RISK FACTORS ASSOCIATED WITH OUTCOME OF PERITONEAL DIALYSIS AND HEMODIALAYSIS DONE FOR PATIENT WITH ACUTE KIDNEY INJURY IN TIKURE ANBESA HOSPITAL PEDIATRICS INTENSIVE CARE UNIT FROM JANUARY 2018 TO DEC 2023

RESEARCH TO BE SUBMITTED TO ADDIS ABABA UNIVERSITY, COLLAGE OF HEALTH SCIENCES, PEDIATRICS AND CHILD HEALTH DEPARTMENT IN PARTIAL FULFILMENT OF THE REQUIRMENT FOR THE SPECIALITY CERTIFICATE PROGRAM IN PEDIATRICS AND CHILD HEALTH

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APRIL, 2024

ADDIS ABABA, ETHIOPIA

APPROVAL FORM

ADDIS ABABA UNIVERSITY COLLEGE OF HEALTH SCIENCES SCHOOL OF MEDICINE DEPARTMENT OF PEDIATRICS AND CHILD HEALTH

I, The undersigned Pediatrics and Child health resident declare that I have submitted my original proposal with the title: RISK FACTORS ASSOCIATED WITH OUTCOME OF PERITONEAL DIALYSIS AND HEMODIALAYSIS DONE FOR PATIENT WITH ACUTE KIDNEY INJURY IN TIKURE ANBESA HOSPITAL PEDIATRICS INTENSIVE CARE UNIT FROM JANUARY 2018 TO DEC 2023**. An institution based retrospective cohort study**

Submitted by

Name of resident: Dr Anteneh Tafere Signature :…… Date

This research result has been submitted with my approval as an advisor,

Approved by

1. **Dr Muluwork Tefera (Associate professor of pediatrics and child health, pediatrics emergency and critical care subspecialist)**

Primary Advisor Signature Date

Acknowledgement

First of all, I would like to thank the almighty God for being with me in all the way, sincere gratefulness goes to Addis Ababa University College of Health Science, School of medicine, Department of Pediatrics and Child Health for allocating the budget and giving me the opportunity to do this research. I would like to appreciate my Advisor Dr Muluwork Tefera (Associate professor of pediatrics and child health, pediatric emergency and critical care subspecialist), For her positive guidance, unreserved help, constructive comments, and continuous effort until the end of the research.

Table of Contents

Table Lists and figures

ACRONYM

AAU - ADDIS ABEBA UNIVERSITY

AKI - ACUTE KIDNEY INJURY

APD - ACUTE PERITONEAL DIALAYSIS

CI - CONFIDENCE NTERVAL

CRRT - CONTINOUS RENAL REPLACEMENT THERAPY

HD – HEMODIALAYSIS

HMIS - HEALTH MANAGEMENT INFORMATION SYSTEM

HIC - HIGH INCOME COUNTRY

IHD - INTERMITENT HEMODIALAYSIS

ISPD - INTERNATIONAL SOCIETY OF PERITONEAL DIALAYSIS

KDIGO - KIDNEY DISEASSE IMPROVING GLOBAL OUTCOMES

Kt/V- WEEKLY UREA CLEARANCE

NGT - NASOGASTRIC TUBE

PD - PERITONEAL DIALAYSIS

PICU - PEDIATRIC INTENSIVE CARE UNIT

RPGN - RAPID PROGRESSIVE GLOMERULONEPHRITIS

RVHD -REHUMATIC VALVULAR HEART DISEASE

WCCr - WEEKLY CREATININE CLERANCE

Abstract

Back ground: Acute kidney injury is an abrupt loss of kidney function that results in a decline in glomerular filtration rate, retention of urea and other nitrogenous waste products, and deregulation of extracellular volume and electrolytes The AKI is a serious condition, with a multi

factorial etiology In numerous cases, and with variable mortality, reaching further than 60% in patient who took dialysis. Morbidity and mortality is especially high in sub-Saharan Africa where access to dialysis is veritably limited. Identifying modifiable risk factor associated with outcome of dialysis may improve the outcome **Objective**: - To identify the risk factors associated with the outcomes of HD and PD among patient with acute kidney injury at Tikure Anbessa hospital pediatric intensive care unit from Jan 2018 to Dec 2023

Method:-a retrospective cohort study will be conducted on risk factors associated with outcomes of hemodyalisis and peritoneal dialysis done for patient with AKI in TASH PICU from Jan 2018 to Dec 2023 with structured questionnaire to collect the data from the patients' card. Data checked, gutted and Inputted into SPSS interpretation 27.0 software version for analysis. P values of (P <0.005) will be considered statistically significant. Paired t test was used to compare blood biochemistry before initiation and at the end of dialysis and Multinomial logistic regression was used to determine the relation between the different independent variables to final outcome.

Results:-there were 30 children in this study Most of patient were male in 56.7% .Most of the cases who undertake peritoneal dialysis were less than 5 years (59.1%) whereas greater than 10 years for those who took hemodyalisis .The majority were from outside of Addis Ababa which is 24 (80%) . The highest cause of AKI was RPGN in 20 (66.6%) from this PSGN was the cause in 50% but the remaining cause of RPGN was not identified, followed by ATN and lupus nephritis each in (10%) HUS in (6.5%), malignancy and ATIN each in (3.3%).there is a statistically significant mean difference on serum BUN, creatinine and potassium before initiation and after the last dialysis with P value of (P< 0.001). In hospital mortality rate was in 40% and low urine output was significantly associated with mortality with P value of (P< 0.037). In these study most of peritoneal dialysis was done with locally prepared solution with Ringer lactate and Dextrose and Hemodyalisis was done on adult side.

