

Assessment of Nutritional Status in Chronic Hemodialysis Patients in Chad: A Cross-Sectional Study at the Renaissance University Hospital in N'Djamena

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Abstract

Chronic kidney disease (CKD) is a growing public health problem, particularly in Chad, where its incidence is four times higher than in developed countries. This study aimed to assess the nutritional status of chronic hemodialysis patients and identify associated risk factors at the Renaissance University Hospital in N'Djamena, Chad. In this cross-sectional study, 17 patients underwent nutritional assessment using anthropometric measurements (BMI) and the Mini Nutritional Assessment Short-Form (MNA-SF). Hypertension and diabetes were the main causes of chronic kidney disease (CKD), accounting for 58.8% and 29.4% of cases, respectively. The average treatment duration was 10 years. Notably, 23.5% of patients experienced weight loss between 1 and 3 kg. According to the MNA-SF, 47% of patients were malnourished (score < 17), 41.2% were at risk of malnutrition (score 17 - 23.5), and 11.8% had a satisfactory nutritional status (score ≥ 24). Systematic nutritional monitoring is essential to prevent health deterioration in CKD patients. Dietary management represents a critical component of the treatment plan for hemodialysis patients.

Keywords

Hemodialysis, Chronic, University Hospital, Chad

1. Introduction

Chronic kidney disease (CKD) is characterized by a sustained decrease in glomerular filtration rate (GFR < 60 ml/min) for more than 3 months, progressing to end-stage renal disease [1]. It constitutes a major public health problem, particularly in Africa, where its prevalence is four times higher than in developed countries [2], although often underestimated due to difficulties in accessing care. In Chad, hospital prevalence was 2.5%. Patients with end-stage CKD frequently present protein-energy malnutrition (PEM), related to a combination of factors: insufficient nutritional intake, hypercatabolism, anorexia, comorbidities, dietary restrictions, and metabolic alterations. This malnutrition affects 30 to 50% of hemodialysis patients, with comparable rates in other African countries such as Senegal (41.1%) [3] [4] and Morocco (37%) [5].

Nutritional assessment is, however, difficult in these patients due to metabolic disturbances and hydration issues. Dietary management is essential, as it influences both morbidity and mortality and can delay the need for renal replacement therapy [6]. It must be adapted to the stage of the disease and the specific needs of each patient.

In Chad, despite the availability of nutritional support, no standardized evaluation of their effectiveness or the nutritional status of hemodialysis patients is performed.

Thus, the objective of this study is to conduct an assessment of the nutritional status of patients with end-stage chronic kidney disease treated by hemodialysis at the Chad Hemodialysis Center.

2. Materials and Methods

Study Design and Population: This descriptive, analytical, and observational study involved retrospective data collection over four months. The study population consisted of 17 patients with end-stage CKD receiving intermittent hemodialysis at the Hemodialysis Unit of the Renaissance University Hospital in N'Djamena, Chad.

Sampling and Eligibility: A non-probabilistic (convenience) sampling method was used, with consecutive recruitment of patients meeting the eligibility criteria. Inclusion criteria comprised all patients receiving permanent intermittent hemodialysis at the unit. Exclusion criteria included patients under 15 years of age, those with acute kidney failure, malabsorption, or digestive neoplasia, and files with missing information.

Data Collection: Data were collected using a structured survey form and patient medical records. Sociodemographic, clinical, and anthropometric data were recorded. Anthropometric measurements (weight and height) were taken immediately after dialysis sessions using calibrated equipment. Post-dialysis “dry weight” was determined based on clinical assessment and the absence of edema.

Nutritional Assessment: Nutritional status was evaluated using the Mini Nu-

tritional Assessment Short-Form (MNA-SF), a 6-item tool validated for rapid screening of malnutrition. The MNA-SF assesses food intake, weight loss, mobility, psychological stress, neuropsychological problems, and body mass index (BMI). The French version of the MNA-SF was used, though its validation in African dialysis populations remains limited.

Biochemical Parameters: Biochemical markers such as serum albumin, pre-albumin, and C-reactive protein (CRP) were not routinely available in patient records. This limitation is acknowledged and discussed in the study limitations.

