Adherence to Hemodialysis Regimen and Biochemical Outcomes in Patients on Maintenance Dialysis: A Comparative Analysis Across Three Avenue Hospitals

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Abstract

Background: Chronic Kidney Disease (CKD) affects approximately 13.4% of the global population, with up to 7 million patients requiring hemodialysis (HD). Adherence to HD schedules, medications, fluid limits, and diet is essential, as non-adherence increases morbidity and mortality. At Avenue Hospitals in Thika, Kisumu, and Nairobi, internal reports showed annual HD patient mortality rates of 9.2%, 12.4%, and 11.1%, respectively. The objective of the study was to assess adherence to the HD regimen and compare key biochemical and clinical markers among maintenance dialysis patients across three Avenue Hospitals.

Methodology: An analytical cross-sectional study was conducted between April and June 2024 involving 129 adult CKD patients at Avenue Hospitals (Thika, Nairobi and Kisumu). Patients were grouped into: Site A (Thika, n=54) and Site B (Nairobi/Kisumu, n=75). Data were collected using a modified End-stage Renal Disease Adherence Questionnaire ESRD-AQ and a data abstraction tool. Analysis in SPSS version 27 included descriptive statistics for socio-demographics and adherence, and independent t-tests to compare biochemical and clinical markers. Statistical significance was set at p<0.05.

Results: Unsatisfactory adherence was seen in 81.5% of the participants in site A and 73.3% of the participants in site B. The mean composite adherence score was marginally higher in site B (Mean = 110.03, 95% CI: 107.24-112.81). Dietary adherence was lower at Site A (Mean=18.26, 95% CI:17.06-19.46). The mean serum potassium was significantly higher in site A (mean = 4.99 ± 0.864 mmol/L, P <0.001) compared to site B. Conversely, the mean serum sodium level was significantly lower in site A (Mean=134 ± 5.178 mmol/L, P <0.001) than in site B.

Conclusion: The study found similar overall adherence across sites but significant differences in key biochemical markers, particularly potassium and sodium, indicating gaps in dietary and fluid management. These findings highlight the need for targeted, site-specific interventions and support the development of a standardised adherence assessment tool to strengthen dialysis care and patient education.

Keywords: *End-stage Renal Disease, Hemodialysis, Adherence.*

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Introduction

Chronic Kidney Disease (CKD) affects approximately 13.4% of the global population, with an estimated 7 million people requiring renal replacement therapy such as hemodialysis (HD) [1]. The World Health Organisation (WHO) identifies CKD as a growing global threat, projecting it to become the 5th leading cause of death by 2040 [2]. Prevalence varies widely, with higher rates reported in Asia (9.5-18%), South America (9-35%), and Africa (10.1-15.8%) [3].

In South America, CKD has risen steadily, with over 10 million people projected to be affected by 2030. In Asia, 65.6 million of the 434.3 million adults with CKD have progressed to End Stage Renal Disease (ESRD), with national prevalence ranging from 7% in South Korea to 34.3% in Singapore. In Africa, CKD prevalence varies widely from 4% in Northern Africa to 16.5% in Western, 11% in Eastern, 12.2% in Central, and 16% in Southern Africa [3]. In Kenya, over 10,000 new cases are diagnosed annually, and projections estimated that 4.8 million Kenyans would have CKD by 2020 [4].

Hemodialysis (HD) is the most common treatment for ESRD [5], but adherence to its demanding regimen (dialysis sessions, medications, fluid and diet) remains challenging [6]. Globally, about 50% of patients are non-adherent, with 18% missing sessions, 22.4% shortening treatments, 80% skipping medications, 75.3% ignoring fluid restrictions, and 81.4% neglecting diet [7]. Non-adherence increases mortality in HD patients by 6.3-8.2 times [6,7]. Regional studies report HD adherence rates of 50% in Zimbabwe and 49% in Rwanda [8,9], while Kenyan hospitals show non-adherence rates of 52.5%, 11.1%, and 46.5% [10-12].

Positive outcomes in End Stage Renal Disease (ESRD) patients depend on strict adherence to treatment. Non-adherence can cause intradialytic weight gain (IDWG), cardiovascular complications, and mortality. Excess dietary sodium increases thirst and fluid intake, raising IDWG and straining the cardiovascular system [13,14]. Elevated serum phosphorus (>1.61mmol/L) and potassium (>5.5mEq/L) are linked to higher mortality, hospitalisations, and cardiovascular events [15-17].

