, descritivo, transversal. Compôs-se a amostra por 94 pacientes idosos, com 65 anos ou mais, em tratamento no serviço de hemodiálise. Realizou-se o estudo por meio de instrumento de caracterização dos sujeitos e questionário minixame do estado mental. Testou-se, na análise estatística, a diferença entre o número de indivíduos com e sem alteração do estado mental por meio de teste binomial, utilizado o critério de Akaike (AIC) e a regressão logística. Apresentaram-se os resultados em forma de tabelas e figuras. **Resultados:** resalta-se que destes, 78% apresentaram *deficit* cognitivo, demonstrando diferença significativa ($p < 0.01$). Apresentaram-se as variáveis "idade" e "origem" (urbana ou rural) relevância com a presença e a ausência de *deficit* cognitivo. Verificou-se que a idade apresentou aumento de 62% nas chances de *deficit* para cada um ano de idade do paciente. **Conclusão:** concluiu-se que a maioria dos idosos apresentou *deficit* cognitivo independente do tempo de tratamento, o que pode ser um indício de efeito momentâneo da hemodiálise nos pacientes. **Descritores:** Geriatria; Envelhecimento Cognitivo; Hemodiálise; Cognição; Doença Renal Crônica; Enfermagem.

RESUMEN

Objetivo: caracterizar los aspectos sociodemográficos, económicos y clínicos y analizar el estado mental de los ancianos en hemodiálisis. **Método:** se trata de un estudio cuantitativo, analítico, descriptivo, transversal. Se compuso la muestra por 94 pacientes ancianos, con 65 años o más, en tratamiento en el servicio de hemodiálisis. Se realizó el estudio por medio de instrumento de caracterización de los sujetos y cuestionario mini examen del estado mental. En el análisis estadístico se probó la diferencia entre el número de individuos con y sin alteración del estado mental por medio de la prueba binomial, utilizado el criterio de Akaike (AIC) y la regresión logística. Se presentaron los resultados en forma de tablas y figuras. **Resultados:** se resalta que de éstos, 78% presentaron déficit cognitivo, demostrando diferencia significativa ($p < 0.01$). Se presentaron las variables "edad" y "origen" (urbana o rural) relevancia con la presencia y la ausencia de déficit cognitivo. Se verificó que la edad presentó un aumento de 62% en las posibilidades de déficit por cada año de edad del paciente. **Conclusión:** se concluyó que la mayoría de los ancianos presentó déficit cognitivo independiente del tiempo de tratamiento, lo que puede ser un indicio de efecto momentáneo de la hemodiálisis en los pacientes. **Descriptores:** Geriatria; Envejecimiento Cognitivo; Diálisis Renal; Cognición; Insuficiencia Renal Crónica; Enfermería.

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INTRODUCTION

It is intended that the extension of life is the goal of any society. It is necessary to reflect, on the other hand, regarding the preparation of the health area for this reality, when the possibility of autonomy and well-being is compromised and can interfere in the quality of life of the elderly,¹ because, with the increase of life expectancy, new challenges and needs arise. It is concluded that cognitive performance is maintained until a significant deterioration of kidney function occurs. It is understood that since Chronic Kidney Disease (CKD) results from many health problems that damage the kidney, usually by progression and chronicity, preventive and therapeutic strategies can delay the loss of renal function and, consequently, protect cognitive function.²

It is noticed that the phenomenon of the elderly population growth is known worldwide, and particularly in Brazil, is occurring abruptly. It is shown in some projections that, by 2020, Brazil may have the sixth largest population of older people in the world, with more than 30 million individuals.¹ It is known that those responsible for this growth are undoubtedly the progress made in the area of technology and health. In addition to the increase in the elderly, chronic noncommunicable diseases, such as CKD, are prevalent in this population, since their initial stage is usually asymptomatic. For this reason, it is essential to follow-up and carry out frequent examinations.³