Statistical Analysis: Data are analyzed using SPSS 18.0 statistical software. Standard tests were used for statistical analyses: Student's test for quantitative variables; Chi-square test for qualitative variables. The retained error risk α was 5% ($p = 0.05$). Multivariate analysis of predictive factors for malnutrition was performed by stepwise logistic regression.

Ethical Considerations: To conduct this study, we obtained written approval from the Dean of the Faculty of Health Sciences of Nazi Bon University and from the general management of the Renaissance University Hospital. The reasons for the study were explained to patients and their family members, and their verbal consent was obtained before including them in the study.

3. Results and Discussion

3.1. Results

3.1.1. Sociodemographic Characteristics of Surveyed Hemodialysis Patients

The study population consisted of 17 patients with an average age of 55.7 years \pm 13.7 years. The most affected age group was 56 to 65 years (35.3%). It was less significant in patients aged 46 to 55 years (17.6%). The surveyed population was predominantly male, with a rate of 64.7%. The majority of patients resided in N'Djamena and its suburbs. Most of them, 52.9%, were educated, with 29.82%, 12.47%, and 10.61% having secondary, higher, and primary education levels, respectively, compared to 47.1% who were not educated. Access to dialysis is free for all patients thanks to public funds, but only 11.8% of our patients benefit from health insurance for purchasing adjuvant medications for hemodialysis. Regarding profession, 29.4% of our mothers were housewives. Regardless of gender, 17.6% and 11.8% were merchants and teachers, respectively (**Table 1**).

Table 1. Sociodemographic characteristics of surveyed patients.

Characteristics	Number (n = 17)	Percentage (%)
Age (years)		
Under 45		23.5
[45 - 55[17.6
[55 - 65[35.3
65 and Over		23.5

Continued

Sex	
Male	64.7
Female	35.3
Education Level	
No Education	47.1
Primary Education	10.61
Secondary Education	20.82
Higher Education	12.47
Insurance	
Yes	12
No	88
Profession	
Merchant	17.6
Farmer	5.9
Specialized Educator	5.9
Teacher	11.8
Health Manager	5.9
Housewife	29.4
Retired	5.9

3.1.2. Etiologies of Kidney Failure or Causal Nephropathy

Hypertension (48.13%) and diabetes (25.12%) were the predominant causes of CKD. Other etiologies included infection (14.25%), side effects of medication (7.65%), and drepanocytose (4.85%) (**Figure 1**).

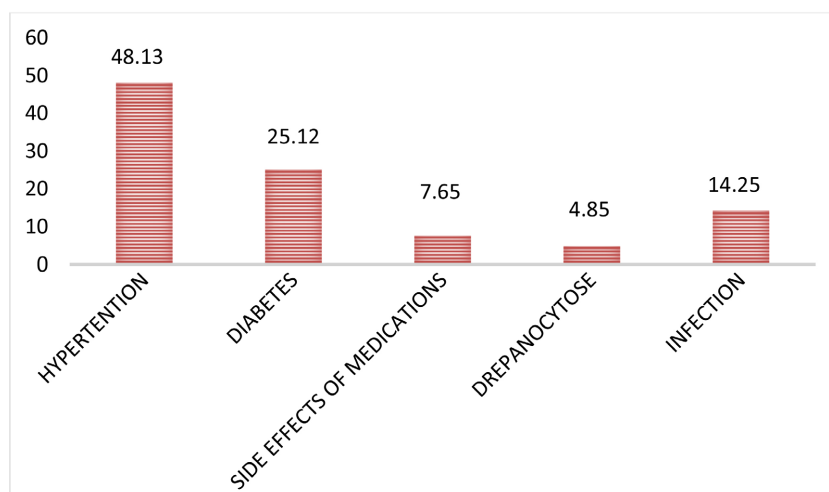


Figure 1. Distribution of patients according to the underlying nephropathy (%).

3.1.3. Duration of Dialysis

The majority of patients (47%) had been on dialysis for 5 - 10 years, while 30%

had undergone treatment for 3 - 5 years (**Figure 2**).

