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Research Article

Socioprofessional Impact on Patients with Chronic Kidney Disease at Aristide Le Dantec Hospital in Dakar: Out-of-Pocket Expenditures Burden and Catastrophic Household Finances

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Abstract

Background: Chronic kidney disease (CKD) represents a major public health burden in sub-Saharan Africa, predominantly affecting young working-age adults. Despite free dialysis policies implemented in Senegal since 2012, the broader socioeconomic consequences of end-stage kidney disease (ESKD) on patients and their families remained poorly documented. Aim: This study aimed to estimate the socioprofessional and economic impact of dialysis on ESKD patients and their families in 2019. Setting: The nephrology and dialysis department of Aristide Le Dantec Hospital, a national level III referral center in Dakar, Senegal. Methods: An analytical cross-sectional study was conducted from January to December 2019. Data were collected through medical record reviews and face-to-face interviews. Direct and indirect costs were calculated, and catastrophic health expenditure was assessed using a 20% annual household income threshold. Results: A total of 89 patients were enrolled. The mean age was 47.83 years and 87.36% had no health insurance. Weekly working hours declined from 38.32 before diagnosis to 4.93 hours after. Job loss affected 59.09% of patients. Nearly all patients (89.53%) reported social repercussions, primarily activity limitations. Additionally, 43.68% sold personal assets to cover treatment costs, and 18.39% contracted loans. Catastrophic health expenditure affected 95.98% of patients, with out-of-pocket costs representing 52.86% of total management expenditures. Conclusion: Despite state subsidies, ESKD imposed a devastating socioeconomic burden on patients and families. Strengthening health insurance coverage and expanding social protection for CKD patients is strongly recommended. Contribution: This study provides critical evidence on the socioprofessional consequences of ESKD in West Africa, informing equitable health policy and resource allocation for kidney disease management in low- and middle-income countries.

Keywords

Chronic Kidney Disease, Socioprofessional Impact, Out-of-Pocket Expenditures, Catastrophic Health Expenditure, Dialysis, Senegal, Sub-Saharan Africa

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1. Introduction

Chronic kidney disease is defined as a decrease in creatinine clearance below 90 ml/min/1.73 m^2 [1]. Various communicable and non-communicable diseases lead to renal complications, and many individuals with kidney disease lack access to care.

Chronic kidney disease is a global public health issue. In 2015, more than 353 million people (5% of the world's population) suffered from CKD [2]. In developed countries it primarily affects elderly individuals, whereas in Africa it predominantly occurs in young working-age adults, increasing at an annual rate of 5% in industrialized nations.

In the United States the prevalence is approximately 13%, affecting nearly 20 million Americans, with 650,000 patients on dialysis in 2010 [3]. In sub-Saharan Africa the prevalence is 13.9%, ranging from 2% in Côte d'Ivoire to 30.2% in Zimbabwe [4].

In Senegal the prevalence is estimated at 4.9%. In 2019 the number of patients on dialysis in public facilities rose to 842, including 50 on peritoneal dialysis [4]. Since 2012 the Government has made dialysis free of charge, increased center numbers from 4 to 23 [5], and enacted Law n° 2015-22 on organ donation and Decree n° 2018-1583 establishing the NCDT [5]. Despite these efforts, residual costs continue to burden patients and families.

The objective of this study was to estimate the socioprofessional and economic impact of dialysis on ESKD patients and their families in 2019.

2. Materials and Methods

2.1. Study Setting

The study was conducted in the nephrology, dialysis, and kidney transplantation department of Aristide Le Dantec Hospital (HALD) in Dakar, a national level III referral center.

2.2. Type and Period of Study

Analytical cross-sectional study with an economic focus, conducted from January 2 to December 31, 2019.

2.3. Study Population

2.3.1. Inclusion Criteria

ESKD patients regularly dialyzed at HALD for at least one year during 2019 with a complete medical record.

2.3.2. Exclusion Criteria

Patients who refused to participate, whose health condition prevented answering questions, or whose records were incomplete or lost.

2.3.3. Recruitment

Exhaustive recruitment of all patients meeting inclusion criteria.

2.4. Data Collection

Medical record review combined with face-to-face interviews. A structured form collected sociodemographic, clinical, socioprofessional, and cost data.