It is observed that, with aging, many structural changes occur in organs, including renal changes, which are associated with renal functional restriction, tubular and kidney atrophy, renal cortex thickness decrease (approximately 10% 30 years) to glomerulosclerosis (after the age of 70, there is a reduction of up to 50% in the cortical glomeruli) and in the intravascular variations.³ The kidneys are responsible for maintaining the homeostasis of the body, therefore, with the gradual decrease of the renal functioning, it is natural that a change in the systemic function happens, being able to culminate in cardiovascular alterations, bone metabolism, glycemia, as well as neurological.⁴

Dementia and other milder forms of cognitive impairment are similarly related to aging. It is reported that, unlike dementias, mild cognitive impairment does not interfere with day-to-day activities, but allows the early identification of patients at high risk of developing dementias.⁵ It is known that cognitive function is the major determinant of

the quality of life of human beings, especially during aging, since the elderly have a great predisposition to develop cognitive disorders.⁶

The diagnosis of dementia is made based on a clinical analysis performed by more than one type of healthcare professional. Neuropsychological tests and behavioral assessment are applied, and these clinical tests can distinguish between normal aging, cognitive decline without dementia, advanced dementia or Alzheimer's disease.⁷

Both chronic kidney disease and cognitive impairment are considered to be associated with frequent use of medical care and increased public health care. CKD is associated with the acceleration of cognitive aging, however, this has not yet been fully elucidated. The process of physiological aging of the kidneys is often exacerbated by comorbidities and lifestyle.⁸

It has been shown, through recent data, that patients with CKD are more likely to develop some type of dementia.⁶ CKD is highly diffused in mild to moderate individuals, and severity of renal dysfunction is independently correlated with cognitive impairment. It is believed that the results of this research are important if one considers that cognitive and renal function declines may contribute to the clinical vulnerability of the elderly.⁹

It can be said that patients with CKD and fragile elderly people with cognitive impairment share an increase in the frequency and severity of symptoms, such as fatigue, weakness, lack of energy, difficulty sleeping, muscle cramps and easy bruising, and psychological distress. It has been shown that cognitive impairment is also associated with decreased adherence to medications and therefore may contribute to a more rapid progression to chronic end-stage renal disease and to the need for chronic renal replacement therapy.⁹

It is found that chronic kidney patients often have comorbidities, such as Diabetes Mellitus and hypertension, so these patients are polymedicated, a factor that can affect cognition. It is also identified that they present a retention of uremic toxin, vascular alterations and microinflammations that cause a metabolic dysregulation, affecting in different ways the organs and the systemic functions.⁹

Among the alterations that may occur due to comorbidities caused by CKD, vascular endothelium dysfunction, atherosclerosis of carotid arteries and high indexes of inflammatory markers and homocystein, factors related to the decrease of vascular cognitive function.⁴

Studies are reported that hypertension and diabetes may favor the risk of loss of mental agility, just as the severity of CKD may be closely related to decreased cognitive function.⁴ It is recalled that the most common causes of cognitive problems in humans are Alzheimer's disease and vascular dementia. Although the causes of cognitive impairment in chronic renal patients are not known, there is no evidence of the prevalence of Alzheimer's disease with CKD. Therefore, it can be said, analyzing the evidence, that vascular dementia is the closest cause of cognitive impairment caused by CKD.⁴

It is understood that, faced with CKD, dialytic treatment is a common reality for elderly patients. Therefore, the need to change habits, such as specific diet, water restrictions and even the presence of the vascular catheter or arteriovenous fistula, arises. Limitations, frustrations, and stress can be brought about through all of these changes. In elderly patients, there is a significant decrease in general quality of life (QoL), influenced by physical and social aspects.¹⁰

In a recent study, a large number of patients had no expectation of disease improvement, and this may be related to the difficulties of adapting to the changes imposed by CKD and hemodialysis treatment. Many patients are also reported to be away from family and friends after the diagnosis of the disease, claiming to be a nuisance for them.¹¹ It is inferred that the stressful process of hemodialysis is often accompanied by scores with significant improvements, which are believed to be related to the adaptation to hemodialysis treatment and the constant tendency of the team to improve services and care provided, as well as equipment / structure.¹⁰

OBJECTIVE

- To characterize sociodemographic, economic and clinical aspects and to analyze the mental state of the elderly in hemodialysis.