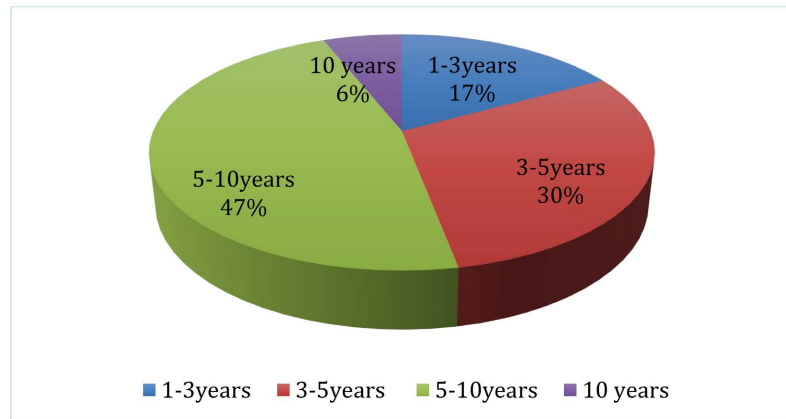


Figure 2. Distribution of dialysis duration among patients.

3.2. Nutritional Assessment according to MNA-SF

3.2.1. MNA-SF Score Parameters

Nutritional status assessment according to the MNA-SF score was based on six parameters:

Food Intake and Anorexia: **Figure 3** shows that 82.4% (14 patients) had not decreased their food intake. As for **Table 2**, it reveals that most of our patients were not anorexic, 52.9% of cases after one month, but after three months, 60.7% had severe anorexia and 30.1% had moderate anorexia.

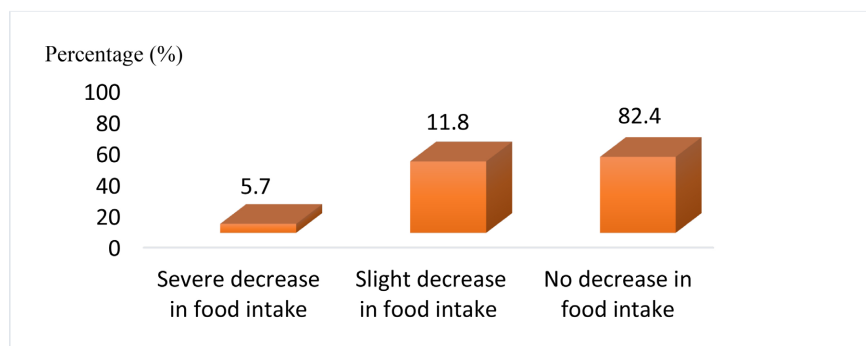


Figure 3. Distribution according to food intake.

Table 2. Distribution according to the evolution of anorexia.

	Number	Percentage (1 Month)	Percentage (3 Months)
Moderate Anorexia	7	41.2	30.1
Severe Anorexia	1	5.9	60.7
No Anorexia	9	52.9	9.2
Total	17	100	100

Recent Weight Loss: **Table 3** reveals that 4 patients (23.5%) had recent weight

loss > 3 kg.

Table 3. Distribution according to recent weight loss.

Recent Weight Loss	Number (n = 17)	Percentage
Don't Know	3	17.6
No Weight Loss	6	35.3
Weight Loss between 1 and 3 kg	4	23.5
Weight Loss > 3 kg	4	23.5
Total	17	100.0

Mobility: Table 4 shows that 52.9% (9 patients) left their homes.

Table 4. Distribution according to mobility.

Mobility	Number	Frequency (%)
Autonomy Indoors	4	23.5
Bed to Chair	4	23.5
Leaves Home	9	52.9
Total	17	100.0

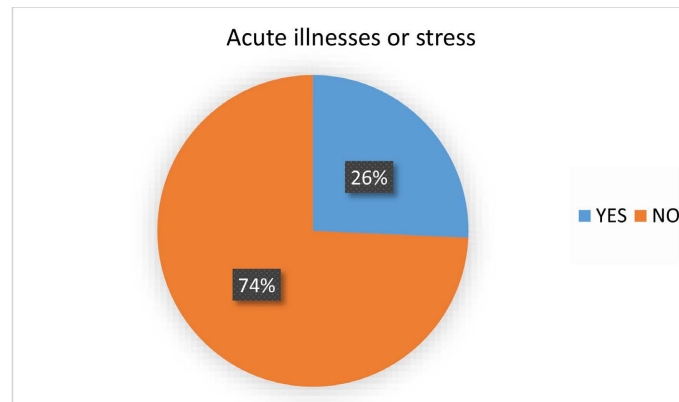


Figure 4. Distribution according to the presence of an acute illness.

