

# Predialysis Care Experience Among Patients With CKD at a Teaching Hospital in Kenya



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Chronic kidney disease (CKD) is a global health problem affecting more than 1 in every 10 of the adult population.<sup>1</sup> The leading causes of CKD are diabetes mellitus and hypertension. End-stage kidney disease (ESKD) requires kidney replacement therapy (KRT) for sustenance of bodily functions. The KRT includes kidney transplantation and dialytic therapies. Dialytic therapies include hemodialysis (HD) and peritoneal dialysis. In recent years, the government of Kenya has set up at least one HD unit in each of the country's 47 counties. Predialysis care is important. Lower mortality has been reported in people treated with dialysis for ESKD who received at least one month of predialysis care compared with those with shorter or no predialysis care.<sup>2</sup> The optimal way of managing CKD prior to KRT has been a focus of intense investigation.<sup>3</sup> Referral to a nephrologist is recommended for people with CKD who have either an estimated glomerular filtration rate of <30 ml/min per 1.73 m<sup>2</sup>, a consistent finding of significant albuminuria, or signs of progressive disease.<sup>4</sup> Patient education requires the flexibility to individualize the delivery of a standardized CKD curriculum in partnership with a patient–healthcare team, to fulfill the goal of informed and shared decision-making.<sup>5</sup> We studied the predialysis experience among the ambulant patients on maintenance HD at Kenyatta National Hospital (KNH) in Kenya during June and July 2018 (Supplementary Methods). The study was approved by the Kenyatta National Hospital–University of Nairobi Ethics and Research Committee, registration number P226/04/2018.

## RESULTS

Eighty-two of 91 patients were enrolled (Supplementary Figure S1). The follow-up outpatient treatment before initiation of HD included visits to hypertension, renal, and diabetes clinics. There were 39, 26, and 16 patients from the hypertension, renal, and diabetes clinics, respectively

(Supplementary Results). Eleven of the 16 patients (68.8%) who attended the diabetes clinic also attended the hypertension clinic (Supplementary Table S1). The percentage of female patients was 76.9% in the renal clinic, 43.8% in the diabetes clinic, and 46.2% in the hypertension clinic. For the diabetes, hypertension, and renal clinics, the mean ages were  $53 \pm 7.92$  years,  $47.31 \pm 15.67$  years, and  $39.85 \pm 15.31$  years, respectively. The mean follow-up duration was 71.19 months for those in the diabetes clinic, 65 months for those in the hypertension clinic, and 20.77 months for those in the renal clinic. The mean HD duration was 28.77 months, 16.88 months, and 13.95 months for the renal, hypertension, and diabetes clinics, respectively (Table 1). Anemia was also common as less than 40% of the patients had a hemoglobin concentration  $\geq 9$  g/dl. HD was initiated as an emergency measure for 57.7% of patients in the renal clinic, 81.3% in the diabetes clinic, and 76.9% in the hypertension clinic. Almost 80% of the renal and hypertension clinic attendees were aware of kidney transplantation as a type of KRT, compared with 69% from the diabetes clinic (Table 1). About 70% of patients from the 3 clinics underwent temporary vascular access placement at HD initiation (Figure 1). Renal clinic attendees appeared to have better information about the progression of the underlying medical conditions, as only 15.4% of the patients reported having never been informed about disease progression, compared with >30% from the diabetes and hypertension clinics. Clinician communication to patients about test results was poor across all 3 clinics, as >40% of patients reported not having every test result discussed with them. Health education referral was poorest in the hypertension clinic, where 28.2% of patients reported having never been referred for health education about their disease. More than 30% of the attendees from all the clinics felt strongly that they were not well informed about their health conditions. Similarly, the information provided about the risk

**Table 1.** Characteristics of patients among those followed up in the renal, DM, and HTN clinics

Characteristic	Renal clinic	DM clinic	HTN clinic
No. of patients	26	16	39
Female sex, %	76.9	43.8	46.2
Median follow-up duration before starting HD, mo	6.5	26.5	24
Median HD duration, mo	11.5	5.5	9
Emergency HD initiation, %	57.7	81.3	76.9
HD and KTx, %	80.8	68.8	76.9
Blood transfusion, %	84.6	68.8	74.4
Hemoglobin level $\geq 9$ g/dl, %	38.5	37.5	35.9

DM, diabetes mellitus; HD, hemodialysis; HTN, hypertension; KRT, kidney replacement therapy; KTx, kidney transplant.

of kidney failure from the underlying conditions was poor, with the diabetes clinic performing the worst. Readiness to cope with kidney complications was at its best among the hypertension clinic attendees, of whom >40% said they felt strongly that they were adequately informed to cope with kidney complications. Nutritional counseling was poorest among the attendees of the hypertension clinic, and best among the renal clinic attendees. By the time of initiation of HD, >50% of the patients who had previously attended either the diabetes or hypertension clinic reported receiving no counseling about KRT (Table 2).

