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Dialysis Prevalence in Zimbabwe: A Cross-sectional Descriptive Study

To the Editor:

The contribution of chronic kidney disease (CKD) to the global burden of disease is growing, accounting for an estimated 1.2 million deaths worldwide in 2017.[1,2] In the low- and lower-middle-income countries of sub-Saharan Africa, such as Zimbabwe, the burden of CKD is poorly understood, with little data on even the most severe form, kidney failure. This poverty of data was highlighted by the recent Assessment of Global Kidney Health Atlas being unable to report a prevalence of treated kidney failure across most of Africa, including Zimbabwe.[3]

The Dialysis in Zimbabwe (DIAZ) project was designed to collect and report on prevalence, incidence, characteristics, and outcomes of treated kidney failure patients. All dialysis patients in Zimbabwe were approached for participation in February 2018, with participants providing written informed consent. The study had an observational cohort design and used World Bank population estimates for the year 2018 as the denominator in describing prevalence (Item S1). Ethics approval was granted by the Medical Research Council of Zimbabwe (approval number MRCZ/A/2202).

The 16 participating dialysis units are located across Zimbabwe's major cities (Fig 1, Table S1), with the majority in the capital, Harare. Peritoneal dialysis (PD)

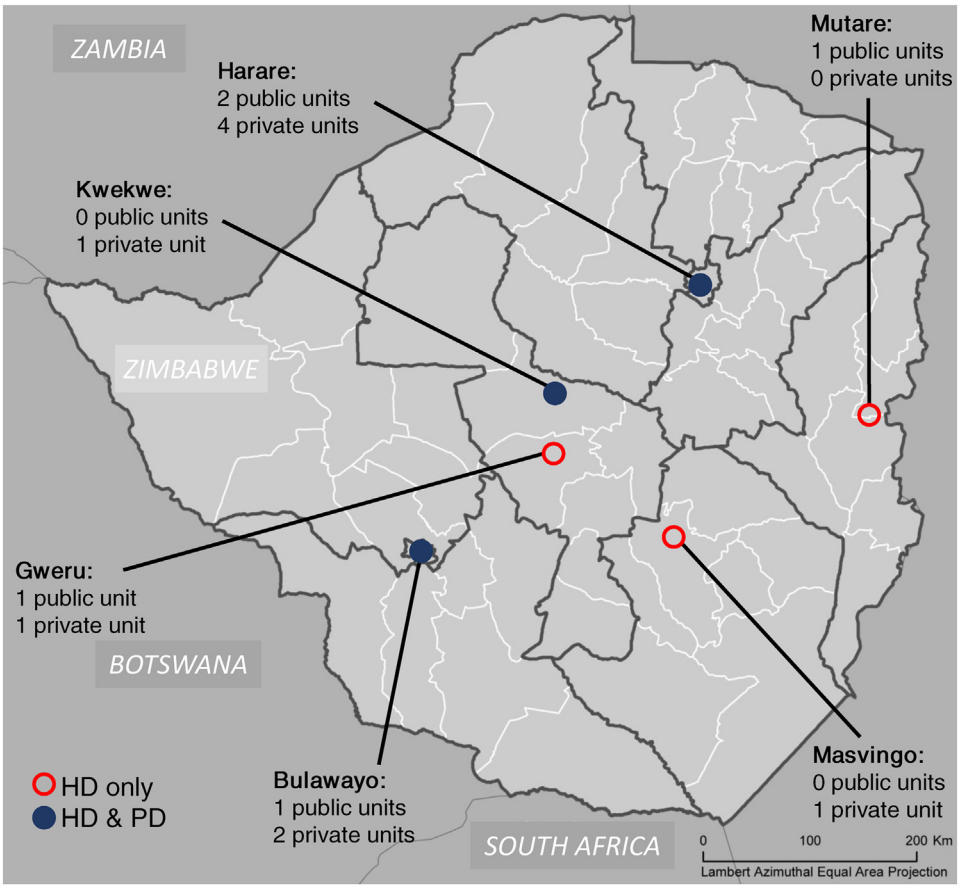

Figure 1. Geographical distribution of dialysis treatment across Zimbabwe. Adapted under a CC BY 3.0 license from the Center for International Earth Science Information Network, Columbia University; original graphic ©2005 The Trustees of Columbia University.

training occurs in a single public unit in Harare, with PD supplies available from Harare and Bulawayo. Most patients, however, access government-funded supplies in Harare, requiring travel distances of 5-272 kilometers. At the time of this study, dialysis was not publicly subsidized, and all patients were required to pay for dialysis through health insurance or direct payment.

A total of 482 prevalent dialysis patients were identified in February 2018 (hemodialysis [HD]: 457; PD: 25), equating to a crude national prevalence rate of 33.4 patients per million population (pmp) and an estimated dialysis prevalence of 46.0 and 21.8 pmp for male and female persons, respectively. Consent for data collection was obtained from 367 of the prevalent patients (HD: 354; PD: 13), representing 76% of Zimbabwe's prevalent dialysis population.

