

ST. PAUL'S HOSPITAL MILLENNIUM MEDICAL COLLEGE



**OUTCOME OF HEMODIALYSIS IN ACUTE KIDNEY
INJURY PATIENTS AND FACTORS ASSOCIATED WITH
SURVIVAL AMONG PATIENTS IN SPHMMC, ADDIS
ABABA, ETHIOPIA.**

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**A RESEARCH TO BE SUBMITTED TO PUBLIC HEALTH
DEPARTMENT , IN PARTIAL FULFILMENT OF THE
REQUIREMENT FOR THE DEGREE OF DOCTOR OF
MEDICINE**

SEPTEMBER, 2017

Acknowledgement

My deepest gratitude goes to Saint Paul's Hospital Millennium Medical College Internal Medicine department for allowing us the chance to conduct this research in their hospital supporting me in this research I would like to express my heart-felt thanks to my advisors **Dr,Mamo Wubshet** for his comments and guidance that he provided me throughout the development of this research paper. I would also like to thank my family and friends for their support in doing this research and also throughout this journey.

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List of Abbreviation

AKI-Acute kidney Injury

AGN-acute glomerulonephritis

ATN-acute tubular necrosis

CKD-chronic kidney disease

ESRD-End Stage Renal Disease

HD-Hemodialysis

ICU-Intensive Care Unit

SPHMMC-St Paul's hospital Millennium Medical College

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Abstract

Background

Hemodialysis usually has a positive outcome in patients with Acute Kidney Injury. It has improved signs and symptoms of AKI. Hemodialysis is associated with marked benefits. These include improved solute clearance, better blood pressure control, and reduced medication requirement. It has improved the quality of life of patients significantly. However, it has some complications associated with it which include hypotension, cramps, nausea and vomiting, Headache, chest pain, back pain etc. Studies have shown that there are factors which affect the outcome of hemodialysis. These factors could be patient factors or technical. Saint Paul's Hospital Millennium Medical College (SPHMMC) is one of the pioneers in having a sustainable dialysis unit which is government funded in Ethiopia. This study was conducted to describe the clinical profile and outcome of adult Acute Kidney Injury patients treated with intermittent hemodialysis at the dialysis center of SPHMMC.

Objectives:

The purpose of this study is to identify the negative outcomes of dialysis and factors associated with survival among AKI patients in SPHMMC.

Method- A Retrospective record review was conducted, in order to determine the Outcome of dialysis in AKI patients in medical ward at SPHMMC who were admitted from February 1 2015 to December 31 2015, and the charts were collected after checking the HMIS chart from the dialysis unit. A total of 160 cards were recorded in the year but only 117 charts were found. The data were analyzed by summarizing, tabulating and presenting in various formats by using SPSS version 21. Then bivariate and multivariate analysis was done to determine the variables who have association with the outcome. Significance was determined if p value was <0.05 .

Result- Out of total 117 patients who have undergone hemodialysis 83(70.3%) of them had improvement. 34 (28.8%) of them died. Of those 83 patients who had improvement 49 of them were females and the rest 34 were males. The mean age of the patients who have undergone hemodialysis during the one year period was 37.3 years. Most of the patients were from Oromia region followed by Addis Ababa and SNNP Regions. Patients who had AKI due to sepsis and have undergone hemodialysis has increased, it is 25.4%. Sepsis has been associated with 3.5 times increased risk of

death in the patients. 26.3% of patients has other cause of AKI. Those patients are associated with 0.25 times increased risk of death. Death was associated in 24.6% of patients.

Conclusion- While sepsis is the single most important factor associated with the negative outcome of hemodialysis. Patients who developed AKI due to Sepsis has increased risk of mortality than other patients who had AKI due to other causes

Recommendation- Aggressive measures should be taken in treating Sepsis since it is associated with increased mortality in AKI patients who undergo hemodialysis

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1. Introduction

Background

Acute Kidney Injury, previously known as Acute Renal Failure, is a clinical syndrome characterized by an abrupt decline in glomerular filtration rate sufficient to decrease the elimination of nitrogenous waste products (urea and creatinine) and other uremic toxins [1]. According to a standardized definition from the Acute Kidney Injury Network proposed in 2007, AKI is a decline in kidney function during 48 h as demonstrated by an increase in serum creatinine of more than 0.3 mg/dl, an increase in serum creatinine of more than 50 % or the development of oliguria [1].