2.5. Variables and Cost Calculations

Indirect costs assessed as productivity loss (annual income before minus current income). Income thresholds per 2017 HEA Senegal: low <769,450 FCFA; middle 769,450–1,388,100 FCFA; high >2,234,500 FCFA (1 euro=655.96 FCFA; 1 USD=571.30 FCFA). Catastrophic health expenditure (CHE) defined as annual health expenditure ≥20% of annual household income [13]. Direct costs included transportation, medications, laboratory, radiology, consultations, and accommodation.

2.6. Data Analysis

Data entered in Excel and analyzed using Epi Info 7. Descriptive statistics and t-test for cost comparisons between dialysis modalities (significance: 0.05).

2.7. Ethical Considerations

Informed consent obtained from all participants. Strict confidentiality and anonymity assured. Legal guardian used for patients under 18.

3. Results

3.1. Descriptive Results

A total of 89 patients were enrolled. Mean age 47.83 ±13.40 years (range 15–83). Females 51.96% (n=53). Among 87 patients, 71.26% were married. Informal workers 44.44%; no employment 37.37%. No health insurance: 87.36% (Table 1).

Table 1. Distribution of Patient Characteristics.

Sociodemographic characteristics	N (N=89)	Percentage (%)	Mean
Age (years): <20 / 20–29 / 30–39 / 40–49 / 50–59 / >60	2 / 7 / 15 / 25 / 21 / 19	2 / 8 / 17 / 28 / 24 / 21	47.83 ± 13.40 years
Gender: Male / Female	43 / 57	48.04 / 51.96	Sex ratio = 0.92
Marital status: Married / Single / Divorced / Widowed	63 / 19 / 3 / 4	71.26 / 20.69 / 3.45 / 4.60	—
Professional activity: Informal / No activity / Formal / Student	44 / 37 / 12 / 6	44.44 / 37.37 / 12.12 / 6.06	—
Health insurance: Private / Mutual org / None	11 / 0 / 78	12.64 / 0 / 87.36	—

3.2. Socioprofessional Impact

3.2.1. Primary Household Earner

Among 86 patients, 29 (33.72%) were the primary earner before ESKD diagnosis.

3.2.2. Working Hours

Mean weekly hours declined from 38.32 ± 27.75 before diagnosis to 4.93 ± 10.99 after.

3.2.3. Monthly Occasional Assistance

20 patients (23.81%) received monthly assistance: 85% from family, 15% from employers. Mean: 48,894 ± 64,277 FCFA.

3.2.4. Impact on Professional Life

76.74% (n=66) of 86 patients confirmed professional life impact. Job loss was the main consequence (59.09%, n=39) (Figure 1).

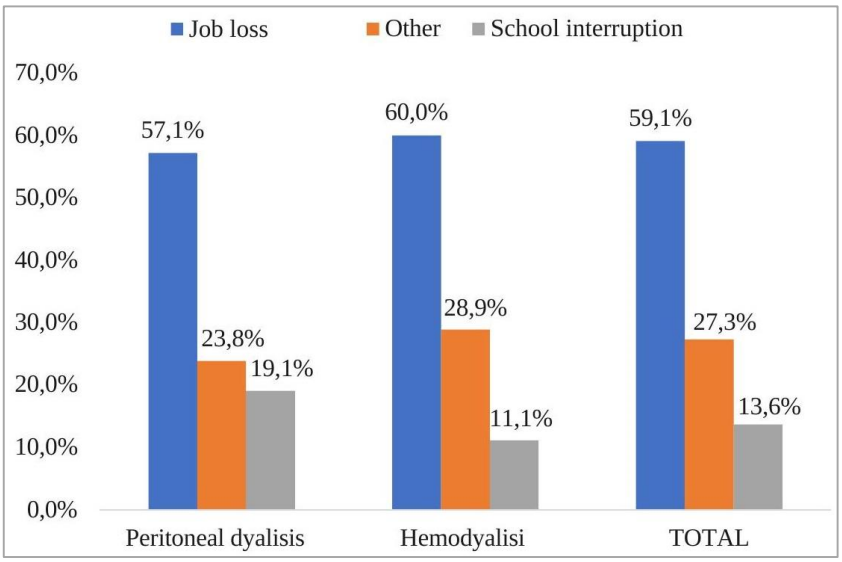

Figure 1. Distribution of patients according to the impact of CKD on professional life and dialysis modality.

3.2.5. Impact on Social Life

89.53% (n=77) reported social repercussions. Activity limitations accounted for 51.95% (n=40) of cases.