METHOD

This is a quantitative, analytical, cross-sectional study conducted at the dialysis treatment unit of FUNFARME Base Hospital and Nephrology Unit of São José do Rio Preto - SP. The sample was composed of 94 elderly patients, aged 65 years and over, undergoing treatment at the hemodialysis service.

A sociodemographic characterization tool, developed by the researcher, and the Mini

Mental State Exam questionnaire (MMSE),¹³ were used, which is composed of six items that assess cognitive ability and enable the detection of dementia and the monitoring of response to treatment. The MMSE is divided into three areas, among them temporal orientation, spatial orientation and immediate memory. It is a generic instrument for assessing the cognitive state, translated, adequate and validated for the Portuguese language, easy to administer and understand. The MMSE questionnaire was distributed to each study participant, informing the purpose of the research and the voluntary nature of participation, in addition to each one being given explanations for completing the instrument, and for those who did not know how to read or write, reading and transcription of the questionnaire by the researcher.¹⁴

A method for data planning was established. A Microsoft Excel spreadsheet, version 2010, was used for the construction of figures and tables. The data were presented as a percentage (%) by means of binomial analysis, which tests the difference between the number of individuals with and without cognitive deficit and verifies their null hypothesis, that is, if two categories have equal chances to occur. We identified, in this case, the chances of the individuals interviewed to have or not cognitive deficit. Additionally, the influence of nominal variables, such as the origin (urban or rural), sex (male or female), race (white or black) and continuous variables, age and time of treatment were verified through logistic regression.

Logistic regression was opted for, which is a regression model in which the dependent variable is categorical. A binary variable was used in this article; this means that the dependent variable assumes only two values (0 and 1) that represent the presence or absence of cognitive deficit. The most parsimonious model was chosen by means of a step-by-step procedure using the Akaike criterion (AIC).¹⁵ It is reported that the Akaike information criterion (AIC) is a measure of the relative quality of the statistical models for a given set of data. Different models with different combinations of variables with the characteristics of the respondents, such as age, gender, origin and race, were used in this study. In this context, the AIC criterion will show which variables have the greatest influence on the presence or absence of cognitive deficit. It would be done, if one of the continuous variables were found, a proportional ratio to describe the probabilities

of occurrence. The ratio ratio is obtained by the logistic regression coefficients. A multilevel pie chart was used for the descriptive analysis of the data, and R (R Development Core Team 2016) software was used for the statistical analyses.¹⁶

All participants were informed, prior to the beginning of the research, about the study and its objectives, the right of non-participation, guarantee that its assistance would not be affected, if it did not agree to participate, nor for the answers provided, if it accepted. Anonymity and secrecy were ensured. The Term of Post-Informed Consent was signed by those who agreed to participate. This study was approved by the Ethics and Research Committee of the School of Medicine of São José do Rio Preto (FAMERP), in accordance with resolution NHC 466/12, opinion no. 1,508,014

RESULTS

There was a significant difference between the number of people evaluated with and without cognitive deficit ($p < 0.01$); of these, 78% had a deficit and 22% did not (Figure 1), which may be an indication of the momentary effect of hemodialysis in patients. However, it was observed that only "age" and "origin" (urban or rural) were related to the presence

and absence of cognitive deficit (Table 1). It is indicated by the lack of relationship of the variable "treatment time", that there are no long-term effects on hemodialysis treatment in the cognitive status of patients.

It was found that, for the continuous variable "age", the proportion ratio shows a 62% increase in the chances of deficit for each one-year increase in the patient's age, not being a cumulative effect and, additionally, preserved cognitive status, none was older than 80 years (Figure 2). It should be noted that most of the interviewees were white and urban men (Figure 1), justifying the lack of effect of the variable "sex" on the data. Cognitive deficit was present for all individuals of rural origin, which may explain the effect of this variable on the model, and "treatment time" is another variable that did not show a significant effect, in view that individuals with and without cognitive deficit, presented percentages of very similar treatment time classes (Figure 3).

Pro = Provenance; AG= Age; TT = Treatment time; RC = Race; Sex = Sex

Table 1. Rank of the best logistic regression models with the nominal variables Origin, Race and Sex; and continuous, Age and Treatment Time. The lower AIC values indicate better models. São José do Rio Preto (SP), Brazil, 2016.