Acute Kidney Injury complicates 5–7% of acute care hospital admissions and up to 30% of admissions to the intensive care unit (2). It is a common complication of critical illness, with some researches showing that as high as 1 in 5 adults and 1 in 3 children experiencing AKI per hospital admission. The incidence of AKI has grown by more than fourfold in the United States since 1988 and is estimated to have a yearly incidence of 500 per 100,000 population, higher than the yearly incidence of stroke [2]. AKI is associated with a markedly increased risk of death in hospitalized individuals, particularly in those admitted to the ICU where in-hospital mortality rates may exceed 50% [2]. Management of AKI requires; early recognition, Prevention of ongoing kidney injury, Aggressive supportive care and Correction of the primary disorder(s) Management of uremic complications, Timely renal replacement therapy [3].

AKI is also a major medical complication in the developing world, particularly in the setting of diarrheal illnesses, infectious diseases like malaria and leptospirosis, and natural disasters such as earthquakes. , these causes are largely obsolete in developed countries [4]. Regardless of cause, the management of AKI is mainly supportive, with dialysis being indicated when medical management fails to treat the complications. Hemodialysis is the most commonly used renal replacement therapy in Africa. However, poverty, maladministration of resources and lack of adequate funding for health in nearly all African countries has massively stunted the growth of hemodialysis as a modality of renal replacement therapy.

The causes of acute kidney injury can be broadly classified into three types. Pre renal, Intrinsic and post renal causes [1, 4]. Pre renal causes include hypovolemia, decreased cardiac output and burns. Intrinsic causes include glomerular diseases like acute glomerulonephritis, tubular diseases like ischemia, nephrotoxins and sepsis, and post renal causes like bladder outlet obstruction. [5]

There are two main types of dialysis: hemodialysis and peritoneal dialysis. Both types filter your blood to rid your body of harmful wastes, extra salt and water. [5]. Hemodialysis does that with a machine. Peritoneal dialysis uses the lining of your abdomen, called the peritoneal membrane, to filter your blood. [2, 6] Each type has both risks and benefits. They also require that you follow a special diet.[7]

Hemodialysis usually has a positive outcome in patients with AKI. It has improved signs and symptoms of AKI. Hemodialysis is associated with marked benefits[7]. These include improved solute clearance, better blood pressure control, and reduced medication requirement. It has improved the quality of life of patients significantly [7]. However, it has some complications associated with it which include hypotension, cramps, nausea and vomiting, Headache, chest pain, back pain etc.[8]. Studies have shown that there are factors which affect the outcome of hemodialysis. These factors could be patient factors or technical factors. Patient factors include age, associated comorbidities, serum creatinine level and the like. Technical factors associated with poor outcome of hemodialysis include inappropriate usage of hemodialysis machine [9].

1.1 Statement of the Problem

Acute kidney injury (AKI) continues to be a severe disease associated with poor prognosis. AKI is independently associated with diminished short- and long-term survival, and outcomes are proportional to AKI severity. Additionally, AKI is associated with substantially increased propensity for chronic kidney disease (CKD) including end-stage renal disease (ESRD). Crude incidence rates of dialysis-requiring AKI have increased substantially throughout the last two decades [10].

In resource-poor countries of sub-Saharan Africa such as Ethiopia, data on the burden of AKI are minimal because of a lack of nephrology services and an inability to recognize and diagnose AKI with any certainty. There had not been a sustainable government run dialysis service in Ethiopia until the establishment of the Ethio-Egyptian Hemodialysis Unit in August of 2013 at SPHMMC

.Previous studies were done in different hospitals around the world and also in this hospital focused on the etiology and clinical manifestations of AKI patients who required dialysis rather than outcomes and survival factors.

1.2 Significance of the study

In the recent days the number patients who require dialysis is increasing from time to time due to many reasons. The incidence of acute kidney injury is also increasing in ethiopia.in the previous researches it focused more on the clinical presentation and causes of AKI especially the previous research which was done in SPHMMC.The purpose of this study is to focus more on the outcome of dialysis on patients with AKI and also factors that are associated with the survival of the patients and complications that are associated with hemodialysis.it will emphasis more on the prognosis of patients after dialysis rather than clinical etiology and sign and symptoms and also take appropriate measures if possible for these causes.

