FOOD AND NUTRITION IN COLLECTIVE HEALTH

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Nutritional status and quality of life in patients under chronic hemodialysis on a waiting list from a kidney transplantation center in Fortaleza, Ceará, Brazil

Estado nutricional e qualidade de vida de pacientes em tratamento crônico de hemodiálise em lista de espera de um centro de transplante renal em Fortaleza, Ceará

Abstract

Objective: To investigate the association between nutritional status and quality of life in patients under hemodialysis from a kidney transplantation center in Fortaleza, Ceará waiting for kidney transplantation. ***Methods:*** Cross-sectional analytical study carried out from August to October 2018, in which the patients' nutritional status and quality of life were evaluated using the Brazilian version of the SF-36 questionnaire. A total of 52 patients from a kidney transplantation center belonging to a public university hospital participated. ***Results:*** It was observed that most patients were eutrophic according to the body mass index (59.6%), arm circumference (48.1%), and arm muscle circumference (75.0%) parameters; however, based on the tricipital skin-fold measurement, 59.6% of the sample was malnourished. Regarding the quality of life dimensions, the "physical role functioning" and "general health perceptions" had the worst scores, but a significant association with female gender (p = 0.046) and body mass index (p=0.010), respectively. The “physical functioning” dimension, on the other hand, was significantly associated with male gender (p=0.045). ***Conclusion:*** Compromise was observed in some quality of life dimensions, and the findings suggest a relationship between quality of life and sex and nutritional status. Patients under hemodialysis deserve special attention as they present several physical, social, and emotional weaknesses that can compromise important nutritional aspects and quality of life before and after transplantation, affecting the treatment of the disease. Thus, the importance of periodic nutritional diagnosis and quality of life assessment is emphasized.

Keywords: Nutritional status. Quality of life. Chronic kidney disease. Transplant.

Resumo

Objetivo: Investigar a associação entre o estado nutricional e a qualidade de vida de pacientes dialíticos em lista de espera para Transplante Renal (TxR) de um centro de transplante em Fortaleza, Ceará. ***Métodos:*** Estudo caráter transversal analítico, realizado entre agosto a outubro de 2018, no qual foram avaliados o estado nutricional (EN) e a qualidade de vida (QV), utilizando a versão brasileira do questionário SF-36, em 52 pacientes de um centro de TxR de um hospital universitário da rede pública de saúde. ***Resultados:*** Observou-se que a maioria dos pacientes eram eutróficos de acordo com os parâmetros índice de massa corporal (59,6%),

circunferência do braço (48,1%) e circunferência muscular do braço (75,0%); no entanto, de acordo com prega cutânea tricipital, 59,6% da amostra encontrava-se desnutrida. Com relação às dimensões de QV, verificou-se que os "Aspectos Físicos" e "Estado Geral de Saúde" tiveram os piores escores, mas apresentaram associação significativa com o sexo feminino (p=0,046) e com o IMC (p=0,010), respectivamente. Já a dimensão "Capacidade Funcional" apresentou associação significativa com a população masculina (p=0,045). *Conclusão:* Observou-se comprometimento em algumas das dimensões de QV, as quais sugeriram guardar relação com o sexo e o EN. Assim, ressalta-se a importância da realização periódica do diagnóstico nutricional e da avaliação da QV, visto que os pacientes renais dialíticos listados merecem atenção especial, pois apresentam diversas fragilidades físicas, sociais e emocionais, que podem comprometer aspectos importantes no EN e na QV durante o cuidado antes e após o TXR e impactar no tratamento da doença.

Palavras-chave: Estado nutricional. Qualidade de vida. Doença renal crônica. Transplante.