Complication encountered in 17 (56.7%) of patients from this 13 (60%) associated with peritoneal dialysis and 4 (50%) associated with hemodyalisis Most common complication associated with peritoneal dialysis were catheter leakage 6 (26%) then followed by catheter blockage 5 (21.7%) and peritonitis in 5 (21.7%), omental herniation 2(8.6%), hyperglycemia 2 (8.6%) presence of complication was not associated with mortality with P value of 0.9

Conclusion:-our finding revealed that majority of pediatrics AKI patients had successful restoration of kidney function after dialysis which was comparable to other study. Low urine output at the end of dialysis was the independent predictor for death, which was supported by other study. In poor resource setting like in our country improvised peritoneal dialysis was safe and effective method to manage pediatrics AKI. It is recommended to have more trained medical staff in pediatrics Nephrology and extending PD service to other parts of the country. It

is recommended to conduct well-structured prospective study including the other referral hospital in the country with adequate sample size to better assess the outcome of dialysis.

1. Introduction

Acute kidney injury is a complex syndrome caused by multiple etiologies and characterized by sudden decrease in kidney function, defined by increase in serum creatinine or reduce in urine amount. And a common problem associated with increased mortality and health care costs(2).AKI possess some adverse outcome some of which are short term while others are long term adverse effect, mild reversible AKI also has important clinical consequence that include increased threat of death, these adverse problem could still be avoided by proper and timely intervention of AKI(3).

Renal replacement therapy (RRT) is the main option for intervention of AKI patients. Dialaytic intervention for younger children with AKI can take numerous forms. Whether cases are treated by intermittent hemodyalisis, peritoneal dialysis or continuous renal replacement therapy depends on specific cases characteristics. Modality choice is also determined by a variety of factors including provider preference, available institutional coffers, Dialaytic pretensions and specific advantage or disadvantage of each modalities(4).

Both forms of dialysis promote renal relief by withdrawing solutes and water restoring electrolyte balance and correcting acidosis. still unlike HD, which is grounded on blood passing through an extracorporeal circuit through a vascular access, PD involves the exchange of solutes and water between bloods in the peritoneal depression(dialysate) through a catheter using the peritoneal membrane as the dialyzing surface(5).

Continuous renal replacement therapy and intermittent hemodyalisis (HD) are the modalities most generally used in developed countries(4,6). In developing countries PD is constantly used because of its lower cost and can be prepared with locally available material. In developing countries, continuous RRT is limited because of a lack of age applicable vascular catheters in combination with the cost of treatment.

Children with severe AKI have a high mortality rate, despite an enhancement in pediatric critical care and use of advanced RRT in advanced countries, the mortality rate remain high, ranging from 36% to 50%(7,8). pitfalls of mortality in severe AKI taking RRT include bone marrow transplantation, multiorgan dysfunction syndrome (MODS), sepsis, high degree of fluid load, vasopressor use, late start of RRT, and infant patient(9). In another study in Taiwan shows diabetes mellitus is a risk factor in development of PD related peritonitis. Male patients and low serum albumin levels were associated with increased number in technique failure. Female gender, lower Kt/V, and WCCr are predictor of overall mortality in PD cases(10).

In Ethiopia study on clinical profile and outcome of children who received RRT from 2016 to 2018 shows overall mortality was 37.14%. from this children who took APD there was a 37.5% complications; peritonitis, catheter blockage and leak(3). A study on the survival pattern of hemodyalisis cases in Ethiopia shows that 45.1% of patient died during dialysis treatment and 23.1% of the patient failed within the first days of initiation of dialysis, and only 42.1% of the cases survive further than years(11).As there is no research was done in our country on risk factor associated with outcome of hemodyalisis and peritoneal dialysis, this study would help to improve modifiable risk factors.

1.2: Statement of the problem

Over 2.3 million peoples worldwide are to die yearly from AKI and further than 30% of survivor progress to end stage renal disease that frequently necessitates dialysis or transplantation. The AKI is a serious condition, with a multi factorial etiology In numerous cases, and with variable mortality, reaching further than 60% in patient who took dialysis(12).World prevalence of AKI a Meta analysis shows, using KDIGO description, 1 in 5 grown-ups and 1 in 3 children world wide experience AKI during a hospital admission of care(13) .

A Meta-analysis on the outcome of AKI in children and grown - up in sub-Saharan Africa in 2016 shows, utmost children presented with severe AKI with high requirement for dialysis 66% of them compared to the total world need for dialysis in AKI of 11%. Morbidity and mortality is especially high in sub-Saharan Africa where access to dialysis is veritably limited. Dialysis is not available in all service and only 64% of children with need of dialysis could take the RRT. Outcome of these children is thus veritably poor with mortality rate estimated at 34%(14).

Commercially set dialysis fluid and Tenckhoff catheter for fluid delivery are the gold standard for PD, but its affordability and vacuity remain a challenge(15). chancing from other countries have shown that the locally set PD fluid is as effective as the commercially set dialysate and thus should be considered as a lifesaving volition(16).

In study in Ethiopia on clinical profile and outcome of children who took RRT from 2016 to 2018 shows overall mortality was 37.14%. Among 11cases who received APD with improvised fluids, there was 37.5% complication, 2 children catheter blockage, 5 catheter leaks from insertion site and 2 children had peritonitis(3).

1.3: Significance of the study

This study will aim to give the available information on risk factor associated with outcome of HD and PD, this information helps further to ameliorate medical care and reducing complications associated with PD and HD. Knowledge of the issues of PD and HD, and the

associated challenges in resource limited setting are pivotal in relating adjustable risk factors for adverse issue and in developing strategy to ameliorate the care of children with AKI.

