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Dialyzing Against Time: Early Hemodialysis Initiation and Clinical Outcomes among Patients with Acute Kidney Injury in a Ghanaian Military Hospital

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Abstract

Background

Acute kidney injury (AKI) remains a major contributor to morbidity and mortality globally, particularly among critically ill patients. Hemodialysis is an essential renal replacement therapy in severe AKI management; however, uncertainty persists regarding the optimal timing for initiation. Delayed intervention is common in low-resource settings and may worsen patient outcomes. This study examined the influence of early hemodialysis initiation on mortality, renal recovery, and complication outcomes among AKI patients in Ghana.

Methods

A retrospective analytical study was conducted among 35 adult patients diagnosed with AKI and managed with hemodialysis at the 37 Military Hospital, Ghana, between January 2019 and December 2023. Early hemodialysis was defined as initiation within 24 hours of meeting the kidney disease: Improving Global Outcomes (KDIGO) stage 3 AKI criteria. Data were analyzed using SPSS version 24. Descriptive statistics, Pearson correlation, independent t-test, cross-tabulation, and logistic regression analyses were performed.

Results

Mortality was significantly lower among patients who received early hemodialysis compared with delayed intervention [1/13 (7.7%) versus 11/22 (50.0%)]. Timing of hemodialysis was significantly associated with short-term mortality ($r = -0.431$, $p = 0.010$). Logistic regression showed that delayed hemodialysis significantly increased mortality risk (OR = 12.00, $p = 0.027$). Early hemodialysis also significantly improved renal recovery outcomes ($p = 0.021$). However, timing of dialysis initiation was not significantly associated with complication rates (OR = 1.895, $p = 0.598$).

Conclusions

Early hemodialysis initiation was associated with improved survival and renal recovery among AKI patients. Delayed initiation substantially worsened mortality outcomes. Strengthening early AKI recognition and timely nephrology referral pathways may improve outcomes in resource-constrained settings.

Background

Acute kidney injury (AKI) is characterized by a sudden decline in renal function resulting in impaired excretion of metabolic waste products, fluid imbalance, electrolyte abnormalities, and acid-base

disturbances [1, 2]. AKI remains a major public health challenge globally and contributes substantially to morbidity, mortality, prolonged hospitalization, and healthcare expenditure [3]. The burden is particularly severe in low- and middle-income countries (LMICs), where delays in diagnosis, limited nephrology services, inadequate dialysis infrastructure, and financial barriers negatively affect patient outcomes [4].

Globally, an estimated 13 million people develop AKI annually, with the majority of cases occurring in resource-constrained settings [5]. In sub-Saharan Africa, AKI commonly results from sepsis, dehydration, obstetric complications, nephrotoxic medications, hypertension, diabetes mellitus, and trauma [6].

In Ghana, increasing prevalence of kidney disease and limited accessibility to dialysis services continue to pose significant healthcare challenges [7, 8]. Renal replacement therapy (RRT), particularly hemodialysis, remains a life-saving intervention for severe AKI [9]. Hemodialysis facilitates removal of uremic toxins, correction of electrolyte disturbances, management of fluid overload, and stabilization of acid-base imbalance [10]. However, despite its established therapeutic role, controversy remains regarding the optimal timing for initiating dialysis in AKI patients [11].

Advocates of early hemodialysis argue that prompt intervention reduces systemic inflammation, limits nephron injury, improves metabolic stabilization, and enhances survival [12]. Early initiation has also been associated with improved renal recovery and reduced progression to chronic kidney disease [13]. Conversely, proponents of delayed initiation suggest that unnecessary early dialysis may expose patients to avoidable complications such as vascular access infections, hypotension, bleeding, and increased healthcare costs [14].

Several randomized controlled trials and observational studies have reported conflicting findings regarding the benefits of early versus delayed dialysis initiation [15–18]. While some studies demonstrated reduced mortality and improved renal recovery with early intervention [19], others reported no significant survival benefit [20]. Recent nephrology discussions increasingly emphasize individualized decision-making based on clinical severity, biochemical derangements, urine output, and hemodynamic status rather than strict time thresholds [21].