INTRODUCTION

Chronic kidney disease (CKD) is a term used to define structural or functional kidney abnormalities with implications for health, present for more than three months.[1] Due to the significant increase in incidence rates, this clinical condition has been considered an important public health problem worldwide.[2]

According to the census conducted by the Brazilian Society of Nephrology, the estimated total number of dialysis patients in the country, up to the second half of 2017, was 126,583. From 2012 to 2017, there was an increase of approximately 35 thousand patients, a number that represents an average annual increase of 3% (3,758 patients / year).[3]

Hemodialysis (HD) is considered a therapeutic approach needed to maintain the life of patients with renal failure, which, among chronic diseases, has the greatest impact on the patients' quality of life (QL).[1,4] Such impact occurs, among other factors, due to the need for dietary modification, with dietary restrictions that end up negatively impacting the QL.[4,5] Studies report that nutritional status (NS) is an important factor in determining QL, transforming this aspect into a clinical challenge, directly linked to the dialysis phase.[6,7]

The World Health Organization (WHO) defines QL as an individual's perception of their physical, emotional, and social well-being.[8] Several instruments can be used to assess CKD patients' QL, among which the Medical Outcomes Study 36-Item Short-Form Health Survey (SF-36) is considered the most appropriate. This instrument includes eight dimensions to assess generic and specific aspects related to the disease including physical and social functioning, mental health, bodily pain, vitality, and emotional role functioning.[7]

Although no treatment completely cures CKD, patients on the kidney transplant wait list must be followed up in order to keep their nutritional and health status under control, including QL. This study aims to investigate the association between nutritional status and quality of life in patients under hemodialysis from a kidney transplantation center in Fortaleza, Ceará waiting for kidney transplantation.

METHODS

This is a cross-sectional study, with a descriptive and analytical approach. The sampling method was non-probabilistic and by convenience. Individuals of both sexes, adults (≥ 19 and <60 years old) and elderly patients (≥ 60 years old), attending to nutritional consultations at a KT outpatient clinic of a public hospital in Fortaleza, Ceará (Northeastern Brazil), were recruited. The data collection took place from August to October 2018. The research protocol was approved by the Research Ethics Committee of the Walter Cantídio University Hospital, of the Federal University of Ceará, under the protocol number 2,804,766.

The study included all patients who had undergone HD for at least three months and were on the kidney transplant wait list. Patients were excluded if the following criteria were presented: conservative treatment, having undergone another therapeutic approach (peritoneal dialysis or transplant), and presenting cognitive or physical limitations (amputation of the lower or upper limbs) that could prevent data collection.

Sociodemographic data (gender, age [adults <60 years and elderly ≥ 60 years], race/skin color, educational level, origin - urban or rural area, marital status and income in minimum wages) and time of HD treatment were collected using a semi-structured form, applied in individual interviews with the patients.

The patients' NS was determined through anthropometric parameters such as dry weight, height, arm circumference (AC), tricipital skin-fold (TS) and arm muscle circumference (AMC), measured after the HD session.[9] All measures were collected by two evaluators who received theoretical and practical training to ensure a standardized nutritional assessment. This training took place in three meetings.

To measure the post-dialysis body weight, an electronic scale (Filizola®, Brazil) was used, with a maximum capacity of 150 kilograms. Participants were weighed with as little clothing as possible, barefoot, and unadorned. The height value was obtained from the patient's medical record. From the measures of weight and height, the body mass index [BMI: Weight (Kg)/Height² (m²)] was calculated. According to the parameters established by the International Society in Renal Nutrition and Metabolism,[10,11] a BMI cutoff point of 23 kg/m² indicates normal weight in patients undergoing chronic dialysis treatment (hemodialysis or peritoneal dialysis). The cutoff point of (BMI> 30kg / m²) suggested by the WHO to define obesity was adopted.[12]

Both arm measurements were made on the opposite arm of the arteriovenous fistula. The AC was measured with the aid of a Cescorf® inelastic steel anthropometric tape at the midway between the acromial process and the olecranon process, with values expressed in centimeters. Study participants were instructed to keep their arms flexed along the body and with the palm facing the thigh. A Cescorf® scientific adipometer was used to obtain the TS of the patients, at the same part of the body where the AC was measured, using the back of the arm. The skin-fold measurement was picked up by pinching the skin and pulling it away from the underlying muscle and expressed in millimeters. All measurements were performed in triplicate and mean values calculated.