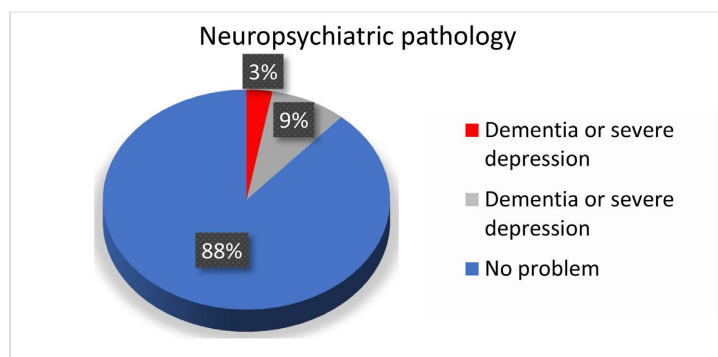


Figure 5. Distribution according to the presence of a neuropsychiatric pathology.

Acute Illness or Stress: According to **Figure 4**, the majority of patients did not suffer from acute illness or stress.

Neurological Problems: **Figure 5** shows that 88% of patients had no neurological problems.

Body Mass Index: **Figure 6** reveals that nearly half of our patients had a BMI < 19 kg/m² (8 patients or 47%) while 11.8% tended toward being overweight.

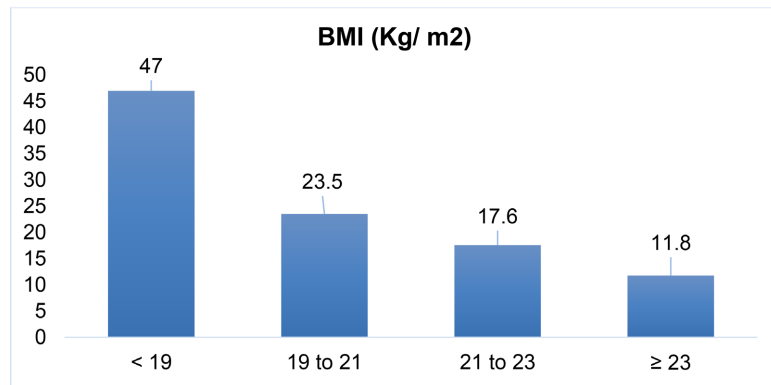


Figure 6. Distribution according to the presence of a neuropsychiatric pathology.

3.2.2. Nutritional Status according to MNA-SF Score

MNA results showed that 47% of hemodialysis patients are malnourished, 41.14% are at risk of malnutrition, and only 11.76% have satisfactory nutritional status (**Table 5**).

Table 5. Nutritional assessment according to the Mini Nutritional Assessment score.

Assessment	Number	Percentage
Malnourished (Score < 17 Points)	8	47
Risk of Malnutrition (Score 17 to 23.5 Points)	7	41.14
Satisfactory (Score 24 to 30 Points)	2	11.76
Total	17	100.0

3.3. Discussion

The main objective of the study was to assess the nutritional status of patients with chronic kidney disease followed at the University Hospital. The sociodemographic profile of kidney failure patients was first determined.

This study illuminates a profound and critical public health crisis within Chad’s healthcare system, revealing an alarmingly high prevalence of malnutrition among chronic hemodialysis patients that borders on an epidemic within this vulnerable cohort. Our data indicate a devastating reality where 47% of patients are classified as malnourished and a further 41.2% are at serious risk, meaning that nearly 90% of the individuals reliant on hemodialysis for survival are grappling with significant nutritional deficits [7] [8]. This figure is not an outlier but rather a grim confirmation of the well-documented, yet persistently unaddressed, crisis across Sub-

