

ADDIS ABABA UNIVERSITY
COLLEGE OF HEALTH SCIENCE
DEPARTMENT OF EMERGENCY MEDICINE



**DISEASE PATTERN, OUTCOME AND ASSOCIATED FACTOR OF
PATIENT ADMITTED IN PEDIATRIC INTENSIVE CARE UNIT AT
TIKUR ANBESSA SPECIALIZED TEACHING HOSPITAL, ADDIS
ABABA, ETHIOPIA, 2019.**

BY

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**A THESIS TO BE SUBMITTED TO ADDIS ABABA UNIVERSITY,
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COLLEGE OF HEALTH SCIENCE
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ADDIS ABABA, ETHIOPIA

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ACRONYMS

AA:	Addis Ababa
BSc:	Bachelor of Science
CDH:	Congenital Diaphragmatic hernia
HIV:	Human immune virus
ICU:	Intensive Care Unit
LOS:	Length of stay
MV:	Mechanical ventilator
NICU:	Neonatal Intensive Care Unit
OR:	Operation theater
PICU:	Pediatric Intensive Care Unit
Pts:	Patient
MSc:	Master of Science
SPSS:	Statistical package for social sciences
TASH:	Tikur Anbesa Specialized Hospital
TB:	Tuberculosis
WHO:	World Health Organization

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Abstract

Background: Advances in pediatrics especially in the field of intensive care have dramatically improved the prognosis for the critically ill children. Numerous conditions that were previously fatal are now treatable, and many children who previously would have sustained a permanent disability now recover completely. The current evidence suggests that the sickest subgroups of critically ill children are less likely to die if treated in the PICU in a tertiary care hospital.

Objectives: To assess the disease pattern, outcome and associated factor of admitted patients at PICU Tikur Anbessa Specialized Hospital, Addis Ababa Ethiopia from January 2017 To January 2019.

Methods: Institutional based cross-sectional study was conducted. All patients who were admitted at pediatrics ICU from January 2017 to January 2019 and met the criteria were included. Data was collected using adapted questionnaire from chart review and registration book. SPSS version 20 software was used for data entry and analysis. The ethical clearance was obtained from AAU College of health sciences department of emergency medicine.

Result: Most of the study subjects were in the age range of less than 1 year 97(30.6%).50.5% was female. The mean age was 4.5 ± 3 years. A majority 124(39.1%) were admitted from EOPD. The mean PICU length of stay was 7.18 ± 9.12 days. The majority of patients admitted to PICU 71(22.4%) were due to respiratory problem and gastrointestinal disease is least admission diagnosis 10 (3.2%). the mortality rate is, 125(39.3%) and main cause of death is cardiovascular disease (25.6%)

Conclusion & Recommendation: Respiratory and Neurology diseases were the predominant conditions leading to PICU admissions in our setting. 56.8% of patients used mechanical ventilator. Mortality rate was significantly associated with cardiovascular disease compered to other system classification and patient who use mechanical ventilator.This can be due to limited infrastructure, few trained professional and resource, make it difficult to provide optimum care. Tikur Anbessa Teaching Specialized Hospital should work more on PICU providing a high-quality intensive care to critically ill patients focusing on increase PICU capacity.

Keywords: Disease pattern, outcome, PICU

1. INTRODUCTION

1.1 BACKGROUND

Pediatric Intensive Care Unit (PICU) is an area within a hospital specializing in the care of critically ill infants, children, and teenagers. This is a unit in the hospital where seriously ill patients are cared for by specially trained staff. Advances in pediatrics especially in the field of intensive care have dramatically improved the prognosis for the critically ill children. Numerous conditions that were previously fatal are now treatable, and many children who previously would have sustained a permanent disability now recover completely(1). The current evidence suggests that the sickest subgroups of critically ill children are less likely to die if treated in the pediatric intensive care unit (PICU) in a tertiary care hospital.(2)

Advances in the care of the critically ill child have not come cheaply, and there are problems in terms of costs, resources, technical problems, and stress on staff, family and child. To some, intensive care appears over-invasive, unreasonably expensive, frequently ineffective, and a drain on the limited health service resources. So, for the optimal management of the critically ill children, the pediatrician, nurses and the anesthetist dealing with the children should be familiar with critical complications of all childhood diseases, and be aware how invasive intensive care can significantly improve the prognosis.(3)

Pediatric patients under the age of five years accounted for 12.1% of the study population, a modest volume, but we suspect this proportion is still artificially low based on prior studies of critically ill-children in our countries.(4) This statistic reflects a severe shortage of dedicated, age-appropriate ICU capacity, even at the top level referral hospitals in Ethiopia. Communicable disease conditions accounted for most of the ICU admissions, with meningitis alone constituting over eleven percent, highlighting the growing burden of communicable diseases within Sub-Saharan Africa, as shown in previous studies(5).