The study on the outcomes at TASH will serve as platform for the extension of this service to the country hospitals as utmost of them are not giving RRT. This will helps in early initiation of PD which is effective as study by(2). This exploration will also induce areas of unborn exploration that will better the practice with the end of precluding complication and death.

2. Literature Review.

2.1 Globally

Acute kidney injury is a major contributor to poor cases outcomes. AKI occurs in about 13.3 million people per time, 85% of who live in developing world. AKI is thought to cause about 1.7 million deaths every time(17,18).

Acute kidney injury is common in critically ill children, being in 10% to 82% of critically ill cases depending on the description and population studied(7,19). According to the reported data from tertiary care sanitarium in Thailand, the prevalence of AKI varies from 0.5-9.9 cases per 1000 pediatric cases admitted to general pediatric wards(20). Children with severe AKI frequently need dialysis. Indication for dialysis includes electrolyte imbalance, fluid overload, and uremia, which is refractory to medical treatments. Despite an enhancement in pediatrics critical care and use of an advanced RRT in advanced countries, the mortality rates remained still high, ranging from 36% to 50%(7,8).

A 10 years' retrospective observational study in Thailand for clinical outcomes of RRT in pediatrics AKI shows from 92cases a 45% survival rate. 5 factors associated with mortality included presence of sepsis, multiorgan dysfunction syndrome, and higher risk of mortality in pediatrics, use of nephro toxin medicines, and use of vasopressor.

By multivariate analysis, the presence of sepsis and use of nephro toxin medicines were singly associated with mortality. Cases with fluid over load >10% was associated with poor survival(21). In another study in Turkey on the outcome of dialaysis in critically ill children a aggregate of 37 cases CRRT were used in 43%, hemodyalisis in 38%, and peritoneal dialysis in 19%. In all 28(73%) survived the mean systolic BP lower who received CRRT. The need for inotropic medications and were found to be topmost pointer of mortality(22).

A recent internet check of dialysis modality used for AKI in children in high income countries (HIC) , low and lower income countries (LLMIC) showed that , HIC countries, hemodyalisis (HD) 72% and CRRT 24% were the preferred modality, whereas in LLMIC 68% of infants were dialyzed with PD(23).

In discrepancy, a recent check of 35 European pediatric nephrology centers showed that PD and CRRT were the most constantly reported dialysis modalities counting for 39.4% and 38.2% of treatment, independently followed by intermittent HD 22.4%(24). In centers treating post cardiac surgery, PD was the most generally chosen modality.

Observational studies comparing modalities have shown no difference in mortality between children who received PD and those treated with CRRT as a treatment for AKI. According to KDIGO 2018 the only absolute contraindication for hemodyalisis is the absence of possible vascular access or prohibitive cardiovascular instability. Peritoneal dialysis is contraindicated if the membrane is not functional , the peritoneal cavity is obliterated, , or catheter access is not possible(25).

Safety of continuous PD versus daily intermittent HD in 136 children from 1 month to 16 yrs found the risk of death for patients treated with HD was 75% advanced than those who took PD. Children treated with HD in this study had frequent hypotensive occurrence during treatment and risk analysis of cause of death suggest fluid and electrolyte change as a possible cause of death(26).In another retrospective analysis from Israel of 115 children needing dialysis for AKI Krause et al. set up intermittent HD to be associated with a significantly better outcome compared to PD and HDF had advanced higher vasopressor support and therefore were likely to have had more severe illness(27). According to ISPD 2020 update as there is no clear benefit of one dialysis modality over another in mortality. PD is suitable modality for treatment of AKI in children of all periods and sizes(15).

Outcomes of hemodyalisis in children a 35 years' experience in south Korea shows the most frequent complication was catheter related complication 21.7%, disequilibrium syndrome occurred more constantly in older cases (p= 0.04) and a higher systolic and diastolic blood pressure before HD (systolic: p=0.02); diastolic (p=0.04)(28). Complication of peritoneal dialysis includes pericatheter leak, catheter dysfunction, hernias, hydrothorax, edema and ultrafiltration failure, encapsulating peritoneal sclerosing, and peritonitis(29).Risk factor associated with outcomes of PD in Taiwan reveals diabetes mellitus is a risk factor contributing PD- related peritonitis. Male patients and low serum albumin levels were associated with increased rate of technique failure. Female gender, lower Kt/V, and WCCr are predictor of overall mortality in PD(10).

2.2 Africa

A prospective cohort study done at Lagose state teaching Hospital AKI incidence of 29/1000 admissions. Sepsis was the leading cause of AKI 79.4% most of the subjects presented in KDIGO

stage 3. Major determinants of outcome included level of consciousness, KDIGO stage 3, platelet level less than 100,000, and acidosis and sodium level(30).

A systematic review from sub Saharan Africa found acute kidney injury to be severe, with 1042 (66%) of 1572 children and 178(70%) of 253 adults needing dialysis in studies reporting dialysis need. Only 666 (64%) of 1042 children and 58(33%) of 18 adult received dialysis when needed. Overall mortality was 34% in children and 32% in adults but rose to 73% in children and 86% in adults when dialysis needed but not received(31). An audit of a decade of acute peritoneal dialysis in children with AKI in Nigeria tertiary Hospital the major observed PD complications were catheter blockage 37.5%, dialysate fluid retention 16% and peritonitis in 16.7%) (32).