Despite growing evidence internationally, studies examining dialysis timing among AKI patients in Ghana remain limited. Existing Ghanaian nephrology research has focused largely on chronic kidney disease burden, dialysis affordability, and renal service accessibility [7, 8]. Consequently, local evidence regarding the timing of hemodialysis initiation and AKI outcomes remains inadequate.

Delayed initiation of hemodialysis among severe AKI patients may worsen mortality and impair renal recovery due to prolonged exposure to metabolic disturbances and inflammatory injury. However, evidence specific to Ghanaian healthcare settings is scarce. This study, therefore, examined the influence of early hemodialysis initiation on short-term mortality, renal recovery, and complication rates among AKI patients treated at the 37 Military Hospital, Ghana.

Methods and Materials

Study design

A retrospective analytical study design with a quantitative approach was employed for this study. The retrospective design involved reviewing previously documented patient records of individuals diagnosed with acute kidney injury (AKI) who underwent hemodialysis at the 37 Military Hospital between January 2019 and December 2023.

The design was considered appropriate because the study sought to examine the relationship between timing of hemodialysis initiation and clinical outcomes including mortality, renal recovery, and complication rates among AKI patients. Retrospective analytical studies are useful in assessing existing clinical data over a defined period to identify patterns, associations, and outcomes without interfering with patient management or treatment processes.

The quantitative approach enabled objective measurement and statistical analysis of variables such as mortality rates, renal recovery indicators, timing of dialysis initiation, and complication outcomes. Numerical data extracted from patient records facilitated statistical comparisons between patients who received early hemodialysis and those who received delayed intervention.

The retrospective analytical design was also advantageous because it allowed evaluation of real-world clinical practices and patient outcomes over a prolonged period; it was cost-effective and time-efficient compared with prospective cohort studies; it enabled assessment of rare but clinically important outcomes among AKI patients; it minimized disruption to clinical activities since patient management had already occurred.

Furthermore, the analytical component of the study allowed the researchers to examine statistical relationships between exposure variables (timing of hemodialysis initiation) and outcome variables (mortality, renal recovery, and complications). This facilitated the identification of whether delayed dialysis initiation significantly influenced patient outcomes.

Although retrospective studies may be associated with limitations such as incomplete documentation and reduced control over confounding variables, the design was considered suitable because it provided valuable clinical evidence regarding AKI management within a resource-constrained Ghanaian healthcare setting where prospective nephrology studies remain limited.

Study setting.

The study was conducted at the dialysis unit of the 37 Military Hospital in Accra, Ghana. The hospital is a major referral institution that provides specialized nephrology and dialysis services to military personnel, their dependents, and civilians.

Study population

The study population comprised adult patients diagnosed with acute kidney injury (AKI) who underwent hemodialysis at the dialysis unit of the 37 Military Hospital during the five-year retrospective review period from January 2019 to December 2023.

The accessible population consisted of 69 patients who met the initial AKI diagnostic criteria and received hemodialysis during the review period. AKI diagnosis was based on kidney disease: Improving Global Outcomes (KDIGO) criteria documented in patient records. These criteria included abrupt elevation in serum creatinine levels, reduction in urine output, or both.

The study specifically focused on patients with severe AKI requiring hemodialysis intervention. These patients were selected because the study sought to evaluate whether the timing of hemodialysis initiation influenced mortality outcomes, renal recovery, and complication rates.

Adult patients aged 18 years and above were included because management approaches, physiological responses, and dialysis indications may differ between adults and pediatric populations. Patients with documented chronic kidney disease, end-stage kidney disease, previous maintenance dialysis, or incomplete clinical records were excluded to minimize confounding effects and ensure that the study specifically assessed acute kidney injury outcomes.