3.2.6. Borrowing and Asset Sales

18.39% (n=16) resorted to loans (mean: 229,615 ± 257,443 FCFA). 43.68% (n=38) sold personal or family assets to finance care (Table 2).

Table 2. Distribution of dialysis patients according to assets sold, by dialysis modality (Freq. = Frequency; n = number of patients).

Category	Peritoneal Dialysis (n=7)		Hemodialysis (n=31)		Total (n=38)	
	Freq.	%	Freq.	%	Freq.	%
Land plot	1	14.29	15	48.39	16	42.11
Gold / Jewelry	4	57.14	7	22.58	11	28.95
Work equipment	1	14.29	6	19.35	7	18.42
Household appliance	1	14.29	2	6.45	3	7.89
Transportation / Vehicle	—	—	1	3.23	1	2.63
Total	7	100.00	31	100.00	38	100.00

3.2.7. Stigmatization and Catastrophic Expenditure

8.14% (n=7) experienced stigmatization from neighbors. 95.98% of patients faced catastrophic health expenditure (Figure 2).

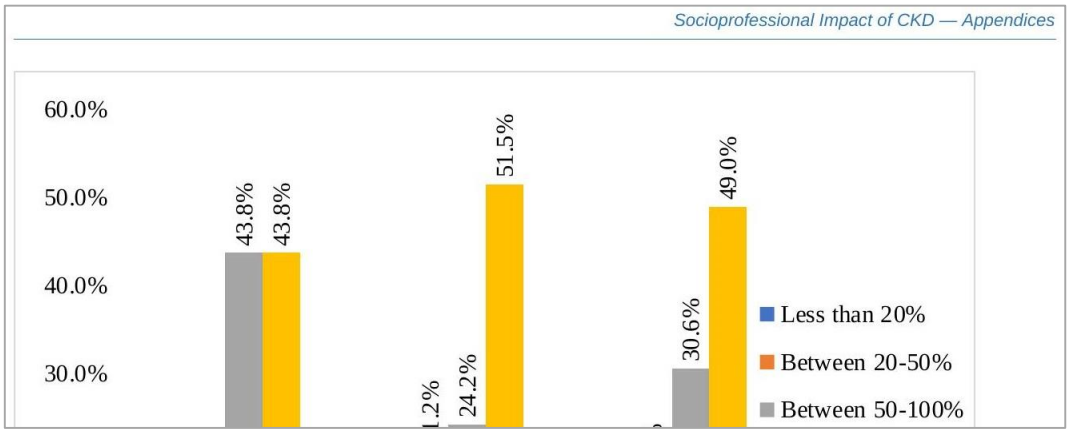

Figure 2. Distribution according to the share of ESKD management expenditures on patient income by dialysis modality.

3.3. Total Management Costs

Hemodialysis total costs: 1,136,580,121 FCFA (54.79% patient-borne) (Table 3). Peritoneal dialysis: 345,342,284 FCFA (46.52% patient-borne) (Table 4). All dialysis patients: 1,481,922,405 FCFA (52.86% patient-borne) (Table 5).

Table 3. Distribution of management costs for hemodialysis patients according to funding sources.

Cost types	Total amount (FCFA)	Patients and/or families Amount (%)	State Amount (%)
Direct medical costs	638,583,502	124,719,502 (19.53%)	513,864,000 (80.47%)
Direct non-medical costs	151,416,823	151,416,823 (100%)	0 (0%)
Indirect costs	346,579,796	346,579,796 (100%)	0 (0%)
Total costs	1,136,580,121	622,716,121 (54.79%)	513,864,000 (45.21%)

Table 4. Distribution of management costs for peritoneal dialysis patients according to funding sources.

Cost types	Total amount (FCFA)	Patients and/or families Amount (%)	State Amount (%)
Direct medical costs	217,413,140	32,713,940 (15.05%)	184,699,200 (84.95%)
Direct non-medical costs	19,044,144	19,044,144 (100%)	0 (0%)
Indirect costs	108,885,000	108,885,000 (100%)	0 (0%)
Total costs	345,342,284	160,643,084 (46.52%)	184,699,200 (53.48%)

Table 5. Distribution of management costs for all dialysis patients according to funding sources.