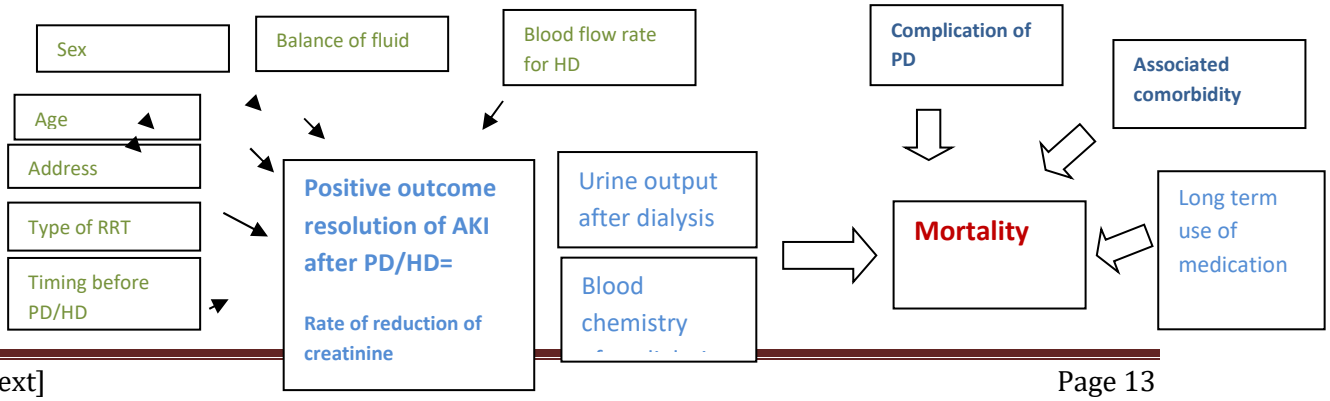
2.3 Ethiopia

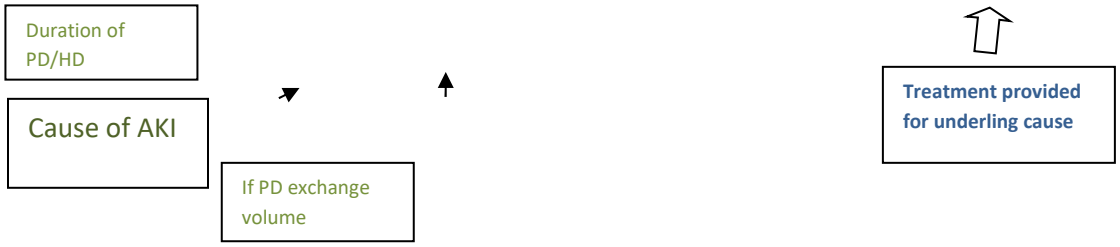
In study at TASH in 2016 shows out of 14,521 cases admitted 3.3% were renal problem among this 4.2% were AKI(33). A prospective cross sectional observational study on critically ill children who were admitted at TASH pediatrics emergency unit and pediatric intensive care unit from April to august 2018 a aggregate of 98 patients were admitted 36 cases develop AKI, 7 cases classified as stage 1, 19 cases stage 2 and 10 cases were stage 3, among this 6 case needed RRT the independent risk factor for AKI were sepsis and septic shock(35). In another study at MizanTepi teaching hospital shows infections and hypovolemia were the primary causes of AKI, complications, persistent AKI, prolonged hospital stay, and re-hospitalization were poor short term issues(34).

Two case reports during northern Ethiopian war shows pediatrics AKI requiring RRT may benefit from careful utilization of an improvised catheter and PD solution in resource limited setting; these can reduce the mortality and morbidity associated with AKI(16). A single center retrospective study that estimated the clinical profile and survival issues of cases with AKI taking intermittent hemodyalisis and acute PD at tertiary hospital at Addis Ababa from July 2016 to October 2018, there were 35 children overall mortality was 37.1%. Underling pulmonary edema and severe sepsis in AGN cases were the most common cause of death, 21 (60%) of children had partial renal recovery on discharge, one goes against medical advice, and 11 children received acute IHD in adult unit. Of the children who received APD, there was a 37.5% complication. 2 children had catheter blockage, 5 catheter leakage and 2 children had

peritonitis, rigid catheter at bedside with improvised fluid using RL and dextrose solutions used for PD(3).

CONCEPTUAL FRAMEWORK





3. Objective

3.1: General Objective

To identify risk factor associated with outcome of PD and HD among patient with AKI at TASH intensive care unit from Jan 2018 to Dec 2023.

3.2: Specific Objective

1 To determine successful restoration in kidney functions after hemodyalisis or peritoneal dialysis among AKI patient admitted at PICU.

2 To describe the type and prevalence of complications.

3 To identify risk factor associated with the outcome of HD and PD among patient with AKI at TASH intensive care unit from Jan 2018 to Dec 2023

4:- Methods

4.1: Study setting:-

This study will be conducted in, Tikure Anbesa Specialized Hospital, at Addis Ababa Ethiopia Tikure-Anbesa Specialized Hospital is set up in the capital megacity of Addis Ababa in the Lideta sub megacity. The sanitarium opened in 1972, and the largest referral sanitarium in the country, and serves roughly 370,000- 400,000 cases a time but the exact number is not known. It is one of the largest medical seminaries in the country with undergraduate, postgraduate and some subspecialty trainings. It has around 800 beds and serves nearly 250,000 cases as outpatients annually. Out of this the pediatric inpatient beds account for 150 including NICU, pediatrics renal clinic working 2 days per week seeing average of 50 patients a day.

4.2: Study Design

A retrospective cohort study will be conducted on the risk factor associated with the outcome of peritoneal dialysis and hemodyalisis among AKI patient admitted to TASH-PICU from Jan 2018 to Dec 2023.