The AC and TS values were obtained in centimeters and millimeters, respectively; after the measurement, the adequacy of AC and TS was assessed using the cutoff points proposed by Frisancho,[13] which take into account gender and age. The classification of the NS was obtained using the formulas of the percentage of adequacy of each measure, classified as follows: severe malnutrition (<70%), moderate malnutrition (70-80%), mild malnutrition (80-90%), eutrophy (90-110%), overweight (110-120%), and obesity (> 120%), according to Blackburn and Thorton.[14]

The AMC, BC and TS measurements were interpreted using the cutoff points established by Frisancho[15] as follows: severe malnutrition = values <70%; moderate malnutrition = 70-80%; mild malnutrition = 80-90%; and eutrophy = > 90%, as established by Blackburn and Thorton.[14]

The generic SF-36 instrument translated and validated to Brazilian Portuguese was used to assess the level of health-related QL.[16] This questionnaire is originally self-administered, but considering the possible difficulties in reading or completing it, the questions were read to the patients who were asked to choose the answer that best suited them.

This questionnaire consists of 36 items, divided into eight dimensions, which are: physical functioning (10 questions); physical role functioning (4 questions); bodily pain (2 questions); general health perceptions (5 questions); vitality (4 questions); mental health (5 questions); social role functioning (2 questions); and emotional role functioning (3 questions). For each of the eight domains, a score was obtained by applying a measurement scale, with values from 0 (highest compromise) to 100 (no compromise). For the analysis, a score ≤ 60% was considered as "compromised QL" and > 60% as "absence of compromised QL".

The collected data were tabulated in the Microsoft Excel® program for further descriptive analysis. The variables were presented using simple frequency, mean, standard deviation (symmetrical distribution), median, and interquartile intervals (asymmetric distribution). Statistical analyzes were performed using the Statistical Package for the Social Sciences (SPSS) software version 19.0. The discrete variables were obtained by counting and analyzed by frequency dispersion using the chi-square test (χ^2) to test associations with anthropometric, sociodemographic variables, and impairment of each QL domain from the questionnaire. When the number of available information was lower than the minimum limit for χ^2, the Fisher's exact test was applied. The level of significance adopted was $p < 0.05$ (95%).