Patient adherence is crucial for disease outcomes, quality of life, and healthcare efficiency [18]. In chronic conditions like ESRD, understanding adherence patterns is vital. This study provides insights into dialysis regimen adherence to guide healthcare professionals in improving policies, interventions, and patient care.

Although HD non-adherence has been studied in Kenya, data on biochemical and clinical markers remain limited. This study assessed adherence using the ESRD-AQ and examined differences in key markers among maintenance HD patients at Avenue Hospitals in Thika, Kisumu, and Nairobi. By linking adherence to clinical and biochemical outcomes, the findings provide evidence to guide site-specific interventions, optimise patient management, and inform hospital policies, with higher adherence expected to correlate with better outcomes. More importantly, we posit that patients demonstrating higher adherence to the HD regimen will have significantly better biochemical and clinical outcomes than those with lower adherence.

Materials and Methods

Study design and area

This was an analytical cross-sectional study carried out between April and June 2024 in the renal units of Avenue Hospitals in Thika, Nairobi, and Kisumu. The three hospitals are private tertiary referral facilities located in Kiambu, Nairobi, and Kisumu Counties. Collectively, they manage about 170 patients on dialysis and conduct approximately 1,200 hemodialysis sessions each month. The units are staffed by nephrologists, trained renal nurses, and patient attendants, with access to ancillary services such as laboratory and outpatient pharmacy support. A census approach was employed, including all 170 patients with ESRD on maintenance hemodialysis. Participants were grouped into Site A (Avenue Hospital, Thika) and Site B (Avenue Hospitals, Nairobi and Kisumu). The census method ensured representativeness of the study population and enhanced the generalizability of findings. Although designed as an analytical cross-sectional study, the analysis also served as baseline data for comparing outcomes across sites and for exploring contextual differences important in interpreting subsequent intervention results.

Study population

The study included all adult outpatient CKD patients on HD for at least three months, who were literate, provided informed consent, and were available during the study period. Patients with acute kidney injury, on HD for less than three months, illiterate, critically ill, cognitively impaired, or unavailable were excluded. Of the 170 initially eligible patients, 54 in Site A and 75 in Site B were analysed for adherence and differences in key biochemical and clinical markers. Exclusions in Site A (n=14) were due to illiteracy (3), hospitalisation (3), HD <3 months (6), and missed sessions (2); in Site B (n=27), exclusions were illiteracy (4), hospitalisation (6), HD <3 months (10), and missed sessions (7). While these exclusions may slightly affect the generalizability of the findings, the majority of the population was included, and the census approach ensured robust and representative data for the study objectives (Figure 1).

Study Variables

The primary outcome of the study was adherence to the HD treatment regimen, which was assessed through four key components: HD session attendance, medication adherence, fluid restriction, and dietary adherence. Adherence was measured using the ESRD-AQ tool, with satisfactory adherence defined as a score of ≥70%. The biochemical and clinical markers of adherence to HD that were included were creatinine, urea, phosphorus, potassium, sodium, and IDWG. These were used to test the difference in their means using an independent T-test.