4.3: Study Period

The study will be conducted from Jan 2018 to Dec 2023

4.4: POPULATION

4.4.1: Source Population

All AKI cases admitted to TASH-PICU from Jan 2018 to Dec 2023

4.4.2: Study population

All AKI cases on PD or HD admitted during the study period who fulfill selection criteria

4.5: Inclusion and Exclusion Criteria

4.5.1: Inclusion Criteria

All children with diagnosis of AKI for whom peritoneal dialysis or hemodyalisis was done and whose chart available and filled with necessary information will be included in the study

4.5.2: Exclusion Criteria

Those Patients whose charts are lost or incompletely filled will be excluded

4.6: Sample Size Determination

All AKI cases admitted to TASH- PICU during the study time for whom dialysis done was included in the study

4.6.2: Sampling procedure

The chart number (MRN) of all patient who have been diagnosed with renal disease and admitted Tikure Anbesa specialized hospital at pediatric intensive care unit was collected from (HMIS) registration book of the PICU and chart revised and all AKI patient for whom dialysis done was selected

Out of 76 renal patient admitted at TASH PICU during the study time from these 13 chart were lost and 31 patients with diagnosis of AKI who undertake dialysis identified from this one was excluded because the chart have incompletely filled

4.7: Data collection and measurement

After identifying the study patients, the data was collected by the top investigator by reviewing charts. Structured questioner were used to gather the data

4.8: Data quality Control and Operation

To insure the quality of data, The Structured questioner was tested on 5% of the sample. Problems stressed during the pre-test were corrected before the launch of the data collection. Every question was duly enciphered; nonstop supervision was done during the pre-test and data gathering period by the top investigator. The gathered data were checked for absoluteness and thickness for every cases.

4.9: VARIABLES OF THE STUDY

4.9.1: Dependent Variable

Positive outcome resolution of AKI after PD/HD (rate of reduction of creatinine after dialysis, urine output after dialysis)

Final outcome (mortality)

4.9.2: Independent Variable

Sex Age

Cause of AKI Associated comorbidity

Timing before PD /HD Complication of PD/HD

Duration of PD/HD Treatment provided for underling cause

Balance of fluid at the end of HD/PD

Positive outcome after dialysis

1st Dependent variable = Reduction rate of creatinine after dialysis (creatinine before dialysis- creatinine after dialysis)*100)/creatinine after dialysis

1st Independent variables

Age Type of RRT

Sex Days of commencement of dialysis after indicated

Address Exchange volume for PD

Admission year Duration of each PD session

Admission criteria Total duration of PD session

Days before seeking medical advice HD total session, blood flow rate

Cause of AKI Duration of each HD

Final outcome (Mortality)

2nd Dependent variable = Death

2nd Independent variable

Blood chemistry creatinine after dialysis

Blood chemistry urea after dialysis

Urine output after dialysis after dialysis

Existing Chronic illness

Long term use of medication

Treatment provided for underling cause

Complication encountered during dialysis

4.8. Operational Definition

Acute kidney injury – is an increase in blood concentration of creatinine and other nitrogenous waste products with the incapability of the kidney to regulate fluid and electrolyte homeostasis.
Uremia – serious condition in which nitrogen wastes such as urea and creatinine. The primary waste products of metabolism, accumulate in the blood because the kidneys are incapable to filter them out and pass them from the body via the urine
Renal replacement therapy – is a therapy which replaces some or utmost of the kidney functions, does not replace endocrine kidney function in cases with renal injury. Techniques include intermittent hemodyalisis, continuous hemofiltration and hemodyalisis, peritoneal dialysis and kidney transplant. All modalities exchange solute and remove fluid from the blood, using dialysis and filtration across passable membranes.

Dialysis - The process of removing waste products and excess fluid from the body necessary when the kidneys are not incapable to adequately filter the blood.

Reduction rate of creatinine after dialysis:-is (creatinine before dialysis- creatinine after dialysis)*100)/creatinine after dialysis

4.9. Data Analysis

Data were entered; gutted and analyzed using SPSS interpretation 27 software version then the demographic and medical history of patients were computed using descriptive statistics with frequencies, and percentage

Blood biochemistry and urine out put before initiation of dialysis and discontinuation of dialysis compared with paired t test and p value obtained

Then Univarate analysis for variance was used to determine subject and group effect on reduction rate of creatinine after dialysis. Multinomial logistic regression was used to determine predictor on final outcome. Statistically significance taken for p values of <0.05 for all statistical.

4.10: Ethical clearance

Pediatrics and Child Health Department's Research and Publications Committee gave Ethical clearance to conduct this study.

Confidentiality was completely maintained during data gathering and analysis.

4.11: Dissemination of findings and utilization of data

The result of this study will be submitted to Addis Ababa University, College of Health Sciences, School of medicine, Department of Pediatrics and Child Health for the demand of partial fulfillment of specialty certificate in pediatric and child health. The finding of the study will also be participated to other concerned bodies. Likewise, the handwriting will be published on peer reviewed journals

5: Results

5.1: Sociodemographic Characteristics

A total 31 chart of cases admitted at TASH PICU during the study time with the diagnosis of AKI for whom dialysis was done were retrieved, from these 30 charts were complete and included. From this 56.7% patient were male with (male to female ratio 1.3/1). The mean age in month of the study subject was 75.4 month the minimum age 12 month and maximum 144 month. Four fifth of study subjects were came from outside of Addis Abeba

Table:1 Sociodemographic Characteristics of participant

	Characteristics	Frequency	Percent
Age	< 5 years	13	43.3
	5 - 10 years	12	40.0
	> 10 years	5	16.7
	Total	30	100.0
Gender	Female	13	43.3
	Male	17	56.7
	Total	30	100.0
Address	Addis Abeba	6	20.0
	Out of Addis Abeba	24	80.0