Saharan Africa, where malnutrition afflicts 30 to 50% of the hemodialysis population, underscoring a catastrophic failure to integrate nutritional support as a cornerstone of comprehensive renal care. The demographic profile of our cohort, with a mean age of 55.7 years, aligns with findings from neighbouring Ghana and Nigeria, but presents a stark contrast to the younger patient populations in the Maghreb and the significantly older demographics typical of Western nations [9]-[12]. This divergence is not merely statistical; it reflects deeper, systemic issues, including the earlier onset of End-Stage Renal Disease (ESRD) due to poorly controlled hypertension and diabetes, lower overall life expectancy, and the immense burden of disease placed upon the socially and economically active segment of the population. A critical, and perhaps the most debilitating, factor exacerbating this medical crisis is the profound socioeconomic precarity of the patients. The vast majority lack any form of health insurance, and while the government's coverage of dialysis costs is a crucial intervention, it is rendered insufficient when patients cannot afford the essential concomitant medications, such as phosphate binders and erythropoietin, or the specific, and often more costly, nutrient-dense foods required to sustain them on dialysis [13] [14]. This financial abyss often forces patients into impossible choices, driving them towards potentially harmful alternatives, including the reliance on traditional herbal remedies and plants, which are themselves frequently implicated in the etiology of kidney damage in the region, creating a vicious cycle of disease and deprivation.

The etiological landscape of Chronic Kidney Disease (CKD) in our cohort is dominated by hypertension and diabetes, mirroring the broader epidemiological transition sweeping across Sub-Saharan Africa [15] [16]. However, this trend is fueled by a confluence of local and structural factors, including the widespread use of nephrotoxic traditional medicines, rampant self-medication due to inadequate access to formal healthcare, and the adoption of diets rich in processed salts, sugars, and unhealthy fats. These dietary patterns, coupled with high rates of tobacco and alcohol use, create a perfect storm for the development of the very cardiovascular diseases that are the primary precursors to kidney failure. It is within this context of multimorbidity and socioeconomic hardship that the patient's nutritional status precipitously declines. The relentless catabolic state induced by the dialysis procedure itself, compounded by uremia-induced anorexia, dietary restrictions, and inflammation, creates a perfect physiological storm for Protein-Energy Wasting (PEW). Our assessment, however, is constrained by significant methodological limitations that must be candidly acknowledged. The modest sample size ($n = 17$) and single-center design limit the generalizability of our findings. More critically, the absence of key biochemical parameters, most notably serum albumin and C-reactive protein (CRP), represents a fundamental gap in our analysis [7]. These biomarkers are indispensable for objectively diagnosing PEW, differentiating it from the effects of systemic inflammation, a common companion in dialysis patients, and for monitoring the efficacy of any nutritional interventions. Their omission in future studies would perpetuate a critical blind spot

in our understanding of the pathophysiology at play.

Therefore, the findings of this study serve as an urgent call for a paradigm shift in the management of CKD in resource-limited settings like Chad. Moving beyond the mere provision of dialysis, we must champion a holistic, integrated care model that places systematic nutritional intervention at its core. This necessitates the immediate implementation of routine nutritional screening using validated tools like the MNA-SF, the development and deployment of culturally sensitive nutritional education programs that leverage locally available and affordable food sources, and the formal integration of dietitians into the multidisciplinary renal team to develop individualized meal plans. Ultimately, tackling the root causes of this crisis requires looking beyond the clinic walls to address the profound socio-economic determinants of health. Policymakers must explore innovative models for broader financial support or food security programs targeted at this population. Without these comprehensive and simultaneous clinical, educational, and socioeconomic efforts to improve the quality of life, reduce mortality, and make dialysis a truly life-sustaining treatment for the chronically ill in Chad, the situation will remain critically hampered [7] [8] [14] [15].

4. Conclusion

This study reveals a high prevalence of malnutrition among chronic hemodialysis patients in Chad, with 47% being malnourished and 41.14% at risk of malnutrition. The main causes of chronic kidney disease were hypertension and diabetes. These findings emphasize the critical need for systematic nutritional assessment, appropriate dietary counseling, and regular monitoring of hemodialysis patients to improve their nutritional status and overall health outcomes. Healthcare providers should implement comprehensive nutritional support programs tailored to the specific needs and socioeconomic context of patients in Chad.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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