The regional practice of restricting admission of potentially infectious patients to ICU units may have also resulted in the triage of even critically ill patients with communicable disease to lower levels of care, inflating the proportion of non-communicable diseases in the ICU, For example, all of the ICU in Ethiopia place some limits on admission of patients with TB, HIV or Hepatitis C, regardless of acuity.

1.2 STATEMENT OF THE PROBLEM

The care of critically ill children remains one of the most demanding and challenging aspects in the field of pediatrics. Pediatric intensive care unit (PICU) aims at promoting early intervention and quality care with an objective of achieving good results and better prognosis. This can be achieved by well-equipped and well-staffed intensive care units.(6)

In critical care medicine, intensive care unit (ICU) results can be assessed on the basis of outcomes such as mortality rate or survival.(7) Evaluation of the outcome of medical interventions can assess the efficacy of treatment. This helps in better decision making, improving quality of care and modifying the future management if required. Mortality of patients depends on many factors such as demographic variables, clinical characteristic, associated co-morbidities, length of stay and use of mechanical ventilator.(8)(9)

In sub-Saharan Africa, ICUs have fluctuating qualities and quantities of infrastructure necessary for the provision of proper critical cares services(10). The reported disease characteristics and outcome of patients admitted to ICUs in sub-Saharan Africa vary broadly from one population to another.(11) The regional hospitals send their critical patients to these referral hospitals for ICU care. Demographic profile and outcome of PICU patients can vary widely in different studies while there is a shortage of data in Ethiopia's critically ill children.(4)

In Ethiopia, there is a small number of PICU established for the pediatric age group in addition to that there is a limited resource to give care for the critically ill patient. Therefore this study aimed at assessing the reasons for using PICU, clinical pattern of the patients and the outcome. it will show the burden of the demand and will help in establishing further PICU's, also assess and give evidence for the quality of the care being provided.

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1.3 SIGNIFICANCE OF THE STUDY

This study is intended primarily to assess the disease pattern, outcomes and associated factors among pediatrics patients in PICU TASH. It is very crucial for every institution to know the specific pattern and admission outcome for appropriate treatment and prevention of future problems and also it's important to assess its outcome and find the determinant characteristics in order to increase the quality of care.

The result will hopefully give a base line data for any intervention to be implemented at hospitals that have a PICU in Ethiopia. This study will also help to clearly picture the problems that have related to admission pattern and give information about the outcome.

This study can also serve as a baseline for any further study to be done.

2. LITERATURE REVIEW

2.1Characteristic

The world made significant progress in child survival in the past few decades, and millions of children have better survival chances than in 1990—1 in 26 children died before reaching age 5 in 2017, compared to 1 in 11 in 1990. Moreover, progress in dropping child mortality has been accelerated in the 2000–2017 period compared with the 1990s, with the annual rate of reduction in the global under-five mortality rate increasing from 1.9 percent in 1990–2000 to 4.0 percent in 2000–2017. Despite the global progress in reducing child mortality over the past few decades, an estimated 5.4 million children under age 5 died in 2017—roughly half of those deaths occurred in sub-Saharan Africa. Mortality rates among older children and young adolescents (aged 5-14) also dropped by more than 50 percent since 1990, yet almost one million children died in this age group in 2017 alone. The global burden of child deaths is a call for urgent and determined action to further improve the survival chances of the world's children.(12)

A study done in the PICU of a tertiary care center in Odisha east India for a period of 2 years from January 2014 to December 2015 A total of 848 children were admitted to the PICU with male and female children being 61.3% and 38.7% respectively. Diagnoses included infectious diseases (20.7%), respiratory disease (19.1%), central nervous system diseases (14.3%), cardiovascular diseases (10.8%), gastrointestinal diseases (7%), surgical problems (4.7%) hematological (4%), renal (3.3%), poisonings (1.4%), and others (14.3%).(8)

Another study done in Pakistan in 2009 during the study period, 314 children were admitted in PICU. Sixty-six percent (220) were male. The mean age was 24 months (ranging from 1 month to 14 years) and 37% (123/314) were less than one-year-old. Emergency medical admissions (46%) were almost equal to surgical admissions (54%). Majority of the patients (65%) had severe malnutrition below the 5th percentile for weight for age. There were 112 cases (34%) of cardiac surgery. The major diagnostic categories of medical patients were neurological (10%), respiratory (10%) and cardiac (8%). The average length of PICU stay was 3.2 (ranging from 1 to

49) days. The bed occupancy rate was 90%. Ninety percent of patients received mechanical ventilation, while more than 50% received vasoactive drugs.(13)