Total	30	100.0

5.2 Participant Medical History

Most of (93.3%) patients were referred from other health care facility while 3.3 were direct admission and 3.3 admission status were not known

One third 33.3% of patients were dialysis done within 1 week of symptom onset where as in 23.3 % dialysis was done after 21 days of illness this is shown in the table 2

In most of 96.7% of patients had no chronic illness and not on long term medication while 1 of the patient was a known Henock Shenolen Purpura(HSP) and taking prednisolone for the last 6 month

Table2: Participant Medical History

Participant Medical History	Frequency	Percent
Participant Year Of Admission		
2019	5	16.7
2020	5	16.7
2021	4	13.3
2022	10	33.3
2023	6	20.0
Total	30	100.0
Admission Criteria		
Referral	28	93.3
Direct admission	1	3.3
Missing	1	3.3
Total	30	100.0
Number of days before PD		
0-7 days	10	33.3
8-14days	8	26.7
15-21days	5	16.7
>21days	7	23.3
Total	30	100.0
Existing Chronic Illness		
Yes	1	3.3
No	29	96.7
Total	30	100.0
Long Term Use Of Medication		

Yes	1	3.3
No	29	96.7
Total	30	100.0

5.3 Cause of AKI

The highest cause of AKI was RPGN in 20 (66.6%) from this PSGN was the cause in 50% but the remaining cause of RPGN was not identified. Followed by ATN and lupus nephritis each 3 (10%), HUS 2 (6.7%), malignancy and ATIN 3.3% each

Choice of renal replacement therapy is shown on table 3

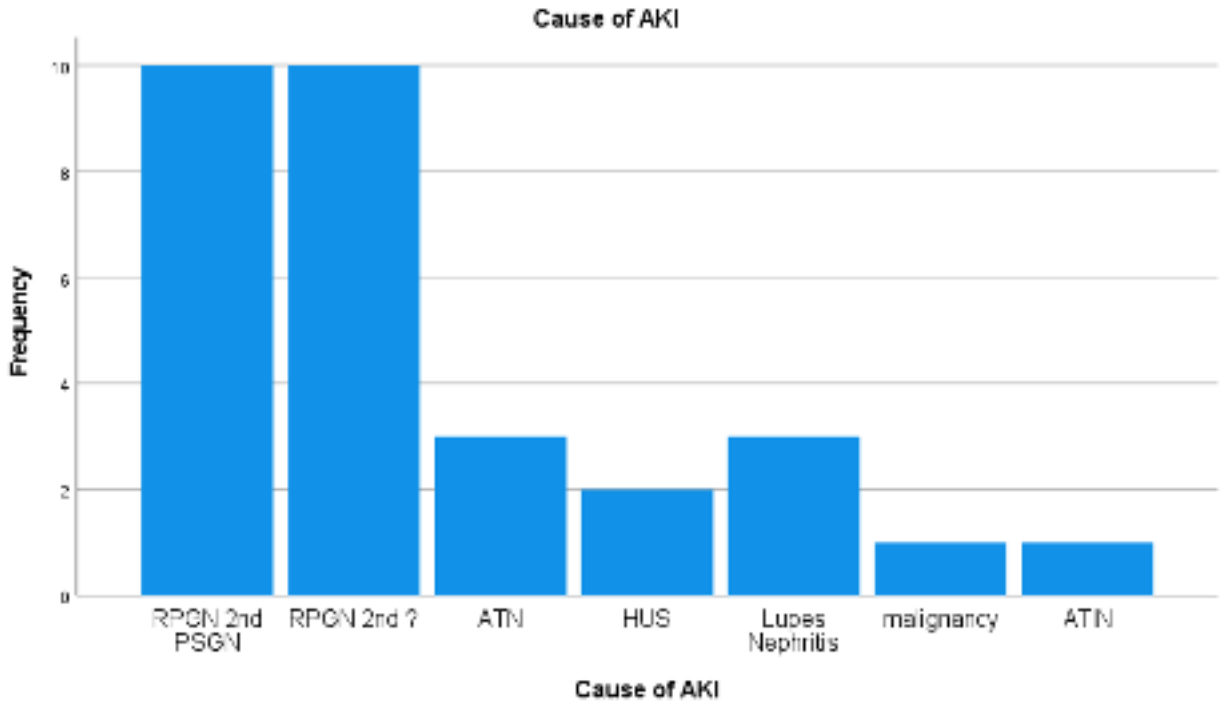


Table 3 Cause of AKI * Type of renal replacement therapy Crosstabulation

			Type of renal replacement therapy			
			hemodyalisis	peritoneal dialysis	both Hemo and peritoneal dialysis	Total
Cause of AKI	RPGN 2nd PSGN	Count	2	8	0	10
		% within Cause of AKI	20.0%	80.0%	0.0%	100.0%
	RPGN 2nd ?	Count	2	7	1	10

		% within Cause of AKI	20.0%	70.0%	10.0%	100.0%
	ATN	Count	0	3	0	3
		% within Cause of AKI	0.0%	100.0%	0.0%	100.0%
	HUS	Count	0	2	0	2
		% within Cause of AKI	0.0%	100.0%	0.0%	100.0%
	Lupus Nephritis	Count	3	0	0	3
		% within Cause of AKI	100.0%	0.0%	0.0%	100.0%
	Malignancy	Count	0	1	0	1
		% within Cause of AKI	0.0%	100.0%	0.0%	100.0%
	ATIN	Count	0	1	0	1
		% within Cause of AKI	0.0%	100.0%	0.0%	100.0%
Total		Count	7	22	1	30
		% within Cause of AKI	23.3%	73.3%	3.3%	100.0%