2. Literature Review

Dialysis-requiring acute kidney injury (AKI) is associated with substantial mortality and risk of end-stage renal disease (ESRD). Despite considerable growth in incidence of severe AKI, information pertaining to trends in outcomes remains limited [10]. The research done in Denmark evaluated time trends in one year risks of ESRD and death in patients with dialysis-requiring AKI over an eight year period. The Methods used were a retrospective nationwide study based on national registers, all adults requiring acute renal replacement therapy between 2005 and 2012 were identified. Patients with preceding ESRD were excluded. Through individual-level cross-referencing of administrative registries, information pertaining to comorbidity, preceding surgical interventions, and concurrent other organ failure and sepsis was ascertained.

It showed that within 1 year, 7.4% patients were registered with ESRD, and 57.2% patients died. The one-year rate of ESRD decreased from 9.0% between 2005 and 2006 to 6.1% between 2011 and 2012. Simultaneously, the one-year mortality rate decreased from 58.2% between 2005 and 2006 to 57.5% between 2011 and 2012. And it concluded that in a nationwide retrospective study on time trends in one year outcomes following dialysis-requiring AKI, risk of all-cause mortality and ESRD decreased over a period of 8 years.

In another study done in Tanzania, Data on the burden of acute kidney injury (AKI) in resource-poor countries are minimal because of a lack of nephrology services and an inability to recognize and diagnose AKI with any certainty. The research documented patient outcomes in a pilot peritoneal dialysis program established in 2009 at a referral hospital in Northern Tanzania. In Brazzaville, Congo, 15% of admissions for kidney disease presented with AKI, and among children, mortality was 37% [4]. The major causes of AKI in Africa are infectious (either sepsis or dehydration from gastroenteritis), but the use of traditional medicines is also suspected to be an important but poorly documented cause [1,4,5]. The research was conducted at the Kilimanjaro Christian Medical Center (KCMC). Patients treated in the pilot program were adults and children with a history and clinical investigations suggestive of AKI (for example, ultrasonography showing normal-size kidneys), who were unresponsive to fluid challenge and who had absolute indications for dialysis. Indications included uremic encephalopathy, refractory hyperkalemia, severe metabolic acidosis, and oliguria with life-threatening fluid overload. Patients with known mild-to-moderate CKD who developed AKI and indications for dialysis would be eligible for dialysis in the program [4]. The results showed good technique for most of the cases Catheter obstruction occurred in 3 patients and was attributed to fibrin

or omental entrapment. Flushing was successful in clearing the fibrin-obstructed catheter in 1 patient; catheter replacement was performed in the other patients. All patients survived to discharge. Low infection rates were achieved, with peritonitis being suspected in only 2 patients. Those patients were successfully treated with antibiotics. And including mortality, it showed that around 20% of patients died before discharge, typically very early in the course of therapy. All the surviving patients were referred for follow-up at a newly established kidney outpatient clinic.

In Ethiopia. A study was conducted to describe the clinical profile and outcome of adult Acute Kidney Injury (AKI) patients treated with intermittent hemodialysis at the dialysis center of SPHMMC in 2013

A retrospective review of clinical records of cases of AKI who required hemodialysis support during the time period from August 1, 2013 to February 1, 2015 was conducted. And it showed that the most common premorbid condition identified were HIV infection (15.9 %), followed by hypertension (14.1 %) and cerebrovascular accident (3.3 %).and 2.6 % had confirmed diabetes. Only four patients had base line premorbid renal function test with mean serum creatinine value of 1.01 mg/dl. And the Average duration of hospital stay was 20.7 days, with range of 1–92 days. And 53 % were discharged improved, and 29.1 % died, with the remaining absconding 10.6 % or progressing to end stage renal disease around 7.3 %. Hypovolemia, AGN and sepsis are the causes of AKI which accounted for more than half around 54.5 % of deaths. The most common cause of death was sudden cardiac arrest.