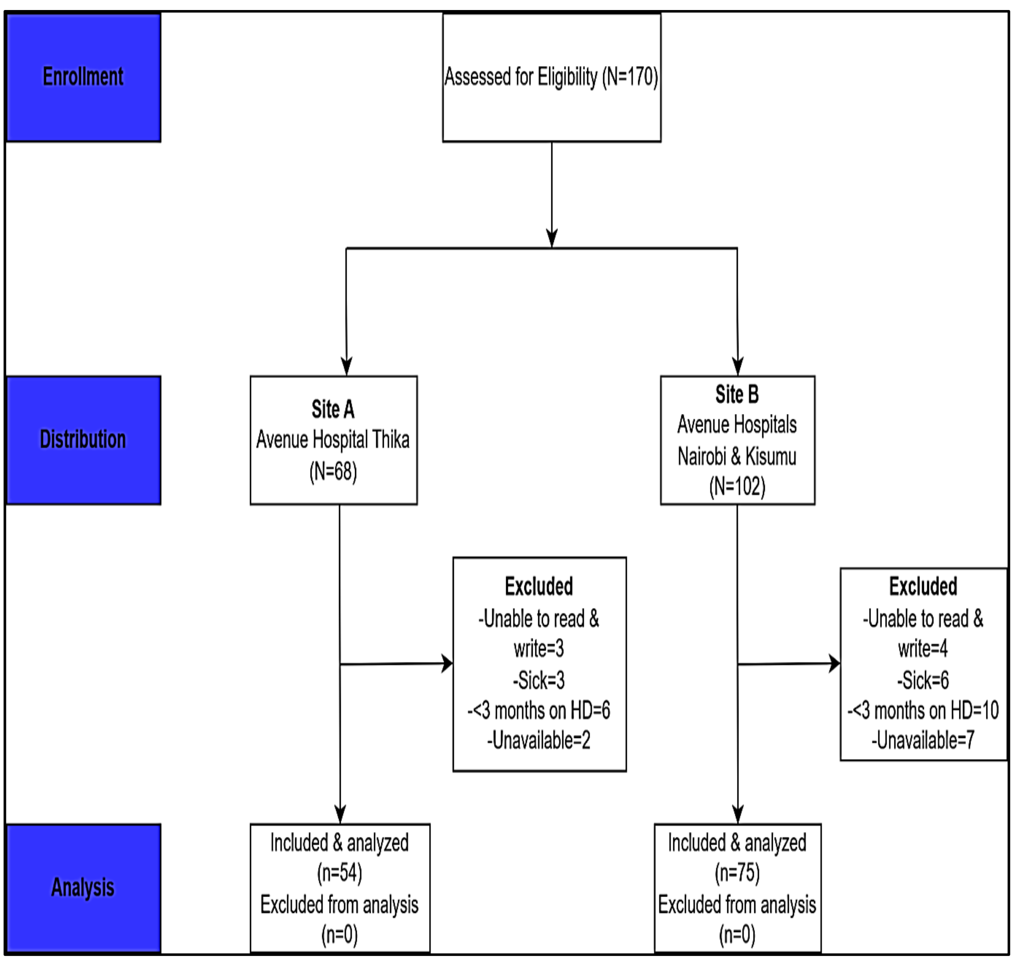

Figure 1
Flow diagram of the study

Study tools

The study used a modified ESRD-AQ questionnaire and a data extraction tool to collect comprehensive data. The questionnaire was tailored to improve cultural relevance and capture local factors affecting adherence. Modifications included items on dialysis schedule convenience, counselling and difficulty completing sessions, medication adherence and side effects, fluid restriction and home weighing, dietary adherence, and therapy-related factors such as cost, distance, staff support, and follow-up communication.

Quality assurance was emphasised. The questionnaire's validity was confirmed through pretesting with 5 maintenance-dialysis patients (10% of the sample) at Kenol Hospital. The tool covered four domains: HD frequency, medication, fluid, and diet adherence. Construct validity was ensured by aligning all items with the study objectives. Reliability testing using Cronbach's alpha showed acceptable scores—0.712 (HD frequency), 0.700 (medication), 0.871 (fluid), and 0.746 (diet)—indicating the tool was reliable for measuring adherence. The data extraction tool was designed to capture creatinine, potassium, phosphorus, sodium, and IDWG levels.

To strengthen study rigour, potential self-report, missing data, and selection biases were identified and addressed. Self-report bias was mitigated through structured and pretested modified ESRD-AQ questionnaires with clear instructions. Missing data were handled by imputing the mean of completed items within a section. Selection bias was minimised by employing a census approach, including all eligible patients on maintenance hemodialysis. These measures enhance the reliability, transparency, and replicability of the study findings.

Study procedures, sample collection and handling process

Data collection was conducted by the principal investigator (PI) and trained research assistants, all registered with the Nursing Council of Kenya and having 8–12 years of renal care experience. Before data collection, the team was trained on study objectives, tools, informed consent, procedures, and research ethics.

At each session, the study purpose and benefits were explained, and informed consent was obtained. Participants were weighed for interdialytic weight gain (IDWG), and blood samples were collected aseptically before HD to avoid dilution. For arteriovenous fistulas, samples were drawn from the arterial needle; for venous catheters, the heparin lock was discarded before sample collection.

Blood for creatinine, sodium, phosphorus, and potassium was placed in labelled vacutainers, transported on ice to the lab within 30 minutes, centrifuged at 4,000 rpm for 10 minutes, and analysed using calibrated Cobas C111 machines with Roche reagents. Quality was assured through internal and external controls (Randox International Quality Assessment Scheme).