The study population represented patients from diverse socioeconomic and educational backgrounds. Many patients presented with comorbid conditions such as hypertension, diabetes mellitus, sepsis, cardiovascular diseases, and infections, which are recognized contributors to AKI development within sub-Saharan African settings.

The predominance of male participants observed in the study population may reflect sex-related differences in healthcare utilization patterns, occupational exposures, cardiovascular risk factors, and prevalence of conditions associated with AKI development.

Sample Size and Sampling Technique

The sample size for the study was determined from an accessible population of 69 adult patients diagnosed with acute kidney injury and managed with hemodialysis at the 37 Military Hospital during the retrospective review period from January 2019 to December 2023. Yamane's formula for sample size determination was used to calculate the required sample size because the accessible population was known and relatively small.

The formula and calculation used were:

$$n = \frac{N}{1 + N * e^2}$$

Where n = sample size

N = population size = 69

e = margin of error = 0.12

$$n = \frac{69}{1 + 69 * (0.12)^2}$$

$$n = \frac{69}{1.9936}$$

$$n = 34.610$$

$$n \approx 35$$

Therefore, the final sample size for the study was 35 patient records. The margin of error of 12% was considered acceptable because the study involved a relatively small accessible population and retrospective clinical review. Additionally, some patient records were excluded because of incomplete clinical information, missing dialysis timing documentation, or previous chronic kidney disease diagnosis. The selected sample size was considered adequate to provide meaningful statistical analysis and facilitate assessment of the relationship between timing of hemodialysis initiation and patient outcomes.

A stratified sampling technique was employed to select patient records for inclusion in the study. Stratified sampling was considered appropriate because the researchers sought to ensure adequate representation of relevant patient subgroups within the study population. The accessible population of AKI patients was first categorized into strata based on important characteristics such as: sex;

age categories; severity of AKI; timing of dialysis initiation.

Following stratification, patient records were proportionally selected from each subgroup to ensure representation across the population.

This approach minimized sampling bias and improved the representativeness of the study sample. Stratified sampling was particularly important because outcomes among AKI patients may vary according to demographic and clinical characteristics. Ensuring representation across categories therefore strengthened the reliability and validity of the findings.

The researchers subsequently reviewed patient folders and dialysis records to identify records that met the eligibility criteria. Patients with incomplete records, chronic kidney disease, or prior maintenance dialysis were excluded before final selection. The use of stratified sampling enhanced the methodological rigor of the study by: improving the representativeness of the study population;

reducing selection bias; increasing precision of statistical estimates; ensuring inclusion of clinically relevant patient subgroups. This sampling approach was considered suitable for retrospective nephrology research involving heterogeneous patient populations and varying AKI severity levels.

Data Collection Tool/Instrument

Data were collected using a structured data extraction form specifically developed for this study. The study did not use a questionnaire. The English-language structured data extraction form was developed for this study by CM and ONM and has been uploaded as Supplementary File 1; it is cited here to clarify the source and availability of the instrument used for the retrospective record review.

The instrument was designed by CM and ONM based on the objectives of the study, relevant nephrology literature, kidney disease: Improving Global Outcomes (KDIGO) clinical guidelines, and variables commonly assessed in acute kidney injury (AKI) outcome studies.

The data extraction form was developed to systematically retrieve relevant clinical and demographic information from electronic and paper-based patient records while ensuring consistency and completeness of data collection. The instrument consisted of four main sections:

Section A: Sociodemographic characteristics. This section captured demographic information of participants, including age, sex, educational level, and occupation, where available. This information was considered important because demographic and socioeconomic factors may influence healthcare access, timing of hospital presentation, and AKI outcomes.

Section B: Clinical and diagnostic characteristics. This section obtained clinical information, including documented AKI diagnosis, comorbidities such as hypertension and diabetes mellitus, laboratory findings, serum creatinine levels, urine output records, electrolyte abnormalities, admission diagnosis, and severity indicators. These variables were included because they are important clinical indicators in AKI diagnosis, progression, and management.

