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ORIGINAL ARTICLE

Survival in elderly patients with kidney failure starting haemodialysis in Cameroon

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ABSTRACT

Introduction: Elderly patients have an increased risk of kidney failure due to ageing and comorbidities. This study assessed survival among elderly patients starting maintenance haemodialysis at the Buea and Bamenda regional hospitals in Cameroon.

Methods: We conducted a retrospective cohort study of elderly patients (65 years of age and older) who began maintenance haemodialysis between January 2016 and December 2020. The primary outcome of interest was survival at one year.

Results: The proportion of elderly patients starting dialysis was 11%. There were 81 patients included in the study. Their median age at dialysis initiation was 70 years [interquartile range (IQR) 66–73 years] and 90% had high comorbidity scores according to the Charlson Comorbidity Index. The median survival time was 7.5 months (IQR 0.7–12.0 months) and the survival rate at one year was 41%. The most common causes of death were sudden death (42%), infection/sepsis (21%) and dialysis withdrawal (17%). The lowest survival time (median 6.5 days) was observed in patients older than 85 years, with a high comorbidity index. Emergency start to dialysis [hazard ratio (HR) 1.434, P = 0.032)], age ≥75 years (HR = 19.384, P = 0.001), refractory hyperkalaemia as an indication for starting dialysis (HR = 1.244, P = 0.02) and high comorbidity index (HR = 2.819, P = 0.014) were associated with poorer survival.

Conclusions: Only half of the elderly patients were still alive one year after starting maintenance haemodialysis. Comorbidity score, age, refractory hyperkalaemia and emergency start to dialysis were associated with survival.

Keywords: kidney failure; elderly; haemodialysis; survival; comorbidity; Cameroon.

INTRODUCTION

Worldwide, the burden of chronic kidney disease (CKD) is rising due to the increasing prevalence of its risk factors such as diabetes and hypertension, and ageing of the population [1]. The global prevalence is 13.4%, and is 10.6% for CKD stages 3–5 [2]. Elderly patients are at increased risk of kidney disease owing to kidney senility and comorbidities [3,4]. Patients with kidney failure who are treated with dialysis have higher mortality rates than the general population [5,6]. The United States Renal Data System reports that dialysis patients have a 15–20% one-year mortality rate, with a 5-year survival rate of under 50% [7]. Jardine et al. [8] found the one-year survival rates of South African patients accessing kidney replacement therapy (KRT) (90.4%) to be comparable to those in better-resourced countries; in the same country, Thapa et al. [9] found a one-year survival rate of 86.4% in elderly patients, which again compares well with the rates reported from better-resourced countries. The one-year mortality rate in other sub-Saharan African countries, however, may be as high as 90% [10-12].

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By 2030, it is estimated that over 70% of patients with kidney failure will be living in developing countries [13,14]. Estimates suggest that 12–23% of adults in sub-Saharan Africa (SSA) have CKD [13-15]. The estimated prevalence of CKD in Cameroon ranges from 10–14% [16].

In Cameroon, elderly patients represent 10% of the total dialysis population [17]. Various studies have identified factors associated with low survival of elderly patients on dialysis, including high comorbidity, late referral and urgent starts to dialysis, poor dialysis adequacy, and high rates of infections and other complications [5,6,18-20].

The utility of maintenance dialysis is increasingly being questioned for frail and morbid patients who experience rapid functional decline and high symptom burden. There are no data on the outcomes of elderly patients starting haemodialysis in Cameroon, and this study addresses this knowledge gap.

METHODS

We conducted a retrospective cohort study of elderly patients (aged 65 years and over) with kidney failure who started treatment with haemodialysis from 1 January 2016 to 31 December 2020 at two regional haemodialysis centres in southern Cameroon. These government-funded centres serve a population of 2.50 million and also serve as a teaching hospital for medical students. Patients receive two 4-hour sessions of dialysis per week. The treatment sessions are subsidised by the government, but other related expenses (including for laboratory investigations, medications and creation of vascular accesses) are paid out of pocket by patients and their families. There is no universal health coverage and fewer than 5% of patients have health insurance.