Most HD patients were male (66.7%) while most PD patients were female (62%); patients' mean age and dialysis vintage were 53.2 and 1.7 years for HD and 50.1 and 0.7 years for PD (Tables 1 and S2). HD patients mostly dialyzed in private units (69.5%), for 2 sessions per week of 5 hours each, and predominantly through tunneled central venous catheters (72.6%) (Table S3). All PD patients were on continuous ambulatory peritoneal dialysis, with 2-4 exchanges per day (Table S4). Demographics of private and public dialysis patients were similar, though in the private setting a higher proportion had diabetes (Table S5). Most patients reported a monthly family income of ≤US$1,000, and most used health insurance to pay for dialysis.

Etiology of kidney disease (as attributed by patients) was dominated by hypertension (HD: 71.8%; PD: 85%) and diabetes (HD: 34.5%; PD: 31%), with HIV-related kidney disease uncommon (Fig S1). The lack of access to kidney biopsy limits our ability to precisely assign etiology; however, the high prevalence of hypertension and diabetes, and the rarity of glomerulonephritis, raises the possibility that targeted use of preventative treatments may mitigate the future burden of kidney failure.

These data provide a valuable insight into dialysis prevalence in Zimbabwe, and the sub-Saharan region generally, home to over 1 billion people.[4] Our results are consistent with prior modeling estimates, based upon life expectancy and gross national income, of a dialysis prevalence of <50 pmp.[4] This compares with a prevalence of 190 pmp in South Africa and more than 1,000 pmp in high-income countries,[5,6] although these rates include transplantation, a treatment modality not accessible in

Table 1. Clinical and sociodemographic characteristics of study population

	HD (n = 354)	PD (n = 13)
Male sex	236 (66.7%)	5 (39%)
Age at enrollment	53.2 ± 13.5	50.1 ± 11.5
<20 y	2 (0.6%)	0
20-39 y	57 (16.1%)	3 (23%)
40-59 y	180 (50.8%)	7 (54%)
≥60 y	115 (32.5%)	3 (23%)
Monthly family income category[a]		
Not available	39 (11.0%)	0
0-500 USD	203 (57.3%)	5 (39%)
500-1,000 USD	54 (15.3%)	6 (46%)
1,000-1,500 USD	27 (7.6%)	0
1,500-2,000 USD	8 (2.3%)	0
>2,000 USD	23 (6.5%)	2 (15%)
Dialysis payment source		
Health insurance	283 (79.9%)	13 (100%)
Self	16 (4.5%)	0
Relative in Zimbabwe or abroad	44 (12.4%)	0
Other	11 (3.1%)	0
Time since CKD diagnosis, y	4.0 (2.0-5.0)	3.0 (2.0-5.0)
Duration of dialysis, y	1.7 (0.7-3.7)	0.7 (0.4-1.8)
Known diabetes	134 (37.9%)	5 (39%)
Duration, y[b]	15.0 (9.8-23.0)	20.0 (5.0-20.0)
Known hypertension	313 (88.4%)	12 (92%)
Duration, y[c]	9.0 (4.0-18.0)	8.5 (5.0-18.0)
Known ischemic heart disease	26 (7.3%)	0
Duration, y	1.0 (1.0-3.5)	–
Infection status		
HBV surface antigen positive	21 (5.9%)	1 (8%)
Hepatitis C virus positive	6 (1.7%)	0
HIV positive	56 (15.8%)	1 (8%)
Renal medication use		
Erythropoietin in last 3 months	251 (70.9%)	4 (31%)
Iron sucrose in last 3 months	204 (57.6%)	3 (23%)
Current phosphate binder use	95 (26.8%)	0

Values given as number (%), mean ± SD, or median (IQR). Abbreviations: CKD, chronic kidney disease; HBV, hepatitis B virus; USD, US dollars.
[a]The World Bank reports the purchasing power parity conversion factor for Zimbabwe as 0.5 per US dollar for 2020.[8] GDP per capita was reported as USD1,239 in 2020.[9]
[b]Duration of diabetes not available for 2 patients.
[c]Duration of hypertension not available for 4 patients.

Zimbabwe. Our study also highlights a very low rate of PD, which likely has multifactorial origins, including the high cost of supplies (equivalent to the cost of twice-weekly HD), concerns about peritonitis, and the lack of PD catheter insertion and training outside of Harare.

Our results confirm modeling that conservatively estimated less than 10% of patients in Zimbabwe that would benefit from kidney failure treatment are currently receiving it.[4] Introduction of public dialysis support by the Zimbabwean government in July 2018 is likely to assist in addressing undertreatment, but gaps in funding, trained staff, and infrastructure are sizeable and will take some time to remedy.[7]

In conclusion, this project provides comprehensive data on the nature and prevalence of dialysis in Zimbabwe, highlighting low access to dialysis and the underuse of PD as a treatment modality. Importantly, our findings provide an insight into the sub-Saharan region, show the feasibility of such measurement, and point to possible approaches that may reduce the future burden of kidney failure.

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Supplementary Material

Supplementary File (PDF)

Figure S1; Item S1; Tables S1-S5.

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