After sample collection, participants completed the modified ESRD-AQ, assisted by the PI and research assistants. Questionnaires captured adherence to HD sessions, medications, fluid, and diet, and were checked for completeness.

Data analysis

Data analysis was performed using SPSS version 27.0. Before commencing the data analysis, cleaning and coding were done to ensure that missing data were captured and corrected. The Kolmogorov-Smirnov test assessed the normality of data, and descriptive statistics described adherence to HD. Socio-demographic characteristics and adherence were analysed using frequencies and percentages, while continuous variables were analysed through measures of central tendency and dispersion.

Adherence to the HD regimen was measured using a Likert scale, with scores classified as satisfactory (above 70%) or unsatisfactory (below 70%). To get the percentage score, the attained score for each participant was divided by the maximum attainable scores of 167 for HD treatment regimen, 42 for HD frequency, 43 for medication, 47 for fluid, and 35 for diet and then multiplied by a hundred. For inferential statistics, an independent T-test was used to assess group mean differences in biochemical and clinical markers, with statistical significance set at $P < 0.05$.

Ethical considerations

The research was approved by the Nairobi Hospital Bioethics and Research Committee (TNH/DMSR/ISERC/RP/001/24) and licensed by the National Commission of Science and Technology (NACOSTI/P/24/33924). Permission was obtained from the Avenue Hospital administration. The study adhered to ethical principles outlined in the Declaration of Helsinki and the Belmont Report.

Results

Demographic characteristics

A total of 129 participants were enrolled for the study. The mean age was 57.2 (SD± 13.2 years) for the participants in site A and 52.5 (SD± 13.8 years) for the participants in site B. Both sites had more males, 72% and 66.7% in sites A and B, respectively. Educational attainment was higher in site B, where 53.3% of the participants had a tertiary level education, compared to 31.5% in site A. Table 1,

Adherence with the HD Treatment Regimen

In site A, 44 (81.5%) participants had unsatisfactory adherence to the HD treatment regimen, while in site B, 55 (73.3%) had unsatisfactory adherence to the HD treatment regimen. Medication adherence was the highest on both sites, with over 74% of the participants reporting satisfactory adherence.

Adherence to fluid and diet was sub-optimal, with less than 8% of the participants in site A and less than 18% in site B meeting the required standards. Table 2.

Table 1
Socio-demographic characteristics

	Site A (Avenue Hospital, Thika)		Site B (Avenue Hospitals, Parklands & Kisumu)	
Variable	**Frequency (n)**	**Percentage (%)**	**Frequency(n)**	**Percentage (%)**
Age	N-54, Mean-57.2, Median-57.5, Range-28-85, SD± 13.2		N-75, Mean-52.5, Median-54, Range-24-86, SD± 13.8	
Gender				
Male	39	72	50	66.7
Female	15	27.8	25	33.3
Education level				
Primary	17	31.5	15	20
Secondary	20	37	20	26.7
Tertiary	17	31.5	40	53.3

***Key**: N-Sample Size, SD-Standard Deviation, n-Frequency*

Table 2
Adherence with the HD treatment regimen

	Site A (Avenue Hospital, Thika)		Site B (Avenue Hospitals, Parklands & Kisumu)	
Component	**Satisfactory adherence n (%)**	**Unsatisfactory adherence n (%)**	**Satisfactory Adherence n (%)**	**Unsatisfactory adherence n (%)**
HD Frequency	18(33.3)	36(66.7)	19(25.3)	56(74.7)
Medication	40(74.1)	14(25.9)	56(74.7)	19(25.3)
Fluid	3(5.6)	51(94.4)	3(4)	72(96)
Diet	4(7.4)	50(92.6)	13(17.3)	62(82.7)
Composite adherence	10(18.5)	44(81.5)	20(26.7)	55(73.3)

***Key**: n-Frequency*

Mean scores of adherence to components of HD treatment regimen

Table 3 summarises the mean adherence scores to the different components of the HD treatment regimen. The mean composite adherence score was marginally higher in site B (Mean=110.03, 95% CI: 107.24-112.81) than in site A (Mean=109.3, 95% CI: 106.2-112.39), even though not statistically significant. Dietary adherence was lower at site A (Mean=18.26, 95% CI:17.06-19.46) versus site B (Mean=22.55, 95% CI: 21.31–23.79). Fluid adherence was higher at site A (Mean=22.96, 95% CI:21.44-24.49) than in site B (Mean=20.15, 95% CI:18.98-21.32).