5.4. Restoration of Kidney function

The patient who achieved successful restoration of kidney functions after dialysis were 57.1%, of these male achieved restoration of kidney function in 50%

Blood biochemistry and urine output result before and after dialysis

A paired T test were used to determine whether there was a significant mean difference between blood biochemistry and urine output before and after dialysis

The mean blood creatinine before dialysis 9.67 mg/dl and the mean blood creatinine after dialysis was 4.6mg/dl. The standard deviation before dialysis was 3.8 and after dialysis were 2. The result is statistical significance with P value of 0.001

The mean blood BUN before dialysis was 275.3 and after dialysis 132. The standard deviation before dialysis was 113.7842 and after dialysis 68.8. . The results are statistical significance with P value of 0.001

The mean blood potassium before dialysis was 6.240 and the mean blood potassium after dialysis was 5. The standard deviation before dialysis was 1.5 and after dialysis 1.1. The results are statistical significance with P value of 0.001

The mean urine output before dialysis was .06ml/kg/hr. and the mean urine output after dialysis were 0.7ml/kg/hr. the standard deviation before dialysis was 0.1ml/kg/hr. and after dialysis 1ml/kg/hr.The results are statistical significance with P value of 0.002

Table4: Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
Pair 1	blood chemistry before dialysis (RFT= creatinine) - blood chemistry after dialysis (RFT= creatinine)	5.1800	3.0550	.5673	4.0180	6.3420	9.131	28	.000
Pair 2	blood chemistry before dialysis (RFT=BUN) - blood chemistry after dialysis(RFT= urea)	136.1821	99.2799	18.7621	97.6854	174.6789	7.258	27	.000
Pair 3	blood chemistry before dialysis potassium (K) - blood chemistry after dialysis potassium (K)	1.0859	1.2813	.2466	.5790	1.5928	4.404	26	.000

Pair 4	urine out put before dialysis in ml/kg/hr - urine out put after dialysis in ml/kg/hr	-.65664	1.03068	.19478	-1.05630	-.25699	-3.371	27	.002

5.5. Positive outcome after dialysis

Univarate analysis for variance was used to determine subject and group effect on the Rate of reduction of creatinine after dialysis there is no subject and group effect from socio demographic data, medical history in the reduction of creatinine after dialysis the p value Age p= 0.7, sex p= 0.1 , address p= 0.08

Also there is no statistical significance association between cause of AKI, day of commencement of dialysis after indicated and type of renal replacement therapy on the reduction of creatinine after dialysis with P value of (P<0.6, P,<0.7 and P < 0.73) respectively

5.6. Final Outcome

The overall mortality in the course of admission was 12(40%) and 5 (16%) gone against medical advice from which all are male. 40% of patient discharged with partial renal recovery and no progression to chronic kidney disease. Multinomial logistic regression was done to determine association of blood creatinine, blood urea and urine output after dialysis , existing chronic illness , long term use of medication, complication encountered during dialysis and treatment provided to underling disease to final outcome with reference category was resolution of AKI low urine output after dialysis is the independent predictor of mortality with p value of (P<0.037), however, there was no statistical significance obtained in other predictor which is shown in table 10

Table: 8Final Outcomes Multinomial logistic regressions

Parameter Estimates

Final Outcome		B	Std. Error	Wald	df	Sig.	Exp(B)	95% Confidence Interval for Exp(B) Lower Bound	Upper Bound
Death	urine out put after dialysis in ml/kg/hr	-2.375	1.142	4.329	1	.037	.093	.010	.871
	blood chemistry after dialysis (RFT= creatinine)	-.828	.551	2.260	1	.133	.437	.148	1.286
	blood chemistry after dialysis(RFT= urea)	.027	.018	2.395	1	.122	1.028	.993	1.064
	[treatment provided for underling cause=1]	1.648	1.551	1.129	1	.288	5.197	.248	108.737
	[Existing chronic illness=1]	15.836	.000	.	1	.	7544401.006	7544401.006	7544401.006
	[Existing chronic illness=2]	0[b]	.	.	0	.	.	.	.
	[complication encounter during dialysis=1]	.354	1.174	.091	1	.763	1.425	.143	14.225
	[complication encounter during dialysis=2]	0[b]	.	.	0	.	.	.	.
	[Long term use of medication=1]	0[b]	.	.	0	.	.	.	.
	[Long term use of medication=2]	0[b]	.	.	0	.	.	.	.

Go Against Medical Advice	urine out put after dialysis in ml/kg/hr	-3.057	1.919	2.537	1	.111	.047	.001	2.024
	blood chemistry after dialysis (RFT= creatinine)	-.433	.553	.614	1	.433	.648	.219	1.916
	blood chemistry after dialysis(RFT= urea)	.038	.023	2.899	1	.089	1.039	.994	1.086
	[treatment provided for underling cause=1]	-20.247	2629.187	.000	1	.994	1.610E-9	.000	.[c]
	[Existing chronic illness=1]	15.321	.000	.	1	.	4504799.071	4504799.071	4504799.071
	[Existing chronic illness=2]	0[b]	.	.	0	.	.	.	.
	[complication encounter during dialysis=1]	17.715	2629.185	.000	1	.995	49396509.802	.000	.[c]
	[complication encounter during dialysis=2]	0[b]	.	.	0	.	.	.	.
	[Long term use of medication=1]	0[b]	.	.	0	.	.	.	.
	[Long term use of medication=2]	0[b]	.	.	0	.	.	.	.

a. The reference category is: Resolution of AKI.

b. This parameter is set to zero because it is redundant.

c. Floating point overflow occurred while computing this statistic. Its value is therefore set to system missing.