Cost types	Total amount (FCFA)	Patients and/or families Amount (%)	State Amount (%)
Direct medical costs	855,996,642	157,433,442 (18.39%)	698,563,200 (81.61%)
Direct non-medical costs	170,460,967	170,460,967 (100%)	0 (0%)
Indirect costs	455,464,796	455,464,796 (100%)	0 (0%)
Total costs	1,481,922,405	783,359,205 (52.86%)	698,563,200 (47.14%)

4. Discussion

4.1. Study Limitations

This study was conducted in 2019 prior to the COVID-19 pandemic in Senegal (the first case was recorded in March 2020); therefore, any reference to COVID-19 as a contextual factor is not applicable to this study period. Additional limitations include reliance on patient recall for some cost items, receipts not always available for verification, limited dialysis bed capacity with 13–19-month waiting times, and exclusion of patients from private-sector facilities.

4.2. Epidemiological Data

4.2.1. Age

Mean age 47.83 years, similar to Dakar [6], Saint-Louis [7], India [8], and Madagascar [2]. While KANE Y et al. had found a mean age of 41.3 years, with extremes of 12 and 72 years [9]. Higher means in UK (58.2) [10], US (54.3) [11], and France (76) [12] reflect population aging.

4.2.2. Gender

Female predominance (51.96%, sex ratio 0.92) may reflect higher cardiovascular risk factors among Senegalese women [14]. 72.55% were on hemodialysis; mean session duration 5.1 ±2.79 hours; mean dialysis vintage 6.57 ±3.93 years.

4.2.3. Education Level

More than half 60.68% were educated, primarily at the secondary level (30.34%) [14]. This contrasts with other settings, such as Congo [15], Rabat, Morocco [16], northern Senegal in 2012 [17], and rural Haiti [18], where it was found that most of these patients had less than 6 years of schooling. In our case, this could be explained by the setting in which we conducted our research, which is located in the heart of the city, limiting access to a large portion of the population, and leading us to assume that the population that frequented this institution is not a true representation of our society as a whole.

4.3. Socioprofessional and Economic Impact

The progression from CKD stage 3 to CKD stages 4-5 was associated with a 1.3 à4.2 fold increase in costs, with the highest costs associated with end-stage renal disease at $20,110 to $100,593 per patient [22].

One in three families lost their primary breadwinner. Weekly hours collapsed from 38.32 to 4.93. Assistance received by 23.81%, mostly from families (85%), similar to Ahoui et al. [23]. Patient-borne costs (54.79% hemodialysis) exceed Indian estimates [19, 20] but are comparable to Ethiopia [21]. Nearly all (95.98%) faced CHE, consistent with India (93.4%) and Ethiopia (90%) [21]. A Thai study found lower EuroQol-5D scores in CHE patients (0.76 vs. 0.82, $p<0.001$) [24]. Social disruption: 89.53%. Stigmatization: 8.14% vs. 4.47% in Benin [23].

5. Conclusions

CKD constitutes a major global public health issue. Despite state subsidies, ESKD imposed a devastating socioeconomic burden on patients and families in Senegal. Strengthening health insurance and expanding social protection for CKD patients is strongly recommended to achieve universal health coverage and the Sustainable Development Goals.

Abbreviations

CKD	Chronic Kidney Disease
ESKD	End-Stage Kidney Disease
FCFA	Franc De La Communauté Financière Africaine
HALD	Hôpital Aristide Le Dantec
CHE	Catastrophic Health Expenditure
CAPD	Continuous Ambulatory Peritoneal Dialysis
ANACMU	Agence Nationale De La Couverture Maladie Universelle
PNA	Pharmacie Nationale d'Approvisionnement
NCDT	National Council for Donation and Transplantation
UHC	Universal Health Coverage

Author Contributions

Mbathio Diop: Conceptualization, Methodology, Writing – original draft, Writing – review & editing

Mareme Maty Dioum: Data curation, Formal Analysis, Investigation

Morel Fabrice Bignon Aguiar: Data curation, Investigation, Writing – original draft

Mamadou Makhtar Mbacke Leye: Project administration, Supervision, Validation, Writing – review & editing

Data Availability Statement

The data supporting the outcome of this research work has been reported in this manuscript.

Conflicts of Interest

The authors declare no conflicts of interest.

References

[1] Cuen FR. Chronic renal failure and chronic kidney disease]. In: Néphrologie, 8e edition, chap. 15. Available from: http://cuen.fr/manuel (accessed 04 Feb 2026).

[2] Ramilitiana B, et al. A retrospective study on the incidence of chronic kidney disease. Thèse médecine. 2016; 23.