3. Objectives

3.1 General Objectives

To identify outcomes of hemodialysis and factors associated with survival among in AKI patients in SPHMMC

3.2 Specific objectives

To describe the outcomes of hemodialysis which includes death and complications associated with it among AKI patients in SPHMMC

To determine the factors that have associations with the outcome of hemodialysis particularly death among AKI patients in SPHMMC

4. Methods and Materials

4.1 Study Area

St Paul's hospital is the second largest public hospital in the nation. The Hospital was built by Emperor Haileselasie I in 1969 G.C as a source of medical care for underserved populations. The hospital was established to serve the economically under privileged population, providing services free of charge to about 75% of its patients. The study was conducted in SPHMMC in internal medicine department which has 2 wards male and female one ICU

The Ethio-Egyptian Hemodialysis Unit was established in August of 2013 at SPHMMC and since its establishment it has led to a significant positive outcome in patients who required hemodialysis. it has 12 beds with the hemodialyzing machines. it works through a collaboration between nephrologists internists, nurses and other health professionals.

4.2 Source population

All patients who were admitted to SPHMMC with a diagnosis of AKI and come for hemodialysis session.

4.3 Study Population

The study populations was adult patients who were admitted to the Dialysis unit who presented with a diagnosis of AKI and took dialysis sessions from february1 2015 up to December 31 2015.

Inclusion and Exclusion Criteria

Inclusion criteria:-All adult patients for which admission is decided and admitted to the dialysis unit and took dialysis or patients who were admitted to other wards but were on dialysis through the study period were included in the criteria

Exclusion Criteria: Patients who undergone dialysis for other causes than AKI like poisoning were excluded. And also patients who are pediatric age groups that is age < 14 are also excluded.

4.4 Study design

A Retrospective record review was conducted, in order to determine the Outcome of dialysis in AKI patients in medical ward admitted patients The total population that was registered on the hemodialysis unit during the one year period was selected for the study and that was 160 patients.

Out of those 10 of them were children 16 of them had a diagnosis of poisoning so they were not included in the study. The rest of the charts were not found. Total number of charts found was 117 and was taken as the total sample size of the study.

4.6 Variables of the study

4.6.1 Dependent Variable

The dependent variables on this study is the negative outcome of hemodialysis that is death

4.6.2. Independent variables

Age, Sex, Religion, Occupation, residence, and Length of stay.

Causes of AKI that led to hemodialysis-variables include hypovolemia, sepsis, and nephrotoxins, obstruction, AGN and other causes like severe preeclampsia and severe malaria.

Indications for dialysis – variables include refractory fluid overload, uremic symptoms, hyperkalemia and severe metabolic acidosis.

Co morbidities- variables include Diabetes, Hypertension, and HIV infection.

Complications of hemodialysis-including infection and hypotension

4.7 Operational Definition

Discharged improved- include categories of patients who showed clinical improvements from the dialysis and had a decrement in the serum creatinine from the baseline and those patients whose signs and symptoms have subsided and has adequate urine output were discharged from the hospital with a written discharge summary.

Negative complications of hemodialysis which includes Death-patients who died after the dialysis sessions which is determined by the death certificate that was written on the charts.

Sepsis-the condition or syndrome caused by the presence of microorganisms or their toxins in the tissue or the bloodstream with a clear cut diagnosis on the chart

4.8 Instrument & Data collection method

Data was collected by using data abstraction format that is using the checklist from the hemodialysis unit by collecting and reviewing patient charts.

4.9 Data analysis, processing and interpretation

Data was entered into a spreadsheet and imported into IBM ® SPSS Statistics 20 (IBM Corp, Armonk, USA). Descriptive and analytical statistics was computed, descriptive data analysis was done for the age, number of cycles of hemodialysis and length of stay in the ward Analysis was performed using bivariate analysis and those variables who had significant association with the outcome, bivariate logistic regression analysis was done to evaluate the possible associations of all the variables that were candidate. And variables that had significant associations were those in which p value was <0.05.

.5.0 Ethical consideration

During data collection, all methodological and ethical considerations was taken care of. Informed consent was obtained from the Medical College.

6. Results

6.1 Socio-demographic characteristics of the Respondents

The total population of the study was one hundred and seventeen (117) of whom 49(41.9%) were male while 68(58.1).the ages of the sample ranges from 14 to 96 while with the majority 30 of the patients being the age of 30.the patients aged thirty five is 8 while six were aged 20. The mean age of the respondents was 37.34 years.

From the total patients who developed AKI and had dialysis 50(42.4%) of them were Oromo by ethnicity and 40(33.9%) were Amara by ethnicity and 18(15.3%) were SNNP and the other ethnicities constitute about 4.2%.