Descriptive statistics for biochemical and clinical markers

At site A, there were higher mean values in IDWG (3.65 ± 5.05 kg vs. 2.59 ± 2.03 kg), urea (21.46 ± 5.07 mmol/L vs. 19.95 ± 5.02 mmol/L), creatinine (863.74 ± 309.24 µmol/L vs. 818.88 ± 310.38 µmol/L), and potassium (4.99 ± 0.86 mmol/L vs. 4.34 ± 0.46 mmol/L) compared to site B. This indicates lower adherence to fluid and dietary restrictions. Site B had slightly better mean phosphorus (1.34 ± 0.44 mmol/L vs. 1.29 ± 0.52 mmol/L) and sodium levels (138.73 ± 3.36 mmol/L vs. 134.35 ± 5.18 mmol/L), suggesting better fluid and electrolyte balance. This is summarised in Table 4.

Inferential statistics for biochemical and clinical markers

To test the mean differences of each biochemical marker for the different sites, an independent t-test was carried out. The Levene test was used to determine the homogeneity of variances. Where the Levene test was >0.05, equal variances were assumed for interpretation. However, where the Levene test was <0.05, equal variances not assumed, were used for interpretation.

Afterwards, P-values were used to establish statistically significant differences between means for each biochemical marker between the intervention and control groups. If the P-value was <0.05, there was a statistically significant difference between the two means of each biochemical marker. However, if the P-value was >0.05, there was no statistically significant difference between the two means of each biochemical marker.

Table 3

Mean scores of adherence to components of the HD treatment regimen

	Site A (Avenue Hospital, Thika)			Site B (Avenue Hospitals, Parklands & Kisumu)		
Component	**Mean score**	**95% CI for the mean score**		**Mean score**	**95% CI for the mean score**	
		Lower	Upper		Lower	Upper
Composite score	109.3	106.2	112.39	110.03	107.24	112.81
HD Frequency	32.26	31.54	32.97	31.57	30.94	32.21
Medication	35.81	34.93	36.70	35.83	34.94	36.71
Fluid	22.96	21.44	24.49	20.15	18.98	21.32
Diet	18.26	17.06	19.46	22.55	21.31	23.79

***Key**: C.I.-Confidence Interval*

Table 4

Descriptive Statistics for Biochemical and Clinical Markers

	Site A (Avenue Hospital, Thika	Site B (Avenue Hospitals, Parklands & Kisumu)
Biochemical/Clinical marker	**Mean±SD**	**Mean±SD**
IDWG	3.65± 5.052	2.59±2.032
Phosphorus	1.29±0.519	1.34±0.439
Urea	21.46±5.067	19.95±5.021
Creatinine	863.74±309.244	818.88±310.383
Potassium	4.99±0.864	4.34±0.464

***Key**: SD- Standard Deviation*

The results of the independent t-test show that there was a statistically significant difference between the means of potassium and sodium levels between the two groups. Table 5 represents the results from the independent T-test.

Discussion

This study aimed to bridge a gap in the literature by not only examining adherence using a validated ESRQ-AQ but also examining the biochemical and clinical markers of adherence among ESKD patients at Avenue Hospitals in Kenya. The results revealed a high non-adherence in the participants, with 81.5% at site A and 73.3% at site B exhibiting unsatisfactory adherence to the HD treatment regimen. These findings differ from regional studies in Zimbabwe (50%) and Rwanda (49%), and previous Kenyan studies, which reported non-adherence rates to be between 46.5% and 52.5% [8,9]. These results highlight a greater burden of non-adherence in this cohort, suggesting possible contextual or institutional factors influencing adherence patterns. The higher non-adherence at site A may be linked to differences in institutional practices, including staff-to-patient ratios, availability of adherence counselling, and follow-up intensity. Patient-level factors, such as income, employment status, and literacy, may have also influenced adherence behaviours differently across sites.