Patients missing key data (date of death, date of haemodialysis initiation, age) were excluded from the study. Participants were followed for one year or until death or withdrawal of dialysis. Demographic and clinical data were extracted from patient records using a data capture form and copied into an Excel spreadsheet. The Charlson Comorbidity Index (CCI) for predicting 10-year survival was calculated by scoring the following: age, myocardial infarction, congestive heart failure, peripheral vascular disease, dementia, chronic obstructive pulmonary disease, liver disease, diabetes, peptic ulcer disease, hemiplegia, CKD, malignancy, and AIDS. Patients were divided into three groups by age: 65–74 years, 75–84 years and >84 years. The primary kidney disease was based on clinical assessment; no kidney biopsies were done. Survival was assessed at one year following initiation and data on hospitalisations were also captured. Sudden death was defined as an unexpected death in a patient still receiving regular dialysis.

Statistical analysis was performed using Statistical Package for Social Sciences version 26. Categorical variables were summarised using counts and percentages, and continuous variables were summarised using means and standard deviations or medians and interquartile ranges, as appropriate. Survival was determined using Kaplan–Meier survival analysis. Bivariate analyses used chi-squared tests for categorical variables and t-tests for continuous variables. Cox proportional hazards models were used for evaluating factors associated with survival.

The study was approved by the Institutional Review Board of the Faculty of Health Sciences, University of Buea (2022/1584-01/UB/SG/IRB/FHS). Given the retrospective nature of the study, a waiver of patient consent was granted.

RESULTS

Of the 731 CKD patients who started dialysis during the study period, 84 (11%) were 65 years or older. Three patients had incomplete records and were excluded, leaving 81 participants included in the analysis.

As shown in Table 1, most participants were male (77%). The median age was 70 years (IQR 66–73 years), with male participants older than females (73 years vs 68 years, $P < 0.001$). About one-third (n = 27) were professionally active. Chronic glomerulonephritis was the most common cause of CKD (30%) followed by hypertension (25%), chronic tubulointerstitial nephritis (13%) and diabetes mellitus (12%). Only 22% had received pre-dialysis care, with a mean follow-up duration of 6.5 months. A high comorbidity index was present in 90% of the participants, with a median CCI value of 5. Gastrointestinal symptoms related to uraemia was the most common indication for starting dialysis (74%).

Hypertension (77%) was the most common comorbidity, followed by severe anaemia (68%) and diabetes mellitus (30%) (Figure 1).

Most of the patients (86%) were hospitalised in the year following dialysis initiation, with a median of two admissions. The most common reasons for hospitalisation were uraemia and infections (Table 2).

A total of 48 deaths (59% of the cohort) were recorded within one year following the onset of dialysis. All four participants aged >85 years died. As shown in Table 3, one-third of deaths occurred at home. The most common causes were sudden unexplained death (42%), infection/sepsis (21%) and dialysis withdrawal (17%).

Table 1. Baseline characteristics of elderly patients starting dialysis (n = 81).