Section C: Hemodialysis initiation characteristics. This section focused on dialysis-related variables, including the timing of hemodialysis initiation, duration between AKI diagnosis and dialysis initiation, number of dialysis sessions, dialysis indications, and dialysis-related complications. This section enabled categorization of participants into early and delayed hemodialysis groups based on KDIGO stage 3 criteria.

Section D: Patient outcomes. This section captured outcome variables including mortality outcomes, renal recovery indicators, duration of hospitalization, complication occurrence, and discharge outcomes. Renal recovery was assessed using documented improvement in serum creatinine levels and urine output following dialysis initiation.

Validity of the instrument

To ensure content validity, the data extraction form was reviewed by experienced nephrology clinicians and researchers with expertise in AKI management and retrospective clinical studies. Suggestions

regarding clarity, relevance, completeness, and organization of the instrument were incorporated before commencement of data collection.

The instrument was further aligned with the objectives of the study and relevant nephrology literature to ensure that all key variables associated with the timing of hemodialysis initiation and AKI outcomes were adequately captured. A pretest of selected patient records was also conducted to assess the feasibility, clarity, and applicability of the instrument within the hospital setting. Minor modifications were subsequently made to improve the consistency of data extraction.

Reliability of the instrument

Reliability of the data extraction instrument was assessed using internal consistency reliability analysis. Following pilot testing of the instrument using selected patient records, Cronbach's alpha coefficient was computed to determine the consistency of items included in the extraction tool.

The instrument demonstrated good internal consistency reliability with a Cronbach's alpha coefficient of 0.82. This value exceeded the acceptable threshold of 0.70 for research instruments, indicating that the variables included in the extraction form were sufficiently consistent in measuring the intended clinical and outcome indicators.

The reliability of the instrument was further strengthened through: use of standardized operational definitions; independent verification of extracted data by AA and ONM; consensus resolution of discrepancies identified during data review; and standardized data coding procedures.

The acceptable Cronbach's alpha value suggested that the data extraction instrument was reliable and appropriate for assessing relationships between timing of hemodialysis initiation and AKI outcomes among patients included in the study.

Data collection/ Instrument

Data collection involved a retrospective review of electronic and paper-based medical records of patients diagnosed with acute kidney injury (AKI) and managed with hemodialysis at the 37 Military Hospital between January 2019 and December 2023. Data were extracted using the study-specific English-language structured data extraction form provided as Supplementary File 1.

A structured data extraction form was developed by CM and ONM based on the objectives of the study, reviewed nephrology literature, and relevant clinical indicators associated with AKI management and dialysis outcomes. The extraction tool was reviewed by the research team to improve clarity, content validity, and consistency of data collection. Prior to data collection, permission to access patient records was obtained from the management of the dialysis unit and the hospital health information department. CM, who served as the principal data collector, conducted the primary extraction of data from patient

folders, dialysis records, laboratory reports, nursing notes, admission records, discharge summaries, and electronic hospital databases where available. The extracted variables included:

demographic characteristics such as age, sex, and educational level; clinical characteristics including AKI diagnosis, comorbidities, laboratory findings, and documented complications; timing of hemodialysis initiation; mortality outcomes; renal recovery indicators such as serum creatinine trends and urine output; duration of hospitalization and dialysis sessions where documented.

ONM supervised the overall data collection process and ensured adherence to the study objectives and methodological rigor. AA independently reviewed selected patient records and verified extracted data to improve reliability and reduce extraction bias. CD and GAA assisted in reviewing the completeness of the extracted data and resolving discrepancies identified during data verification.

Early hemodialysis was operationally defined as initiation of dialysis within 24 hours of meeting kidney disease: Improving Global Outcomes (KDIGO) stage 3 AKI criteria, while delayed hemodialysis referred to initiation after 24 hours. To ensure consistency and accuracy, selected patient records were independently cross-checked by AA and ONM. Any discrepancies identified during the review process were discussed collectively by the research team and resolved through consensus. Incomplete records with substantial missing information regarding dialysis timing, mortality outcomes, or renal recovery indicators were excluded from the study to improve the integrity and reliability of the dataset.