Models	AIC
PRO + AG + TT + RC + SEX	100.31
PRO + AG+ TT + RC	98.36
PRO + AG + TT	96.69
PRO + AG	95.98

Pro = Provenance; AG= Age; TT = Treatment time; RC = Race; Sex = Sex

Figure 1. Percentage of patients with and without cognitive deficit subdivided into sex, race and origin categories

The figure was divided into two levels, the internal pizza being the division by cognitive state (with and without deficit) and the external pizza contains subdivisions within each cognitive state (sex, race and origin).

Figure 2. Percentage of patients with and without cognitive deficit subdivided into sex, race and origin categories.

The central figure shows the breakdown by cognitive state (with and without deficit), and the other two graphs show subdivisions within

Figure 2. Patient ages divided into four class intervals (between 60 and 70 years, between 70 and 80 years, between 80 and 90

each cognitive state (gender, race, and origin).

years and between 90 and 100 years), for individuals with and without cognitive deficit (A and B, respectively).

Figure 3. Treatment time divided into four class intervals (zero to six months, seven to 12 months, 12 to 60 months and more than 60 months) for individuals with and without cognitive deficit (A and B respectively).

DISCUSSION

This study was based on the evidence of the cognitive reduction of elderly patients being treated at the hemodialysis service in a school hospital. In the data analysis, the relevance of elderly individuals with high cognitive loss (78%) was presented in relation to those without loss (22%).

It is considered that aging is a predictable and progressive process, starting on the day of birth and ending on the last day of life. It is something universal, cumulative, that occurs by the deterioration of the physical body in its various aspects. It should be clarified to

understand the distinction between the aging process and associated diseases, as some diseases, such as dementias, in general appear in some, but not in all elderly people. Dementias are characterized by brain degradation or changes in neurophysiological processes.¹⁷ The dramatic increase in the incidence of dementias from the third to the fourth age was demonstrated.¹⁸ It was revealed, in this research, that no elderly person older than 80 years presented a preserved cognitive state.

Daily studies are conducted in the area of Geriatrics. It was concluded, in a bibliographical survey about dependence and

care of the elderly person with dementia, that, at the age of 60, there is a prevalence of 1% of Alzheimer's disease (dementia more commonly found in today's society). every five years.¹⁹ It is therefore not far from the results of different researches that the variable age

exerts a great influence on the results of this study, that is, the older the age, the greater the cognitive loss.²⁰ It is the age-time factor of a risk for both genders (Table 2), and it has been highlighted as one of the major risks for cognitive loss in elderly on hemodialysis.

Table 2. Binomial analysis of the covariable sex present in the sample of patients undergoing hemodialysis at the Base Hospital of São José do Rio Preto. São José do Rio Preto (SP), Brazil, 2016.

Covariables	Final sample	Value of p	Results MMSE lower than expected
Sex		<0.005	
Male	61		77%
Female	33		78%

It has been found that, according to a study developed by the Italian Longitudinal Study on Aging (ILSA), the incidence of dementias in people 65-69 years is 5.57 per thousand person-years. Compared with the "fourth-age" population (80-84), the incidence of 30.06 per thousand person-years, that is, a significant increase.²¹ n this study, a proportion ratio was found in which, in each year of the elderly, there is a 62% increase in the chances of cognitive deficit. This data should be noted as

important when it comes to the person over 65 years in the treatment of hemodialysis.

It should be emphasized that there was no relevance in the results regarding the number of days of treatment, that is, the treatment time does not influence the cognition of patients because the elderly can undergo hemodialysis for years or a few months this will not make a difference in cognitive performance, since the factors contributing to this loss are mainly age and origin (Table 3).