From the total of 117 patients who developed AKI and had dialysis 78% of them were Christian and the rest twenty five(21.2%) were Muslim by religion.

From the total of 117 patients who developed AKI and had dialysis (42.4%) were from Oromia region and (30.5%) were from Addis Ababa. And(16.1%) were from SNNP and from Amara region were eight (6.2%).

Table 1-Sociodemographic characteristics of patients who undergone hemodialysis from February 2015 to December 2016

Characteristics	Frequency	Percent
Gender		
Male	49	41.5
Female	68	57.6
Religion		
Christian	92	78
Muslim	25	21.2
Ethnicity		
Amara	40	33.9
Oromo	50	42.4
Tigre	3	2.5
Somali	1	0.8
SNNP	18	15.3
Other	5	4.2
Residence		
Addis Ababa	36	30.5
Oromia	50	42.4
Tigray	1	0.8
SNNP	19	16.1
Afar	1	0.8
Gambella	1	0.8
Benishangul	1	0.8
Amara	8	6.8

The minimum number of days that the patients stayed at the hospital to take hemodialysis is 1 day and the maximum being 102 days.. Most patients stayed at the hospital for 1 day and 12 days each of them constituting about the mode is 1 and 12 days but 25 patients didn't have any record about their length of stay at the hospital.

6.2 Etiologies for AKI

Out of the 117 total patients the most common causes of AKI were sepsis 30(25.4%) and other causes which constitutes about 26.3% (31) patients. Diseases that were categorized under other causes of AKI were severe preeclampsia, eclampsia and severe malaria.

Other causes of AKI were hypovolemia and glomerulonephritis in which each of them has 24 patients constituting about (20.3%) each of them.16.1% of patients has acute tubular necrosis. Post renal or obstructive causes of AKI constitutes 11 %(13) patients.4.2% of patients took nephrotoxic drugs. And 2.5% of patients were poisoned.

From the total 117 patients who had acute kidney injury and took hemodialysis 32 (27.1%) of patients have associated Chronic Kidney disease (CKD).

From the study the most common indication for hemodialysis was uremic symptoms which includes 62 patients (52.5%) of cases followed by pulmonary edema 45 patients (38.1%) and hyperkalemia (23.7%).while severe metabolic acidosis constitutes about 3.4% of cases.

Table 2- Indications for dialysis of AKI who had undergone hemodialysis at SPHMMC from february 2015 to December 2016

Indication for dialysis	Frequency	Percent
Hyperkalemia		
yes	28	23.7
no	89	75.4
Pulmonary edema		
yes	45	38.1
no	72	61
Uremic symptoms		
yes	62	52.5
no	55	46.6
Severe metabolic acidosis		
yes	4	3.4
no	113	95.8

6.3 Comorbidities associated with AKI

Of the total 117 patients who had AKI and took dialysis eight (6.2%) of patients had associated Diabetic mellitus. And 43 (36.4%) of the patients had hypertension. eight (6.2%) patients have HIV infection.

Seventy (59.3%) patients have other comorbidities. The most common causes or associated comorbidities are aspiration pneumonia, congestive heart failure, pneumonia, disseminated TB, Hospital acquired pneumonia, viral hepatitis, septic shock and puerperal sepsis.

The maximum cycle of dialysis that a patient took is 21 while the mean cycles of dialysis that the Patients took during their hospital stay is 4.7

Table 3- Co morbidities associated with AKI who had undergone hemodialysis at SPHMMC from february 2015 to december 2015

Co morbidities	Frequency	Percent
DM		
Yes	8	6.8
No	109	92.4
hypertension		
yes	43	36.4
No	74	62.7
HIV infection		
Yes	8	6.8
no	109	92.4
Other comorbidities		
Yes	70	59.3
No	47	39.8

Three patients or (2.5%) of patients develop infection which was central catheter associated infection.no cases of other complications of dialysis like hypotension were recorded.