6. Discussion

This study was hospital-based a retrospective study, conducted at pediatric intensive care unit , Tikure Anbesa Specialized Hospital, Addis Ababa, Ethiopia, march, 2024 involving of thirty records from January 2018 to Dec 2023.

In this study, Most of the cases occurred in age ranges less than five years 13 (43.3%) in 5-10 years (36.4%) and in >10 years 4.5% for those who undertake peritoneal dialysis however, In hemodyalisis higher in greater than 10 years 57.1% and 5- 10 years 42.9% When we compare to other studies done in India(36), Kenya(2) and Nigeria(8) the age distribution of cases was similar whereas for hemodyalisis higher in age range 5-10 years the difference in the choice of renal replacement is attributed to in the majority of hemodyalisis machine available on market are only approved for patient greater than 15 _20 years. Males were more affected than Female with ratio of (M:F 1.3:1)

The common causes of AKI which require dialysis differ in different region of the world. In this study we found that RPGN is the most common cause mostly caused by PSGN (50%) and in 50% of cases the secondary cause was not identified then followed by ATN (10%), lupus nephritis (10%), and HUS (6.7%). These are comparable result to study done in Ethiopia (1) acute Glomerulonephritis was predominant cause in 54.3% of cases. However study in India(7) HUS in 36.8%,septicemia 24.6% and ATN 19.3%, South Africa (39) HUS in 35.3 ATN 31.4% and AGN in 15.7% and Bosnia Herzegovina(40) shows HUS25.% Glomerulonephritis 7.7% tumor 7.7% and ATN was the most common cause . Other diagnosis such as AKI associated with post cardiac surgery, chemotherapy and bone marrow transplant have become more prevalent in tertiary care unit developed country Portugal (41), Tehran (38)

This study showed that there was successful restoration of kidney functioning in most of the patients, the mean serum creatinine, BUN , Potassium before and after dialysis are statistically significant P value of <0.001 . This correlates with the results of a study done in India (36) and Kenya (2) lowering retention marker (creatinine and urea) P <0.001 and creatinine P <0.001, urea P value 0.024, potassium P value <0.036 respectively

In hospital mortality rate was 40% and Low urine output after dialysis is the independent predictor of mortality with P value of (P<0.037).This result was comparable from the result in India (36) with P value < 0.05 which reveals anuria significantly associated in non-survivor group. Also study in Korea (13) showed anuric AKI was significantly associated within 90 days mortality P value 0.006. These study also keeping with experience in South Africa (39) anuria more associated with in non-survivor 48% in comparison with survivor 31% p value of 0.176 .The discrepancy was attributed to, this study was assessed urine output after dialysis but study in South Africa assessed anuria from the outset.

There was no statistical significance association between the final outcomes with existing chronic illness, complication encountered with dialysis, long term use of medication and treatment provided for underling cause. Also there was no statistical significance between final outcome and creatinine P value 0.43 and urea after dialysis P value 0.99

In these study most of peritoneal dialysis was done with locally prepared solution and Hemodyalisis was done on adult side

Complication encountered in 17 (56.7%) of patients from this 13 (60%) associated with peritoneal dialysis and 4 (50%) associated with hemodyalisis

Most common complication associated with peritoneal dialysis were catheter leakage 6 (26%) then followed by catheter blockage 5 (21.7%) and peritonitis in 5 (21.7%),omental herniation 2(8.6%),hyperglycemia 2 (8.6%) presence of complication was not statistically significantly association final outcome with P value of 0.9. The result was comparable to study done in Argentina (43) (multicenter study) complication associated with PD were catheter malfunction (24%), peritonitis(19%),fluid leak (11.5%) and hyperglycemia (2%) and mortality in the acute phase occurred in 2.5% of patients which was not related to PD they used semi rigid PD catheter and commercially prepared PD fluid. This little discrepancy may be attributed to, in this study PD catheter was adapted in most cases NG tube used and solution were locally prepared in contrast in Argentina they used semi rigid PD catheter and commercially available PD fluid. In contrary this study show a decrease in complication prevalence as compared to study in Nigeria (44) study on 27 patients the main complication were peritonitis 10 (37%), pericatheter leakage (33.3%), catheter outflow obstruction 5 (18.5%) survival was in 70%. They used Nasogastric tube for PD catheter and commercially prepared PD solution

6.1. Limitation

Due to incomplete registration of some of patient information on chart, variables that may affect the outcome were not included inr the study (such as; final outcome blood chemistry after dialysis creatinine, urine output after dialysis in on e patient.).and from total 77 renal patient admitted TASH-PICU 13 card were lost and there is no registration for whom dialysis was given on PICU HMIS.

6.2. Conclusion

Our finding revealed that majority of pediatrics AKI patients had successful restoration of kidney function after dialysis which was comparable to other study. Low urine output at the end of dialysis was the independent predictor for death, which was supported by other study. In poor resource setting like in our country improvised peritoneal dialysis was safe and effective method to manage pediatrics AKI. It is recommended to conduct well-structured prospective

study including the other referral hospital in the country with adequate sample size to better assess the outcome of dialysis

6.3. Recommendation

To enhance outcomes of pediatric AKI what is required is more effective primary health care with early identification and referral of those in need for dialysis. Ministry of health should work on to have more trained medical staff in pediatrics nephrology and extend the peritoneal dialysis service to other part of the country.

Effort should also be made to mileage the peritoneal dialysis solution and catheter since this modality of renal replacement therapy does not bear any sophisticated outfit.

For future researchers: Since the current study is grounded on retrospective study design and singe centred study it is advisable to conduct prospective multi centred study including the other referral hospital who have adequate sample size

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