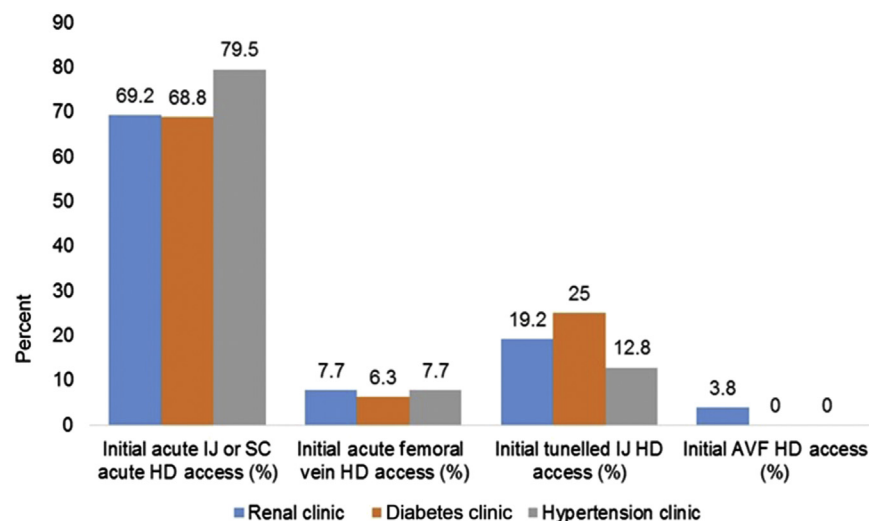
## DISCUSSION

CKD is currently a global health concern. Diabetes and hypertension are the leading underlying causes of CKD. Early identification of patients with CKD and institution by primary care providers of measures to retard its progression are important. For early progressors, early referral to a nephrologist to manage complications and prepare for KRT is key.<sup>6–9, S1</sup> Among

CKD patients not referred to a nephrologist, the risks of ESKD and mortality are higher in those with CKD stages 3b–5.<sup>S2</sup> A similar finding may be implied by our study, as the patients followed up in the diabetes and hypertension clinics had a shorter treatment duration compared with those enrolled from the renal clinic, which is run by nephrologists.

There is value in coordination of care among nephrologists, providers, and health plan case managers to improve outcomes and reduce total medical costs among those at risk for CKD progression from Stage 4 to Stage 5.<sup>S3</sup> Among the CKD population, less than 2% of patients at all stages except CKD 4 progress to ESKD and undergo KRT.<sup>S4</sup> This finding supports the importance of proper management of the early stages of CKD to avert progression to ESKD, which is very expensive to manage.

Low awareness of CKD is quite common in the general population. Even for patients with stage 5 CKD, 30% to 50% are unaware of their CKD status,<sup>S5–S7</sup> a finding similar to that in our study, despite the follow-up treatment in the diabetes and hypertension clinics. Low awareness of CKD and late nephrology referral are associated with poor prognosis, such as rapid progression to ESKD, higher mortality, and hospitalization.<sup>S8, S9</sup> The low awareness and late referrals are multifactorial, and the causative factors may interact with each other.<sup>S10</sup> The factors include knowledge deficits, limited awareness of CKD,<sup>S11</sup> and limited understanding of the dialysis process.<sup>S12–S14</sup> Negative attitudes, denial of the progressing disease state, refusal to accept the need for dialysis,<sup>S13</sup> and economic concerns<sup>S15</sup> are known issues. In Cameroon, 75% of patients present late to a nephrologist; in more than 50% of these cases, the lateness was attributable to the treating physician, and in more than 40%, it was the result of factors related to the patients.<sup>S16</sup> Lack of



**Figure 1.** Vascular access types in patients from different predialysis clinics. AVF, arteriovenous fistula; HD, hemodialysis; IJ, internal jugular; SC, subclavian.