Confidentiality was maintained throughout the data collection process by excluding patient identifiers such as names, addresses, and folder numbers from the extraction forms. Extracted data were securely stored on password-protected devices accessible only to members of the research team. The retrospective approach enabled the researchers to examine real-world clinical practices and outcomes over a prolonged period without interfering with patient care or management processes.

Data analysis

Data analysis was conducted using Statistical Package for Social Sciences (SPSS) version 24. Before analysis, CM performed initial data entry, coding, and cleaning to identify inconsistencies, missing values, and entry errors. ONM supervised the data management and analytical processes to ensure methodological rigor and accuracy of statistical procedures. AA independently verified portions of the dataset and assisted in validating the coding structure and statistical outputs.

Descriptive statistical analyses were first conducted to summarize demographic and clinical characteristics of participants. Frequencies and percentages were used to describe categorical variables such as sex, educational level, mortality outcomes, and complication rates. Means and standard deviations were used to summarize continuous variables where appropriate.

Pearson correlation analysis was performed by CM under the supervision of ONM to assess the relationship between the timing of hemodialysis initiation and short-term mortality outcomes among AKI

patients.

An independent samples t-test analysis was conducted to compare renal recovery outcomes between patients receiving early hemodialysis and those receiving delayed intervention. This analysis enabled the determination of whether statistically significant differences existed between the two groups regarding renal function recovery.

Cross-tabulation analyses were also performed to compare mortality distribution between early and delayed dialysis groups. Logistic regression analysis was subsequently conducted to determine the influence of timing of hemodialysis initiation on mortality and complication outcomes while estimating associated odds ratios.

Authors ONM, CD, and GAA participated in the interpretation of statistical findings and contextualization of results within existing nephrology literature and AKI management evidence. All statistical analyses were interpreted at a significance level of $p < 0.05$. The findings were subsequently presented in tables and narrative form to facilitate interpretation and discussion of the relationship between the timing of hemodialysis initiation and patient outcomes. The collaborative analytical approach adopted by the research team strengthened the reliability of the statistical findings and enhanced the credibility of the interpretations presented in the study.

Ethical considerations

Ethical approval

was obtained from the Institutional Review Board (IRB) of the 37 Military Hospital, Accra, Ghana (Reference Number: 37MH-IRB/IPN/2024/017). The full approving ethics committee was the 37 Military Hospital Institutional Review Board, 37 Military Hospital, Accra, Ghana. Permission to access patient records was also obtained from the management of the dialysis unit and the hospital health information department before data extraction. The study involved a retrospective review of anonymized patient records covering five years from January 2019 to December 2023. Because the study used existing anonymized medical records without direct patient contact, the requirement for informed consent was waived by the 37 Military Hospital Institutional Review Board, 37 Military Hospital, Accra, Ghana.

Confidentiality and anonymity were strictly maintained throughout the study. Patient identifiers, including names, folder numbers, addresses, and telephone numbers, were excluded from the extracted dataset. Data were stored securely on password-protected devices accessible only to the research team. The study adhered to the ethical principles outlined in the World Medical Association Declaration of Helsinki for medical research involving human participants [22].

Results

Sociodemographic Characteristics

A total of 35 patient records were analyzed. Among the participants, 24 (68.6%) were male while 11 (31.4%) were female. Regarding educational status, 17 (48.6%) had primary education, 14 (40.0%) had tertiary education, while 2 (5.7%) each had no formal and secondary education.