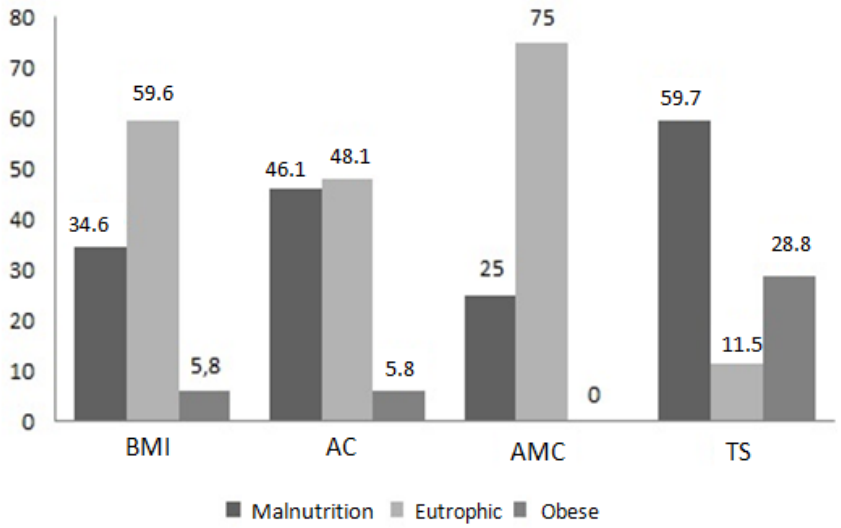
RESULTS

The sample consisted of 52 patients, the majority was female (53.8%), adults aged 19 to 60 years (78.8%), with mixed race by self-declaration (73.1%), married or cohabiting (59.6%), living in the rural area (75%), with elementary educational level (40.4%), and earning from 1 to 3 minimum wages (75%). The sample's mean age was 43.3 ± 12.7 years (Table 1). The duration of HD treatment ranged from three months to 21 years, with a median of 27.5 months. Regarding the patients' nutritional status, the majority was eutrophic based on the BMI cutoff value (59.6%), the AC (48.1%), and the AMC (75%), however, based on the TS measurements, most patients were malnourished (59.6%).

Table 1. Characteristics of the study population, Ceará, 2018.

Gender, n (%)	
Female	53.8% (n= 28)
Male	46.2% (n= 24)
Age, n (%)	
Adult (< 60 year)	78.8% (n= 41)
Elderly (≥ 60 years)	21.2% (n= 11)
Race/color, n (%)	
White	15.4% (n= 8)
Parda/Mulata	73.1% (n= 38)
Black	9.6% (n= 5)
Indigenous	1.9% (n= 1)
Education, n (%)	
Never went to school	3.8% (n= 2)
Fundamental	40.4% (n= 21)
Medium	32.7% (n= 17)
Higher education	23.1% (n= 12)
Region of origin, n (%)	
Rural area	75% (n= 39)
Uban area	25% (n=13)
Marital status, n (%)	
Single	34.7 (n=18)
Married/ cohabiting	59.6% (n=31)
Divorced	3.8% (n=2)
Widower	1.9% n=1)
Income, n (%)	
Up to minimum wage	11.5 (n=6)
>1 – 3 minimum wages	75% (n=39)
> 3 minimum wages	13.5% (n=7)

Figure 1. Nutritional status of the study population, Ceará, 2018.



Legend: BMI - body mass index; AC - arm circumference; TS - tricipital skin-fold; AMC – arm muscle circumference

The mean scores of the SF-36 dimensions are distributed in Table 2, with the domains of physical role functioning (25.0; 0.0 - 50.0) and general health status (62.0; 42.0-77.0) presenting the lowest scores. On the other hand, the domains with the highest scores were social role functioning (100; 76.0-100) and emotional role functioning (100; 33-100).

Table 2. Scores obtained in the dimensions of quality of life from the SF-36 questionnaire, Ceará, 2018.

Dimensions	Median (1st and 4th quartiles)	Variation of scores
Physical functioning	82.5 (70.0 – 95.0)	0-100
Physical role functioning	25.0 (0.0 – 50.0)	0-100
Bodily Pain	72.0 (52.0 – 100.0)	10-100
General health perceptions	62.0 (42.0 – 77.0)	5-100
Vitality	75.0 (55.0 – 90.0)	5-100
Social role functioning	100.0 (76.0 – 100.0)	0-100
Emotional role functioning	100 (33.0 – 100.0)	0-100
Mental health	88.0 (72.0 – 95.0)	8-100

When stratified by sex, a significant difference regarding the physical functioning scores (p = 0.045) was found, with worst scores in men. This also happened with the physical role functioning domain (p = 0.046), with the highest scores in women. There was also an association between QL and the NS parameters, but only the BMI was statistically significant (p = 0.010) (Table 3).

Table 3. Association between gender and BMI with the dimensions of quality of life of patients on hemodialysis, Ceará, 2018.

Quality of life	Gender (%)		p	BMI (%)			p
	Man	Woman		<23.0	23.0-30	>30,0	
Physical functioning							
Committed	75%	25%	0.045†	33.3%	58.3%	8.3%	0.602*
No compromise	37.5%	62.5%		35.0%	60.0%	5.0%	

Table 3. Association between gender and BMI with the dimensions of quality of life of patients on hemodialysis, Ceará, 2018.