Despite receiving care from dialysis centres, the low adherence rates point to possible shortcomings in patient education by healthcare providers. This may be due to insufficient education from physicians and nurses or a lack of patient understanding, underscoring a breakdown in patient-provider communication. Moreover, the limited availability or inconsistent delivery of structured nutritional counselling, particularly from dietitians or trained care providers, may contribute to this gap, suggesting a need to strengthen system-level support for adherence education. Framing these findings within the Health Belief Model (HBM), the limited counselling represents a deficiency in cues to action that motivates adherence, while inadequate understanding reflects low self-efficacy among patients. Site-specific differences in the frequency and quality of counselling may partially explain why adherence varied between sites. For example, patients at site B may have received more consistent guidance from dietitians and nursing staff, resulting in slightly better adherence patterns compared to site A.

Table 5
Independent T-test for Biochemical and Clinical Markers

Biochemical marker	Group	N	Range	Mean±SD	t-test	P-value	Mean difference	95% CI of mean difference	
								Lower	Upper
IDWG (%)	Site A	54	-4-29	3.65±5.052	1.462	0.149	1.061	-0.389	2.511
	Site B	75	-3-7	2.59±2.019					
Phosphorus (mmo/l)	Site A	54	0-3	1.29±0.519	-0.619	0.537	-0.053	-0.222	0.116
	Site B	75	0-2	1.35±0.446					
Urea (mmo/L)	Site A	54	10-38	21.46±5.607	1.350	0.179	1.306	-0.608	3.220
	Site B	75	10-35	20.15±5.281					
Creatinine (umol/L)	Site A	54	348-1708	992.21±981.071	1.392	0.166	168.190	-70.867	407.247
	Site B	75	217-1623	824.02±311.470					
Potassium (mmol/L)	Site A	54	3-7	4.99±0.864	4.994	<0.001	0.645	0.412	0.878
	Site B	75	4-6	4.35±0.462					
Sodium (mmol/L)	Site A	54	104-143	134.35±5.178	-5.982	<0.001	-4.446	-5.939	-2.983
	Site B	75	129-144	138.80±3.387					

***Key**: N-Population, SD-Standard Deviation, C.I.-Confidence Interval*

In terms of adherence to the different components of the HD regimen, there was low adherence to fluid and dietary restrictions. Fluid adherence was only 5.6% & 4% at sites A and B, respectively, while dietary adherence was 7.4% at site A and 17.3% at site B. These findings show lower adherence rates when compared with global data, which indicates that up to 75.3% of patients on dialysis neglect fluid restriction and 81.4% fail to comply with dietary recommendations [6]. This poor dietary and fluid adherence contributes directly to increased IDWG and biochemical imbalances, such as elevated potassium and phosphorus levels, which are strongly linked to cardiovascular events and mortality [13-17]. The particularly low dietary adherence observed in this study may be further explained by cultural dietary preferences that conflict with renal diet recommendations, limited patient literacy about nutrition, and economic barriers to accessing recommended foods, all of which represent perceived barriers within the HBM framework and could be explored in future qualitative studies. Differences between sites may also be attributed to variability in socio-economic and cultural factors. Patients at site A may have had lower access to recommended foods, less support for home fluid monitoring, or cultural dietary practices that conflicted with renal diet recommendations more than those at site B, highlighting how contextual factors influence adherence behaviours.

This study showed higher urea (21.46 ± 5.07 mmol/L), potassium (4.99 ± 0.86 mmol/L), and IDWG (3.65 ± 5.05 kg) levels at site A compared to site B. These findings support previous findings by Abeculo, Hur, and Rodriquez, who found that fluid overload, increased cardiovascular stress, and biochemical derangement [13, 14, 16]. The elevated potassium levels at site A further reinforce the dangers of non-adherence, especially considering that even the modest hyperkalemia of > 5.5 mEq/L is associated with increased mortality [16, 17]. These differences in biochemical markers between sites likely reflect variations in adherence-related behaviours, such as fluid restriction, dietary compliance, and session attendance, as well as differences in institutional support and patient education.

Notably, medication adherence was in both sites (74.1% at site A and 74.7% at site B), aligning with previous Kenyan studies [10,12] and contrasting with global reports that suggest that medication non-adherence is as high as 80% in patients on maintenance HD [6]. This trend may indicate better patient education or improved medication availability within the Avenue ecosystem. From the HBM perspective, higher medication adherence may reflect stronger perceived benefits and self-efficacy for taking medications as prescribed. Further qualitative research is needed to understand the underlying factors.