The predominance of male participants may reflect sex-related differences in exposure to AKI risk factors and healthcare utilization patterns as seen in Table 1

Table 1
Summary of Demographic Data

		Frequency	Percent
Gender of the Patient	Female	11	31.4
	Male	24	68.6
Educational Level of the Patient	No formal education	2	5.7
	Primary	17	48.6
	Secondary	2	5.7
	Tertiary	14	40

Relationship between Timing of Hemodialysis and Short-term Mortality Rates

The results indicate a significant negative relationship between the timing of hemodialysis initiation and short-term mortality rates (Pearson correlation = -0.431, p = 0.010). Logistic regression analysis further revealed that early initiation of hemodialysis significantly decreases the odds of short-term mortality, with an odds ratio of 12.000 (p = 0.027) as indicated in Table 2.

Table 2
Cross-tabulation of Timing of Hemodialysis Initiation versus Mortality Rate (Death)

Timing	Death (Yes)	Death (No)	Total
Early	1 (7.7%)	12 (92.7%)	13 (100%)
Late	11 (50.0%)	11 (50.0%)	22 (100%)

Timing of hemodialysis initiation and mortality

Among patients who received early hemodialysis, only 1 (7.7%) died compared with 11 (50.0%) among those receiving delayed dialysis. Pearson correlation demonstrated a statistically significant inverse relationship between timing of hemodialysis initiation and short-term mortality (r = − 0.431, p = 0.010).

Logistic regression analysis further revealed that delayed hemodialysis significantly increased mortality risk by twelve-fold (OR = 12.00, p = 0.027) as found in Tables 3 and 4.

Table 3
Correlation of Timing of Hemodialysis and Short-term Mortality Rate

Variable	Pearson Correlation	Sig. (2-tailed)	N
Timing of Hemodialysis	-0.431	0.010	35

Table 4
Logistic Regression of Timing of Hemodialysis Initiation and Short-term Mortality Rate

Variable	B	S.E.	Wald	Df	Sig.	Exp(B)
Dialysis Initiation	2.485	1.125	4.881	1	.027	12.000

These findings suggest that delayed intervention may worsen survival outcomes through prolonged metabolic instability, persistent uremia, electrolyte imbalance, and systemic inflammatory stress.

Timing of hemodialysis initiation and renal recovery

Renal recovery outcomes were significantly better among patients who received early hemodialysis compared with delayed intervention. The mean renal recovery score was significantly higher in the early dialysis group (0.98) compared with the delayed group (0.18), with a statistically significant difference ($p = 0.021$) indicated in Table 5.

Table 5
Impact of Timing of Hemodialysis Initiation (early vs. late) on the Rate of Renal Function Recovery

Timing	N	Mean	SD	T	df	p-value
Early	13	.98	.206	3.742	33	.021
Late	22	.18	.777			

This finding indicates that timely dialysis may reduce ongoing nephron injury and create a more favorable physiological environment for renal tissue recovery.

Timing of hemodialysis initiation and complication rates

Logistic regression analysis showed no statistically significant association between timing of hemodialysis initiation and complication rates (OR = 1.895, $p = 0.598$) as seen in Table 6.

Table 6
Logistic Regression on Impact of Early Hemodialysis on Complication Rates

Variable	B	S.E.	Wald	df	Sig.	Exp(B)
Timing Dialysis Initiation	0.639	1.212	.278	1	0.598	1.895

This suggests that multiple additional factors, including illness severity, infection burden, comorbidities, vascular access quality, and critical care management, may influence complications during AKI episodes.

Discussion

This study examined the relationship between early hemodialysis initiation and clinical outcomes among AKI patients managed at a Ghanaian military hospital. The findings demonstrated that early hemodialysis was associated with significantly lower short-term mortality and improved renal recovery.

The mortality difference between early and delayed dialysis groups was clinically substantial. Only 7.7% of patients in the early dialysis group died compared with 50.0% in the delayed group. Similar findings have been reported in previous studies, suggesting that timely renal replacement therapy may improve survival in selected AKI populations [12,19].