Quality of life	Gender (%)		p	BMI (%)			p
	Man	Woman		<23.0	23.0-30	>30,0	
Physical role functioning							
Committed	53.7%	46.3%	0.046†	34.1%	61.0%	4.9%	0.815*
No compromise	18.2%	81.8%		36.4%	54.5%	9.1%	
Bodily pain							
Committed	47.4%	52.6%	1.000*	26.3%	68.4%	5.1%	0.723*
No compromise	45.5%	54.5%		39.4%	54.5%	6.1%	
General health perceptions							
Committed	56.5%	43.5%	0.263*	56.5%	39.1%	4.3%	0.010†
No compromise	37.9%	62.1%		17.2%	75.9%	6.9%	
Vitality							
Committed	42.1%	57.9%	0.775*	26.3%	68.4%	5.3%	0.710*
No compromise	48.5%	51.5%		39.4%	54.5%	6.1%	
Social role functioning							
Committed	60%	40%	0.483*	20%	80%	0%	0.424*
No compromise	2.9%	57.1%		38.1%	54.8%	7.1%	
Emotional role functioning							
Committed	37.5%	62.5%	0.549*	43.8%	50%	6.3%	0.625*
No compromise	50%	50%		30.6%	63.9%	5.6%	
Mental health							
Committed	55%	44.4%	0.716*	33.3%	66.7%	0%	0.365*
No compromise	44.2%	55.8%		34.9%	58.1%	7.0%	

Legend: BMI: Body Mass Index; * χ^2; † Fisher's exact test.

DISCUSSION

The study findings show that, despite the majority of patients having been diagnosed as eutrophic based on the parameters used in the research, most participants had fat mass depletion based on the TS. As for QL, the majority of participants was without compromise, suggesting that the presence of CKD in the dialysis phase, in this sample, did not have a negative impact on the perception of mental and physical health. When relating QL impairment between genders, significant differences were found in relation to physical functioning, with lower scores in the male population and in the physical role functioning domain, with the highest values among women. In relation to nutritional status, it was seen that only the BMI was associated with QL, pointing out that those who were outside the normal range had worse health perceptions.

The assessment of the NS of patients under dialysis is difficult since there is no single criterion that can be used for its determination, given the variety of methods.[17] Several studies conducted with Brazilian patients, however, have been used BMI to identify the nutritional profile of dialysis patients.[3,18-21] It is worth noting that the BMI cut-off point to determine normal weight is higher than the cut-off point used in the healthy population, suggesting a protective effect; such an effect, however, is due to the preservation of muscle mass.[22] It is necessary, therefore, to assess nutritional status through methods that differentiate body mass components, such as lean mass, fat mass, and bone mass, in addition to BMI.[5]

In view of the low sensitivity of the BMI in diagnosing malnutrition, the applicability of AC, AMC, and TS measurements stands out, which allow the assessment of the individual's muscle tissue and body fat reserve. In the present study, it was found that 46.1% of individuals had protein catabolism based on the AC measurements and 40.3% based on the TS measurements.

Silva's study,[18] which aimed to assess the nutritional status of 62 patients undergoing HD, identified protein depletion in 35.3% of patients using AC values, 64.5% based on TS measurements, and 37.1% based on AMC values, corroborating the findings of the present study. Bousquet-Santos et al.,[23] in their study, also found high percentages of malnutrition using TS (72.9%), AC (70.9%), and AMC (64.6%) measurements in dialysis patients. The degrees of malnutrition in CKD patients documented in the literature vary widely, and even overweight individuals are at risk of protein malnutrition, despite increased caloric intake.[23]

The determination of muscle mass is very important for those who need to undergo hemodialysis since due to the depletion of the body's reserves, a more reliable method is needed to determine the NS of this population.[18] Notably, in patients with renal failure, there is a progressive decline in lean mass, and patterns of distribution of body fat appears as a protective factor during the dialysis period, protecting the body from further depletion. In general, the preservation of fat and lean mass seems to be associated with longer survival among dialysis patients.[24]

Along with the monitoring of the NS, the measurement of QL has been considered important as there is a need to improve health care for these patients. In this sense, the Center for Medicare and Medicaid Services formally recommends an annual assessment of the QL in patients with renal failure.[25] It is noteworthy that there is still no recommendation or studies using this tool in patients with CKD under hemodialysis and waiting for KT.