Socio-demographic data indicated that most of the participants had a low income (<Kes 50,000) and were unemployed or self-employed, reflecting broader trends in low to middle-income countries where financial constraints limit access to care and influence health behaviour [18]. This economic vulnerability may negatively influence dietary adherence, as renal diets are often expensive, and transportation challenges may result in missed dialysis appointments. These findings reflect perceived barriers within the HBM framework. Economic disparities may also help explain site-specific differences. Patients at site A may have experienced more financial and logistical barriers to adherence, contributing to higher IDWG and worse biochemical outcomes compared to site B.

While this study showed no statistically significant difference in composite adherence scores between site A and site B, the variation in biochemical markers indicates that even small variances in adherence behaviour may lead to clinically meaningful effects and outcomes. Integrating the HBM provides insight into how patient perceptions, education, socio-economic factors, and the healthcare system interact to influence adherence behaviours. This theoretical integration highlights the importance of targeted interventions that strengthen patient education, enhance cues to action, and reduce perceived barriers to improve adherence and clinical outcomes.

These findings have important implications for health policy and clinical practice. The high rates of non-adherence and their associated biochemical consequences underscore the need for policy interventions that prioritise patient education, structured counselling, and nutritional support within dialysis centres. Health authorities and hospital administrators could consider implementing standardised adherence monitoring protocols, integrating dietitian-led counselling programs, and providing targeted support for socio-economically vulnerable patients. Additionally, enhancing training for healthcare providers on adherence-promoting communication strategies and reinforcing follow-up mechanisms can strengthen system-level support. Policies aimed at improving access to affordable renal diets and facilitating transportation for patients could further reduce barriers to adherence, ultimately improving clinical outcomes and reducing cardiovascular risk among ESRD patients.

Study Limitations and Strengths

Limitations

This study offers important insights, but several limitations must be acknowledged. First, the use of a self-reported modified ESRD-AQ tool introduces potential recall, interviewer, and social desirability biases. Some participants may have overstated their medication adherence due to fear of judgment or perceived expectations from healthcare providers, which could have inflated adherence estimates and understated non-adherence. To minimise this bias, data collection was conducted by three trained research assistants who adhered strictly to the study instruments.

Second, the cross-sectional design, though suitable for examining adherence behaviours alongside biochemical markers at a single point in time, limits the ability to draw causal inferences. While the census approach enhanced representativeness and strengthened the generalizability of results, the associations identified cannot be interpreted as causal; longitudinal studies are needed to establish temporal relationships.

Finally, although the findings are broadly applicable within similar private healthcare contexts, the study was geographically limited. Further research is necessary to determine whether these results extend to public and rural settings, where resource constraints may pose additional barriers to adherence.

Strengths

- The study provides generalizable insights into adherence to HD treatment regimens. The use of validated adherence assessment tools and the inclusion of diverse study sites across multiple hospitals strengthen its relevance to comparable private healthcare settings.
- The results align with global and regional research, which highlights adherence to the HD regimen and outcomes in terms of biochemical and clinical markers.
- The study incorporates regional and global perspectives and trends, thus offering a culturally contextualised understanding of adherence behaviours.
- The study addresses a crucial non-communicable disease with significant clinical implications.

Conclusions

Overall, the study shows low adherence to the HD treatment regimen, particularly for dietary and fluid components in both intervention and control groups. These findings highlight the need for policy and practice measures, including adherence monitoring, dietitian-led counselling, support for vulnerable patients, provider training in adherence communication, and improved access to renal diets and transport. Such strategies could reduce barriers, improve adherence, and enhance clinical outcomes.

Recommendations

Based on the results, there is a need for a targeted education intervention to motivate individuals who have CKD and improve the knowledge of patients undergoing HD regarding dietary and fluid management. Moreover, the planning and designing of dialysis programs and policies should consider the capacity building of clinicians and the provision of well-coordinated patient support groups in dialysis facilities.

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Author contribution

GN: Conceptualisation of the study, methodology, investigation, data collection, formal analysis, original draft, review & editing writing, & project administration.

EM: supervision, methodology, review & editing of writing.

DM: supervision, methodology, review & editing of writing.

ET: supervision, methodology, review & editing of writing.

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Data availability. The data can be obtained from the corresponding author upon request.

Conflict of interest. None

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