Table 3: Binomial analysis of the covariable origin present in the sample of patients undergoing hemodialysis at the Base Hospital of São José do Rio Preto. São Paulo, Brazil, 2016

Covariables	Final sample	Value of p	Results MMSE lower than expected
Provenance		<0.001	
Urban	80		73%
Rural	14		100%

It was considered that the provenance had relevance for the rural population, since the life in the field brings several factors that can influence the health of the people. It is emphasized, in the case of cognition, the difficulty of access to formal study. It is recalled that, most of the time, the population studies a few years, attendance is impaired due to physical barriers, and early work is started to help the family, and this can generate a series of physical exhaustion throughout the life. It is also affected by the distance from rural to urban areas, access to health services, causing late diagnosis of numerous diseases.²²⁻³

It was observed during the analysis of results that 78% of the elderly have cognitive loss, a significant statistic that leads to reflect on the influences that generated this percentage. It is believed that one of the possible connections is that all the elderly

interviewed were undergoing treatment in the hemodialysis service, that is, during the session that occurs three times a week. It is added that this data could not be confirmed, as it would require another test evaluating a possible difference between before, during and after the session.

It has been found that aging can generate frailties in the elderly that result in a higher risk for falls, chronic noncommunicable diseases, social isolation and even psychological problems and, when it comes to the elderly being treated in the hemodialysis service, the prevalence of this fragility going from 11% (elderly without CKD) to 60% (elderly with dialysis dependent CKD).²⁴⁻⁵

It is known that during the hemodialysis session, various modifications occur in the body, and changes in volumes, drugs administered and equipment used are some of

the reasons. Knowledge about these changes is constantly improved through research to improve the quality of life of chronic kidney patients. It is possible to investigate, by studies, whether these electrolytic and corporal changes can exert influence on the cognition of the elderly, justifying a possible momentary effect.²⁶

It was evaluated that the treatment of patients in the hemodialysis service occurs intermittently in the current study population, specifically three times a week, and drastic changes in body functioning occur during each day of therapy. The basic acid balance, the serum potassium concentration and the volume of liquids are changed to totally different values from the beginning to the end of the session. Patients lose weight as a result of fluid retention due to altered renal functioning, withdrawal of excess fluid accumulated over days.²⁷

In the face of all of these changes, a great deal of cardiac stress has been investigated, and the heart needs to adapt to these changes quickly and efficiently as the blood pumping changes with the amount of fluid. It is known that the therapy is basically the attempt to replace 168 hours of renal (physiological) filtration per week for 12 hours of hemodialysis session.²⁷

It is considered that the dialysis treatment can be a stimulant causing arrhythmias, since it induces physical-chemical changes of the body fluids, thus modifying the pH, the temperature, the blood pressure and the electrolytic concentrations, that regulate the excitation of the myocardial tissue. In a recent study, it was found that patients with chronic renal failure frequently present with changes in EKG and a high incidence of ventricular and supraventricular arrhythmias, which may be prognostically significant, during and after hemodialysis.²⁸

It was established that all these evidences reflect on the changes in blood circulation which, during the sessions, undergo several changes and adaptations, causing a cascade of systemic effects. A cognitive change during the hemodialysis session can be brought about by a possible change in cerebral circulation,²⁹ and, physiologically, aging causes a number of bodily changes, including cardiovascular changes, which cause a decrease in cerebral and renal perfusion.³⁰

In a previous study, the relevance index of Nursing diagnoses was analyzed in patients who are submitted to treatment in the hemodialysis service. Based on this study, the diagnoses of ineffective peripheral tissue perfusion, decreased cardiac output and the

risk of ineffective cerebral tissue perfusion were listed.³¹

It was understood that, because of all these changes, the hemodialysis team needs to be prepared to act in the intercurrents that may occur during treatment. Interventions should be planned and the patient should be instructed about the possible symptoms during treatment so that he or she is alert and able to inform when there is any change.²⁵

CONCLUSION

It was concluded, after observing the results, that the majority of the elderly were men, white and urban. The majority of the study population presented a cognitive deficit, which showed an indication of the momentary effect of hemodialysis. It was noticed that there was no relevance regarding the time of treatment, demonstrating that there are no long-term effects on the cognitive state of the elderly related to hemodialysis. As for age, there was a 62% increase in the chance of cognitive deficit for each one-year increase, not a cumulative effect. In addition, all the elderly with 80 years or more presented cognitive deficit, as well as 100% of the population of rural origin. It is believed that these data may contribute with the interdisciplinary team of hemodialysis to attend, in a systematic way, the elderly patients and their peculiarities.

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