6.4 Outcome of Hemodialysis

Out of total 117 patients who had undergone hemodialysis 83(70.3%) of them had improvement.34 (28.8. %) of them died. Of those 83 patients who had improvement 49 of them were females and the rest 34 were males. Bivariate logistic regression was done to determine the association with the outcome and p value was 0.895 which was not significant. Of the total deaths the most common age group for mortality was between age 30 and 55. Out of the total 29 deaths 19(55.8%) of them occurred on females and the rest 15(44.1%) of them occurred in males. And 14(48.2%) were Oromo by ethnicity and 11(37.9%) were Amara by ethnicity.26 out of 29(89.6%) patients who died were Christian and the rest were Muslim.63 out of 83 patients who had improvement were Christians.

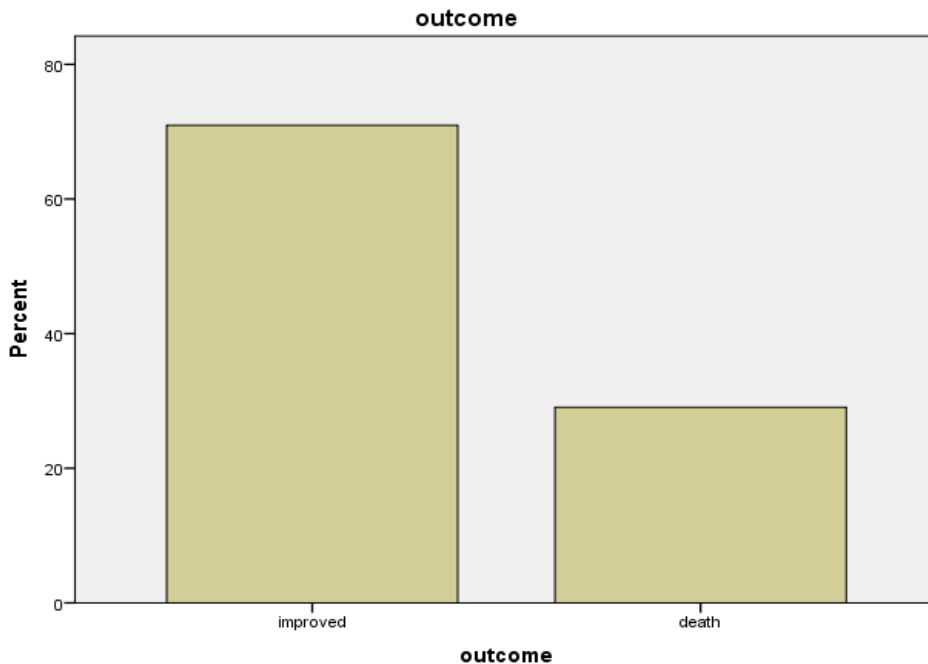


Fig 1- outcome of hemodialysis in AKI patients among SPHMMC from February 2015 to December 2015

Table 4-Association between outcome of Hemodialysis and gender

variable	P value	
gender	.895	Not significant

Out of the total 30 patients who developed AKI due to sepsis 15(50%) had improvement after hemodialysis and the rest 50% of patients died. bivariate analysis was done to determine the association of sepsis with the outcome and p value was 0.001 which was significant

Table 5- Association between etiology and outcome of hemodialysis at SPHMMC from February 2015 to December 2015

Variable	P value	Significance
hypovolemia	.990	Not significant
sepsis	.001	significant
ATN	.419	Not significant
AGN	.129	Not significant
Nephrotoxic drugs	.586	Not significant
obstruction	.253	Not significant
Associated CKD	.892	Not significant
Other causes of AKI	.035	significant

Out of 28 patients who had hyperkalemia as an indication for dialysis, 28.5 % (8 out of 28) died. 71.4% of patients who had hyperkalemia (20 out of 28 patients) had improvement. Out of 45 patients who had pulmonary edema as an indication of dialysis 31.1% of patients (14 out of 45) has died and 68.9% (31 out of 45 patients) had improvement. Out of 62 patients who had uremic symptoms as an indication of dialysis 40(64.5%) of patients had improvement. While 22(35.5%) of patients died. Out of 4 patients who had severe metabolic acidosis as an indication of dialysis 3 of them improved and 1 died. .bivariate analysis was done to determine the association with the outcome and the p values were 0.949, 0.702, 0.106 and 0.857 respectively which implies that there is no association with the outcome.