Variable		n (%)	Female	Male	P value
Age (years)*		70 (66–73)	73 (65–76)	68 (65–88)	<0.001
Age group	>85	4 (4.9)	4 (4.9)	0 (0.0)	0.001
	65–74	62 (76.5)	33 (40.7)	29 (35.8)	
	75–-84	15 (18.5)	14 (17.3)	1 (1.2)	
	Total	81 (100.0)	51 (63.0)	30 (37.0)	
Occupation	Working, public sector	3 (3.7)	3 (5.9)	0 (0.0)	0.240
	Working, private sector	24 (30)	15 (19)	9 (11)	
	Retired	54 (67)	33 (41)	21 (26)	
	Total	81 (100)	51 (63)	30 (37)	
Primary kidney disease	Glomerulonephritis	24 (30)	15 (19)	9 (11)	0.500
	Hypertension	20 (25)	9 (11)	11 (14)	
	Interstitial nephritis	15 (19)	11 (14)	4 (4.9)	
	Diabetes mellitus	10 (12)	7 (9)	3 (3.7)	
	HIV	5 (6)	3 (4)	2 (3)	
	Other	7 (9)	6 (7)	1 (1.2)	
Indications for dialysis	Hyperkalaemia	3 (4)	2 (3)	1 (1.2)	0.692
	Encephalopathy	24 (30)	17 (21)	7 (9)	
	Gastrointestinal symptoms	60 (74)	38 (47)	22 (27)	
	Pulmonary oedema	43 (53)	24 (30)	19 (24)	
CCI score	0–3	8 (9.9)	5 (6.2)	3 (3.7)	0.629
	>3	73 (90.1)	46 (56.8)	27 (33.3)	
Pre-dialysis care	≥6 months	10 (56)	2 (11)	8 (44)	0.533
	<6 months	8 (44)	5 (28)	3 (17)	
Vascular access	Temporary catheter	65 (88)	41 (55)	24 (32)	0.387
	Permanent catheter	9 (12)	7 (10)	2 (3)	

Abbreviations: HIV, human immunodeficiency virus; CCI, Charlson Comorbidity Index. *Median (IQR).

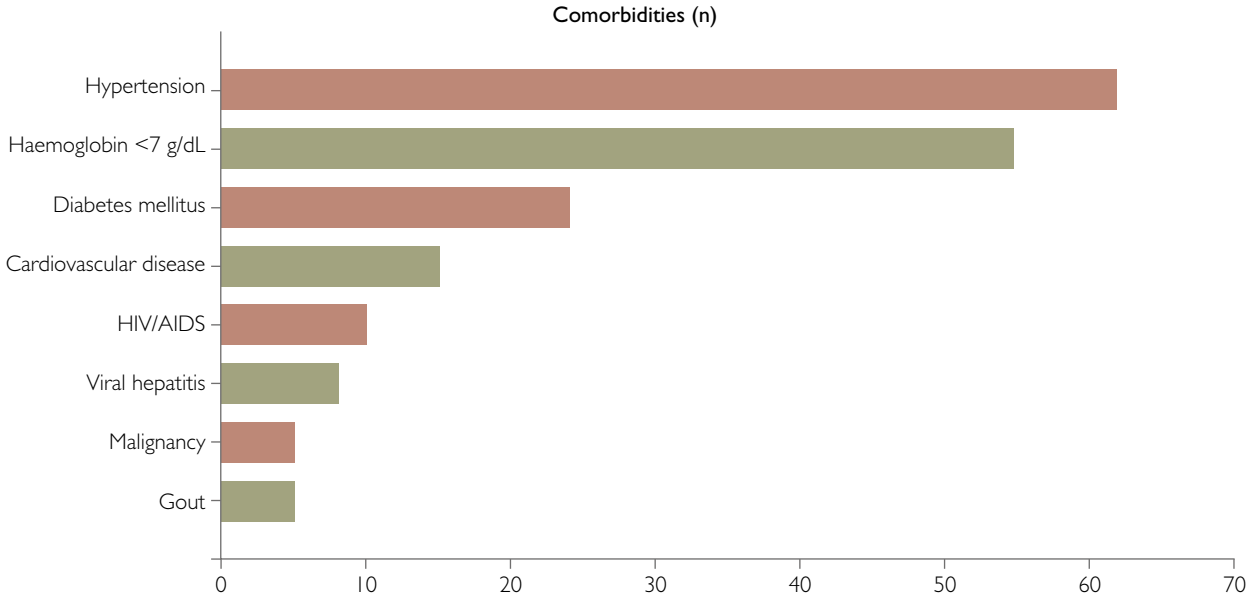

Figure 1. Comorbidities and complications present at dialysis initiation among elderly patients.