**Table 2.** Patients' feelings about communication and supportive care for chronic kidney disease predialysis

Description of feelings by the patients	Response	Renal (%)	Diabetes mellitus (%)	Hypertension (%)
<i>By the time I initiated dialysis, the clinicians informed me about my illness and progression every time I attended the clinic</i>	Never	15.4	37.5	33.3
	Sometimes	30.8	18.8	23.1
	Most of the time	15.4	12.5	17.9
	Every time	38.5	31.3	25.6
<i>The clinicians informed me about the test results every time I brought the results to clinic visits</i>	Never	7.7	18.8	10.3
	Sometimes	19.2	12.5	15.4
	Most of the time	19.2	25	25.6
	Every time	53.8	43.8	48.7
<i>The clinicians referred me for health education during my clinic visits</i>	Never	15.4	18.8	28.2
	Sometimes	38.5	37.5	38.5
	Most of the time	3.8	25	7.7
	Every time	42.3	18.8	25.6
<i>I felt well informed about my health condition by the time I was initiated on hemodialysis</i>	Strongly disagree	3.8	31.3	7.7
	Disagree	3.8	12.5	20.5
	Partly agree	34.6	12.5	25.6
	Strongly agree	57.7	43.8	46.2
<i>I had been informed about the risks of kidney failure due to the primary illness during the clinic visits</i>	Strongly disagree	11.5	12.5	12.8
	Disagree	19.2	43.8	20.5
	Partly agree	15.4	6.3	12.8
	Strongly agree	53.8	37.5	53.8
<i>I felt adequately informed to cope with kidney complications of the disease by the time I was initiated on dialysis</i>	Strongly disagree	3.8	6.3	10.3
	Disagree	15.4	12.5	2.6
	Partly agree	42.3	50	20.5
	Strongly agree	38.5	31.3	43.6
<i>I had adequate nutritional counseling in respect to the kidney disease</i>	Strongly disagree	0.0	0	5.1
	Disagree	15.4	12.5	17.9
	Partly agree	15.4	25	23.1
	Strongly agree	69.2	62.5	53.8
<i>I had sessions with the renal counselor before initiation of dialysis</i>	Strongly disagree	7.7	31.3	17.9
	Disagree	11.5	25	23.1
	Partly agree	15.4	18.8	17.9
	Strongly agree	65.4	25	41

communication between primary care physicians and nephrologists contributes to late referral and occurs more commonly among internal medicine physicians and other specialists than general practice physicians.<sup>S17–S19</sup> This may have occurred in our study as well, given that the outpatient clinics have specialist physicians but there were late referrals to the nephrologists. The type of healthcare system, the density of nephrologists within a given geographic area, and geographic distance to nephrologists are other factors contributing to late presentation.<sup>S19,S20</sup>

Our findings are concordant with this fact, as there are less than 50 nephrologists in Kenya currently. Late presentation is associated with high hospitalization and emergency dialysis rates on temporary catheters,<sup>S21</sup> which also occurred in our setting. Even in nations with national health insurance coverage, such as Taiwan, patients do not have satisfactory follow-up for CKD progression and complications in predialysis,

despite regular medical visits.<sup>S22</sup> Many comorbidities, and regular medical visits to non-nephrology subspecialists, are proven risk factors of unsatisfactory CKD care. In many physicians' practices, CKD screening is not executed routinely, and this constitutes the first obstacle to timely CKD care.<sup>S31</sup> CKD screening often is not considered routine practice in other specialties.<sup>S22,S23</sup> This finding underpins the centrality of the nephrologist's role in CKD care. Both CKD progression retardation and preparation for dialysis initiation constitute the therapeutic goal for late-stage CKD.<sup>S24</sup>

If CKD is actively searched for with simple measures, its early detection allows the implementation of strategies to delay progression to ESKD.<sup>4</sup> For the cases in our study, this approach was not utilized, as emergency HD initiation was the norm. A multidisciplinary approach is advocated for CKD care. Dietetic–nutritional therapy is an important component of conservative

treatment of patients with CKD and should be anticipated and integrated with pharmacologic therapies.<sup>S25</sup> In Australia, CKD knowledge remains inadequate for standard nephrology outpatient care.<sup>S26</sup> In Brazil, patients in intermediate stages of CKD do not receive follow-up with a multidisciplinary team at the recommended frequency.<sup>S27</sup> Anemia in CKD is very prevalent. Although it has been treated with red blood cell transfusion, epoetins, and intravenous iron, the best approaches to anemia management in CKD are still unknown.<sup>S28</sup>

In conclusion, hypertension and diabetes preceded most of our ESKD cases. Hypertension was prevalent among our young ESKD population, which makes glomerulonephritides likely underlying causes, although kidney biopsies are rarely performed. Follow-up in diabetes and hypertension clinics has not translated into better CKD care ([Supplementary Study Limitations](#)). Communication about the disease between patients and healthcare providers is not satisfactory. A multidisciplinary approach by various specialties needs to be embraced when caring for these patients. Patient factors need to be considered when planning healthcare delivery.

## DISCLOSURE

All the authors declared no competing interests.

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## SUPPLEMENTARY MATERIAL

[Supplementary File \(PDF\)](#)

[Supplementary Methods.](#)

[Supplementary Results.](#)

**Table S1.** Characteristics of patients who previously attended the diabetes clinic only and those who previously attended both the diabetes and hypertension clinics.

**Figure S1.** Patient recruitment flowchart.

**Supplementary Study Limitations.**

**Supplementary References.**

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# Association Between Perfluoroalkyl Substance Exposure and Renal Function in Children With CKD Enrolled in H3Africa Kidney Disease Research Network



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