Out of total of 8 patients who had associated diabetic mellitus 4(50%) of them improved and the rest 50% died. Out of the total 43 patients who had AKI and had also comorbid hypertension. 30 (69.7%) of them improved after ongoing hemodialysis and 12(27.9%) of them died

8 patients who had AKI and has undergone hemodialysis has associated HIV infection. Out of those 5(62.5%) of them improved and 2(25%) of them died.

70 patients out of the total 117 patients (59.8%) who has undergone hemodialysis had associated comorbidities. Of those the most common ones were aspiration pneumonia, congestive heart failure, pneumonia, disseminated TB, Hospital acquired pneumonia, viral hepatitis, septic shock and puerperal sepsis.

44 out of 70 patients who had these comorbidities have improvement after dialysis (that is 62.8% of patients). 22(37.1%) of them died. .bivariate analysis was done to determine the associations with the outcome and p values were 0.180, 0.833, 0.590 and 0.019 respectively.

Table 6- Association between outcome of hemodialysis and associated comorbidites with survival

variable	P value	association
Diabetic mellitus	.180	Not significant
Hypertension	.833	Not significant
HIV infection	.590	Not significant
Other co morbidities	.019	significant

Table 7- complications associated with dialysis and association with outcome

variable	P value	Association
IV catheter Infection	.039	significant
Hypotension	no	no

Table 8-variables that are found to have association in determining the outcome of AKI

variable	P value	COR(95 % CI) of Death	AOR(95 % CI)
sepsis	.001	->	3.579(1.487,8.611)
		1	
Other co morbidities	.019	2.881(1.169, 7.100)	
IV Catheter associated Infection	.039	Variables are not in the equation	
Other causes of AKI	.035	Variables are not in the equation	

Out of the four factors which had association with the outcome of hemodialysis logistic regression was done to assess the strength of the association. And sepsis had significant association with 3.5 times increased risk of death (COR=3.579, 95%CI (1.487, 8.611) p=0.004)

Other comorbid illness also has 2.8 times increased risk of death with COR=2.881, 95%CI (1.169, 7.100) p=0.022 then multivariate analysis was done to determine the associations between sepsis, other comorbidities and outcome of hemodialysis and it showed that sepsis is the single most important factor in determining the outcome of hemodialysis with AOR=3.579, 95%CI (1.487, 8.611) p=0.004).

7. Discussion

Regarding the causes of AKI the most common cause of AKI patients who has undergone hemodialysis in this study was found to be other causes of AKI followed by Sepsis, hypovolemia and acute glomerulonephritis. In a research which was done at SPHMMC 22.5% of patients developed AKI due to hypovolemia and 18.5% of the patients had pregnancy related conditions and 11.3% of them had sepsis. [13] This shows that the percentage of patients who developed AKI due to sepsis and has undergone hemodialysis has increased, it is 25.4% in this study. On this study, Sepsis is the single most significant associated factor that has 3.5 times increased risk of death (AOR=3.579, 95%CI (1.487, 8.611) $p=0.004$) that determine the outcome of hemodialysis. Because the other two factors has no variables found in the equation when bivariate and multivariate analysis was tried.

On this study the comorbid diseases that were included in this study like DM, hypertension, HIV infection and has no associations with the outcome of hemodialysis. But other comorbid illness were associated with 2.8 times increased risk of death on AKI .but it has no significant impact in determining the outcome of hemodialysis as compared to sepsis. Similarly it was found that the number of dialysis sessions has no association

The mean age of the patients indicates that most of the patients who developed AKI and has undergone hemodialysis during the one year period was 37.3 years. Most of them are adults between age 30 and 40. This shows that the prevalence is common in middle aged population. Compared to the previous research which was done 4 years back it was almost comparable the mean age being 36.7 years [13]. But there is no significant association identified between the age of the patients and the outcome of hemodialysis.

Most of the patients who have undergone hemodialysis in the one year period were females. There is an increment in the number of female patients from the previous studies. It was 49.7% four years back. The percentage of female patients in this study was 57.6%.

With regard to residential status most of the patients were from Oromia region followed by Addis Ababa and SNNP Regions. This shows that most medical institutes in Oromia refers most of their patients who needs hemodialysis to SPHMMC since it serves as a catchment for some part of the region. Similarly most of the patients were Oromo by ethnicity followed by Amara and SNNP. Majority of patients were Christians and the rest were Muslims. No association was found between the outcome and the residential status of the patients and also religion.