The median survival time after dialysis initiation was 228 days (IQR 2–365 days). The survival rate at 3 months was 67%, at 6 months was 59%, at 9 months was 55% and at 1 year was 41% (Figure 2). Survival was reduced in older patients (Figure 3). The median survival time for participants >85 years was 6.5 days (IQR 2–15 days), for those 75–84 years it was 240 days (IQR 10–365 days), and for those 65–74 years it was 239 days (IQR 30–365 days) (P < 0.001).

Table 2. Hospitalisation among elderly patients on haemodialysis.

	Total n (%)	Female, n (%)	Male, n (%)	P value
Patients hospitalised	70 (86)	47 (54)	23 (32)	0.054
Median number of hospitalisations (IQR)	2.0 (1–4)	2.5 (1–4)	1.5 (1–3)	0.001
Reasons for hospitalisation				
Gastrointestinal haemorrhage	5 (6.2)	4 (4.1)	1 (1.2)	0.384
Cerebrovascular disease	5 (6.2)	4 (4.1)	1 (1.2)	0.384
Fluid overload	20 (25)	14 (17.3)	6 (7.4)	0.318
Catheter infection	5 (6.2)	5 (9.8)	0 (0.0)	0.092
Uraemia	34 (42)	25 (31)	9 (11)	0.074
Other infections	34 (42)	21 (26)	13 (16)	0.052

Table 3. Place and causes of death of elderly patients on dialysis (n = 48).

	Frequency (n)	Percentage
Place		
Home	16	33
Hospital	32	67
Cause of death		
Sudden death	20	42
Dialysis withdrawn	8	17
– Insufficient funds	6	75
– Patient/family decision	2	25
Infection/sepsis	8	17
Gastrointestinal haemorrhage	4	8
Catheter infection	2	4
Unknown	5	10
Severe malnutrition	1	2

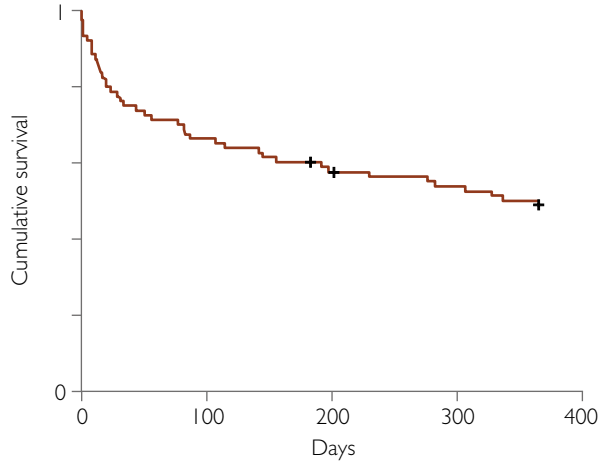

Figure 2. Survival in the year following dialysis initiation among elderly patients.

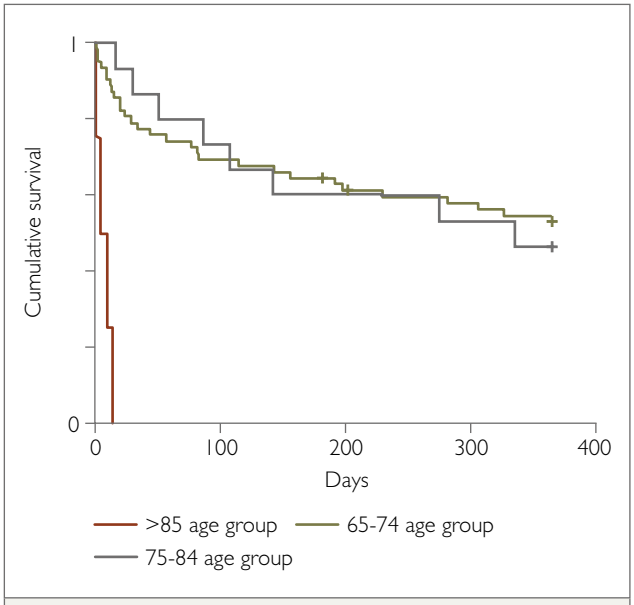

Figure 3. Survival in the year following dialysis initiation, by age group.