The present study found greater impairment in two specific domains of the SF-36 questionnaire: physical role functioning and general health perceptions. Such results are in line with what was observed in previous studies that used the same questionnaire.[4,7,26] Social role functioning and mental health were the least affected dimensions. The study by Silveira et al.,[7] which aimed to assess the QL of 50 patients with CKD in an outpatient HD program at a public hospital in Pará, Brazil, found that CKD has a greater effect on physical health than on mental health.

Despite these results, other studies have shown impairment of mental health, specifically depression and anxiety, as a common finding in dialysis patients, which are often interpreted as symptoms of uremia.[26,27] It has been seen that depressed patients are at higher risk malnutrition, worse adherence to treatment, increased hospitalization and mortality, and psychological worsening related to adaptation to the disease and treatment, compromising their QL.[27] The study by Feroze et al.[28] aimed to assess the association between QL domains and nutritional markers and survival of 705 dialysis patients. The results showed that for every 10 points decreased in the mental health score, the risk of death in patients with CKD with kidney failure increased by approximately 12%.

When compared to other studies, we report higher scores of QL in all domains.[8,29,30] This result may be related to the fact that active patients on the wait list for transplantation are aware of the possibility of getting a kidney transplant at any time, being more anxious; or due to the use of different QL assessment scales in other studies. According to Kostro et al.,[8] differences related to the perception of QL can occur between patients who are waiting for a transplant and those who remain on dialysis treatment.

It was also observed that the male participants differed significantly from the female participants in the physical functioning domain ($p = 0.045$). This finding is probably due to the fact that the majority of the sample has low income and lives in rural areas whose social environment culturally associates the role of man to

physical effort or heavy work. In the studies by Lægreid et al.[4] and Detregiachi et al.,[20] no significant differences related to gender were observed in any dimension of the QL.

QL domains were also analyzed with each NS parameter (BMI, AC, AMC, and TS), but statistical significance was found only in relation to BMI and the general health perceptions domain ($p = 0.010$). The higher the BMI values, the worse the general health perceptions scores, showing that changes in weight impair the general perception of health. This contrasts with the study by Cunha et al.,[31] which observed statistical significance ($p < 0.001$) between BMI only with the physical functioning domain. This is due to the fact that CKD patients undergoing HD treatment undergo important changes in the muscular system, since the muscles atrophy. Consequently, patients develop decreased exercise tolerance.

Some of the limitations of this study are the sample size, which makes more accurate inferences difficult, and the time available for the interviews, since patients had to attend consultations with the multiprofessional team in the same days of the data collection, reducing the time available for additional anthropometric measurements and for a more consistent data collection.

The periodic assessment of health-related QL is a useful tool for multiprofessional teams, as it can help in improving care, assessing patient needs, and planning interventions. Therefore, it is of great interest that more research be carried out, in a longitudinal manner, to support the analysis of QL and the incorporation of various NS parameters into the follow-up of patients with CKD.

CONCLUSION

In view of the results found, it is concluded that the quality of life of the studied population was not compromised, suggesting that the presence of CKD with kidney failure did not negatively impact the perception of mental and physical health. However, BMI values above the normal rang were related with a worse general perception of health.

Patients under hemodialysis deserve special attention as they present several physical, social, and emotional weaknesses that can compromise important nutritional aspects and quality of life before and after transplantation, affecting the treatment of the disease. Thus, the importance of periodic nutritional diagnosis and quality of life assessment is emphasized.

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