Out of the people who were admitted and were on hemodialysis, the average length of stay in the hospital was 16.9 days the range is between 1-102 days. Compared to the research which is conducted four years back at this hospital the average length of stay was 20.7 [13] which showed decrement in the length of stay.

This study considered patients who had AKI due to obstetric causes and medical conditions like Malaria under the category of other causes of AKI. In this study 26.3% of patients has other cause of AKI. When compared to the previous research it was 33.7% which has shown decrement. But this study didn't calculate the percentage of patients who had obstetric causes and malaria. But the etiologies of AKI has no association with the outcome of hemodialysis.

Regarding patients who had associated CKD with AKI, 27.1% of patients had AKI superimposed on CKD. This study has shown a significant increment from the study which was done four years back

in which 16.9% of patients had AKI superimposed on CKD. This has shown that the prevalence of CKD is increasing and the patients who will undergo hemodialysis for AKI with superimposed CKD has also increased. But no association between the outcome and AKI patients with associated CKD.

.Comparing the outcome of hemodialysis in patients with AKI from previous researches death was associated in 28.8% of patients on this study. Previous study done at this hospital has 29.1% mortality rate of AKI. This shows that using hemodialysis has decreased the mortality of AKI.

8. Limitation of the study

- Some patient charts were not found while trying to collect the data which were around 50 charts and also on some of the patient's charts there was no proper documentation about the illness. The charts had incomplete data especially in sociodemographic factors
- This study failed to determine the cause of death for the patients and the percentage some of the diseases that were categorized as an independent causes for AKI.
- The sample size was small which may affect the outcome of the result in making conclusions.
- The factors which was included as other causes of AKI and other comorbidities were not clarified well it should have been well categorized so that they would not have large numbers.

9. Conclusion

The following conclusions are drawn from this study:

Sepsis was found out to be the single most important factor associated with the negative outcome of hemodialysis. Patients who developed AKI due to Sepsis has 3.5 times increased risk of mortality than other patients who had AKI due to other causes.

Adults or Middle aged patients are commonly affected by AKI.

And associated comorbidities that are associated with AKI like diabetes, and hypertension has no have as such as a significant role in determining the outcome of hemodialysis in patients with AKI.

10. Recommendation

- Aggressive measures should be taken in treating Sepsis since it is associated with increased mortality in AKI patients who undergo hemodialysis.
- Giving appropriate health education for the patients about prevention of sepsis.
- Further studies should be done to
- There should be proper documentation of patient data on the charts so every health professional should be responsible for that.
- Proper use of patient charts and the charts should be kept in an organized way so that to reduce missing of the documents since it affects both the patient and the health professional.

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Annexes

Research Questionnaire

1. Age ----- in number

2. Sex

1. Male 2.Female

3. Ethnicity 1.Amara 2.Oromo 3. Tigre 4.Somali 5.SNNP 6. Other

4. Religion 1.Christian 2.Muslim 3.Other

5. Residence 1.Addis Ababa 2.Oromia 3.tigray 4.Somali 5.SNNP 6.Afar 7.Gambella 8. Other

6. Length of stay----- in number

Etiologies

1. Hypovolemia	1.yes	2.no
2. Sepsis	1.yes	2.no
3. ATN	1.yes	2.no
4. AGN	1.yes	2.no
5. Nephrotoic drugs	1.yes	2.no
6. Obstruction	1.yes	2.no
7. Associated CKD	1.yes	2.no
8. Other causes	1.yes	2.no

Indication for dialysis

1. Hyperkalemia	1.yes	2.no
2 .Pulmonary Edema	1.yes	2.no
3. Uremic symptoms	1.yes	2.no
4. Severe Metabolic Acidosis	1.yes	2.no

Associated comorbidities

- | | | |
|------------------------|-------|------|
| 1. Diabetic mellitus | 1.yes | 2.no |
| 2. Hypertension | 1.yes | 2.no |
| 3. HIV | 1.yes | 2.no |
| 4. Other comorbidities | 1.yes | 2.no |

Cycles of dialysis----- in number

Complications

- | | | |
|---------------|-------|------|
| 1.Infection | 1.yes | 2.no |
| 2.hypotension | 1.yes | 2.no |

Outcome

- | | | |
|----------|-------|------|
| Improved | 1.yes | 2.no |
| Death | 1.yes | 2.no |