[3] Ferris ME, Gipson DS, Kimmel PL, Eggers PW. Trends in treatment and outcomes of survival of adolescents initiating end-stage renal disease care in the United States. Pediatrics. 2006; 117(4): 1212–1219. https://doi.org/10.1542/peds.2005-0654

[4] Stanifer JW, et al. The epidemiology of CKD in sub-Saharan Africa: a systematic review and meta-analysis. Lancet Global Health. 2014; 2(3): e174–81. https://doi.org/10.1016/S2214-109X(14)70002-6

[5] Ndiaye AS. Contribution of the PNA Director on the free management of kidney disease in Senegal. Ministère de la Santé 2026.

[6] Niang A, et al. Evaluation of cardiac complications among chronic hemodialysis in Dakar. Pan Afr Med J. 2016; 23: 43. https://doi.org/10.11604/pamj.2016.23.43.8375

[7] Seck S, et al. Prevalence survey of CKD in northern Senegal. Néphrologie & Thérapeutique. 2014; 10(5): 399.

[8] Falodia J, Singla MK. CKD epidemiology and risk factors. Clinical Queries: Nephrology. 2012; 1(4): 249–52.

[9] Kane K, et al. Decentralization of dialysis in Senegal: one-year experience at the Tambacounda center. ESJ. 2016; 12(36): 164.

[10] Bello AK, et al. Socioeconomic Status and CKD at Presentation to a Renal Service in the UK. Clin J Am Soc Nephrol. 2008; 3(5): 1316–23. https://doi.org/10.2215/CJN.00880208

[11] Bruce MA, et al. Association of Socioeconomic Status and CKD Among African Americans: The Jackson Heart Study. J Am Soc Nephrol. 2010; 55(6): 1001–1008. https://doi.org/10.1053/j.ajkd.2009.12.032

[12] Loos-Ayav C, et al. Incidence of CRF in the general population, EPIRAN study. Néphrologie & Thérapeutique. 2009; 5: S250–5.

[13] Xu K, Evans DB, Kawabata K, Zeramdini R, Klavus J, Murray CJL. Household catastrophic health expenditure: a multicountry analysis. Lancet. 2003; 362(9378): 111–117. https://doi.org/10.1016/S0140-6736(03)13861-5

[14] Mbaye A, et al. Prevalence of cardiovascular risk factors in a semi-rural setting in Senegal. Ann Cardiol Angéol. 2018; 67(4): 264–9.

[15] Sumaili EK, et al. High prevalence of undiagnosed CKD among at-risk population in Kinshasa, DRC. BMC Nephrology. 2009; 10(1): 18.

[16] Farouki ME, et al. Profile of diabetic CRF patients at the initiation of hemodialysis in Rabat. Pan Afr Med J. 2013; 15(124): 1–6.

[17] Seck SM, et al. Epidemiology of CKD in northern Senegal: a community-based study in 2012. Pan Afr Med J. 2014; 18(1): 307–315. https://doi.org/10.11604/pamj.2014.18.307.3240

[18] Burkhalter F, et al. Prevalence and risk factors for CKD in rural Haiti. Swiss Med Weekly. 2014; 144(5152).

[19] Gummidi B, et al. Catastrophic Health Expenditure among Patients with Nondialysis CKD in Uddanam, India. Kidney Int Rep. 2022; 7(2): 319–321. https://doi.org/10.1016/j.ekir.2021.10.026

[20] Valsa Jose V, et al. Out-of-pocket expenditures and quality of life among hemodialysis patients in Kerala, India. Hemodialysis Int. 2022; 26(4): 569–574. https://doi.org/10.1111/hdi.13031

[21] Baye TA, et al. Economic burden of hemodialysis in Addis Ababa, Ethiopia. Cost Eff Resour Alloc. 2024; 22: 25. https://doi.org/10.1186/s12962-024-00533-8

[22] Elshahat S, et al. Impact of CKD on developed countries: a systematic scoping review. PLoS One. 2020; 15(3): e0230512. https://doi.org/10.1371/journal.pone.0230512

[23] Ahoui S, et al. Psychosocial consequences of CKD among hemodialysis patients at CNHU-HKM in Cotonou. Rev Sociol Anthropol Psychol. 2017; 16(10/8): 280–294.

[24] Rattanasompattikul M, et al. Association between catastrophic health expenditures and health-related quality of life in CKD patients in Thailand. Qual Life Res. 2020; 29(11): 2965–2976. https://doi.org/10.1007/s11136-020-02533-2