On multivariable analysis, emergency or unplanned dialysis (HR = 1.434, P = 0.032), age ≥75 years (HR = 19.384, P = 0.001), hyperkalaemia (HR = 1.244, P = 0.02) and high comorbidity index (HR = 0.014, P = 2.819) were associated with lower survival time and increased risk of death (Table 4).

DISCUSSION

The management of kidney failure in Cameroon is challenging as out-of-pocket payments for medications, laboratory tests and hospitalisations are not affordable for most patients, and especially for the elderly, who are often dependent on family members and have a lower income upon retirement [21].

We found a mortality rate of 59%, similar to previous reports in developing countries, which varied from 46–66% [19,20]. Sudden cardiovascular death, infection/sepsis and dialysis withdrawal were the main causes of death, similar to other studies in Cameroon [17] and other developing countries [13,19,22]. The high mortality due to sepsis may be due to the high rate of temporary catheter usage.

The median survival time after starting dialysis was 7.5 months. This is less than the median survival times of 19 months reported by Fouda et al. for Cameroon in 2019 [17], 26.9 months in Austria [23] and 17.7 months in Britain

Table 4. Baseline predictors of poor survival at one year after start of haemodialysis among elderly patients.

Variable	HR	SE	Wald	DF	P value	AHR	95.0% CI Lower	95.0% CI Upper
Emergency dialysis	1.360	0.182	3.916	1	0.032	1.434	1.003	2.049
Age >75 years	2.964	0.892	11.045	1	0.001	19.384	3.374	111.355
Sex	0.059	0.411	0.021	1	0.885	0.943	0.422	2.108
Hyperkalaemia	1.409	0.607	5.383	1	0.020	1.244	0.074	0.804
CCI (>3)	3.199	0.943	8.135	1	0.014	2.819	1.282	4.376

Abbreviations: HR, hazard ratio; SE, standard error; AHR: adjusted hazard ratio; DF, degrees of freedom; CI, confidence interval; CCI, Charlson Comorbidity Index.

[24]. The survival rate at 3 months was 67% and at 1 year was 41%, which is less than the survival time reported by Fouda et al. of 84% at 3 months and 65% at 1 year. The South African data indicated an overall one-year survival rate of 90%, and 86% in elderly patients [8, 9]. Our patients had high comorbidity scores and this affects survival [23]. Having only two, rather than the standard three, treatment sessions per week and the high prevalence of anaemia may also have contributed to the high mortality. Also, mortality is higher in patients presenting late and having an urgent start to KRT.

Survival was much lower in the very old patients (median 6.5 days), which is similar to findings reported by Fouda et al. and other groups [17,19,23,25]. As noted by many authors [19,20,23], elderly patients with high comorbidity indices had lower survival. Increasing age is associated with an increasing number of comorbidities, and higher mortality [26].

We found that the factors associated with low survival on multivariate analysis were emergency dialysis, age ≥75 years, hyperkalaemia as indication for starting dialysis and high comorbidity scores. Fouda et al. [17] also found a high comorbidity score to be associated with low survival. Almost all our patients were started on dialysis as an emergency and most had a high comorbidity score.

Our study was limited by a relatively small sample size and the retrospective nature of the study meant that some patients' records were incomplete.

CONCLUSIONS

About one in ten of our incident haemodialysis patients was elderly. Only half of the elderly patients were still alive one year after starting dialysis. Comorbidity, emergency dialysis initiation, age >75 years and refractory hyperkalaemia were factors associated with the survival of this cohort.

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Conflict of interest

The authors have no conflict of interest to declare.

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