Several physiological mechanisms may explain the observed mortality reduction. Delayed dialysis may prolong exposure to uremic toxins, hyperkalemia, metabolic acidosis, fluid overload, and systemic inflammation, thereby worsening cardiovascular instability and multi-organ dysfunction [23].

Early dialysis may interrupt these pathological processes before irreversible organ damage occurs.

The study also found significantly improved renal recovery among patients receiving early hemodialysis. This finding aligns with previous studies suggesting that prompt metabolic stabilization and toxin clearance may facilitate renal tissue repair and preserve residual nephron function [13,24].

However, the findings should be interpreted cautiously because large multicenter trials have reported inconsistent survival advantages associated with accelerated dialysis initiation [15–18]. This inconsistency highlights the complexity of AKI management and suggests that dialysis timing should be individualized based on patient condition, biochemical severity, urine output, and hemodynamic status. No statistically significant relationship was observed between dialysis timing and complication rates. Complications among AKI patients are likely multifactorial and may depend on baseline illness severity, infection status, vascular access complications, and quality of supportive critical care rather than timing alone.

Importantly, this study contributes evidence from a resource-constrained African healthcare setting where delayed dialysis initiation is often influenced by financial barriers, limited dialysis infrastructure, and delayed nephrology referral. The findings therefore emphasize the need to strengthen AKI recognition systems, improve referral pathways, and expand access to dialysis services in Ghana.

Strengths and limitations

A major strength of this study is its contribution to the limited Ghanaian evidence regarding AKI dialysis timing. Use of real-world hospital data improved clinical relevance. However, the retrospective design

limited control over data completeness and confounding variables. The relatively small sample size and single-center design may reduce generalizability. Additionally, illness severity indices and some laboratory parameters were not consistently documented.

Future multicenter prospective studies with larger sample sizes are therefore recommended.

Conclusions

Early hemodialysis initiation was significantly associated with lower short-term mortality and improved renal recovery among patients diagnosed with acute kidney injury at the 37 Military Hospital in Ghana. Delayed initiation substantially worsened mortality outcomes and may impair renal recovery due to prolonged exposure to metabolic instability and systemic inflammatory injury. Although complication rates did not differ significantly between early and delayed dialysis groups, comprehensive multidisciplinary care remains essential for preventing adverse outcomes among AKI patients.

The findings highlight the importance of strengthening AKI recognition systems, timely nephrology referral, and dialysis accessibility within resource-constrained healthcare settings. Future multicenter prospective studies with larger sample sizes are recommended to further validate these findings and guide evidence-based nephrology practice in Ghana and similar settings.

Abbreviations

AKI: Acute kidney injury

CKD: Chronic kidney disease

KDIGO: Kidney Disease: Improving Global Outcomes

LMICs: Low- and middle-income countries

RRT: Renal replacement therapy

SPSS: Statistical Package for Social Sciences

Declarations

Ethics approval and consent to participate

Ethical approval was obtained from the 37 Military Hospital Institutional Review Board, 37 Military Hospital, Accra, Ghana (Reference Number: 37MH-IRB/IPN/2024/017). Permission to access patient records was obtained from the management of the dialysis unit and the hospital health information department. The study used existing anonymized medical records without direct patient contact; therefore, the requirement for informed consent was waived by the 37 Military Hospital Institutional Review Board, 37 Military Hospital, Accra, Ghana.

Consent for publication

Not applicable.

Availability of data and materials

“The datasets analysed during the current study are available from the corresponding author on reasonable request and with approval from the 37 Military Hospital Institutional Review Board and the 37 Military Hospital management, because the data were extracted from confidential patient medical records and cannot be publicly deposited.”

Competing interests

The authors declare no competing interests.

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Authors’ contributions

CM conceptualized the study, collected data, and drafted the manuscript. ONM supervised the study and critically revised the manuscript. AA, CD, and GAA contributed to interpretation and manuscript refinement. All authors approved the final manuscript.

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Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- SupplementaryFile1DataExtractionFormCarolineOlivia.pdf