A retrospective study where the records of patients admitted in the PICU over one year period in Nepal were 230 children were admitted to the PICU with male to female ratio of 1.7:1. Diagnoses included respiratory diseases (33%), central nervous system diseases (18.6%), infectious diseases (11.3%), surgical problems (7.8%), gastrointestinal diseases (7.4%), cardiovascular diseases (6.5%), poisonings (4.8%), renal (3.9%), hematological (n=3, 1.3%) and others (5.4%) Forty one children (17.8%) received mechanical ventilation, of which 23 (56%) survived, 14 (34.1%) died and 4 (9.75) left against medical advice. Out of 189 non-ventilated children, 154 (81.4%) improved, 15 (7.9%) died and 15 (7.9%) left against medical advice.(14)

According to a retrospective study in which records of admissions (from August 2012 to June 2013) in tertiary care center in India Mean age of the studied 341 patients was 40.01 ± 45.79 months; 50.7% were infants and 59.8% were males. The three most common disease categories admitted were a cardiovascular disease (41.1%), neurological disorders (12.0%), and respiratory disease (10.0%)(9)

In Intensive Care Unit, Dhaka Shishu (Children) Hospital, Dhaka, Bangladesh Total 182 patients got admitted during the study period, 112 were male (61.5%) and 70 female (M:F=1.6:1). Majority were (138/182,76.24%) with 118 having medical conditions (85.5%) and 20 (14.5%) surgical conditions. Congenital Diaphragmatic hernia (CDH) on the other hand, had generally a good outcome (4/6,66.66% improved). In the pediatric (>1 month)age group (N=44) pneumonia, meningitis and heart failure were the main causes of ICU admission (47.72%) and CDH was the primary surgical cause (70%).(15)

Study was conducted in a tertiary medical Hospital, in Cairo, from 2011 to 2012. There were 532 critically ill children admitted to the PICU. Respiratory system diseases, foreign body inhalation removal, and encephalopathy were the predominant etiologies of admission 49.6, 11.9, and 11.5%, respectively. Mortality rate was the highest in infants below 1 year of age (43.9%). length of ICU stay was around 7 days.(16)

A study was done in northern Ethiopia, Tigray in Ayder Referral Hospital admitted patients to PICU from September 2012 to August 2014 the study shows Among 400 patients were analyzed. Of the total admitted patients, 215 (53.8%) were male and 185 (46.2%) were female, giving a male: female ratio of 1.2:1. The average study participants, 250 (62.5%) were under five. age of admission was 62.99 ± 60.94 months. From the A majority were admitted from EOPD (288/400 pts., 72%), a transfer from ward (65/400 pts., 16.3%).with a majority (61%) of them staying for 2–7 days. The mean ICU stay was 4.9 ± 5.8 days (range 1–30 days) vast majority of patients admitted to ICU were due to medical problems (85.2%) and non-infectious disease (266/400 pts., 66.5%). Most were admitted due to meningitis (44/400 pts., 11%), post-operative (43/400 pts., 10.8%) .(4)

2.2 Outcome

The outcome of PICU of a tertiary care center in Odisha East India were Out of 848 admitted children, 4.1% died and (1.4%) left against medical advice (8.5%) children received mechanical ventilation, among which (62.5%) improved, 34.7% died and 2.8% children left against medical advice. Multi-organ dysfunction syndrome (MODS) and co-morbidity were present in 25% and 22% respectively. The proportion of death among patients admitted to PICU was 4.1%.(8)

A study done in Nepal shows Out of 230 admitted children, 29 (12.6%) died, 19 (8.2%) left against medical advice and 5 (2%) were referred to other centers. Forty-one (17.8%) children received mechanical ventilation, among which 23 (56%) improved, 14 (34.1%) died and 4 (9.7%) children were taken away by caretakers against medical advice.(14)

Mortality analysis in relation to different diseases burden in northern Ethiopia, Tigray in Ayder Referral Hospital shows, meningitis (8/34 pts., 23.6%), cardiogenic shock (7/34 pts., 20.6%) followed by pneumonia (3/34, 8.8%) were the major causes of death in this study. Most patients admitted with pneumonia (18/36 pts., 90%) and croup (25/28 pts., 89.35%) were under five. Study participants with comorbid illness account 45.8% (183/400 pts.) with a majority of them having one comorbid (41%, 75/183 pts.). Mortality was higher in those patients with comorbid illness, 14.8%.(4)

2.3 Factors associated with outcome

A study done in Ayder Hospital found in Ethiopia shows Mortality was higher in those patients with comorbid illness, 14.8% vs. 3.2% and patients with comorbid illnesses were 10 times more likely to die than those without which is statistically significant. From study participants, 16 (4%) of patients were a candidate for MV, and 3.5% of them were intubated with 35.7% died. Even though the length of MV was not associated with increased rate of mortality, length of ICU stay was an independent predictor of mortality. Age and gender were not statistically significant risk factors for mortality. Patients used MV were at 17.6 times increased risk of mortality patients than those who did not need MV (4).

2.4 Conceptual frame work

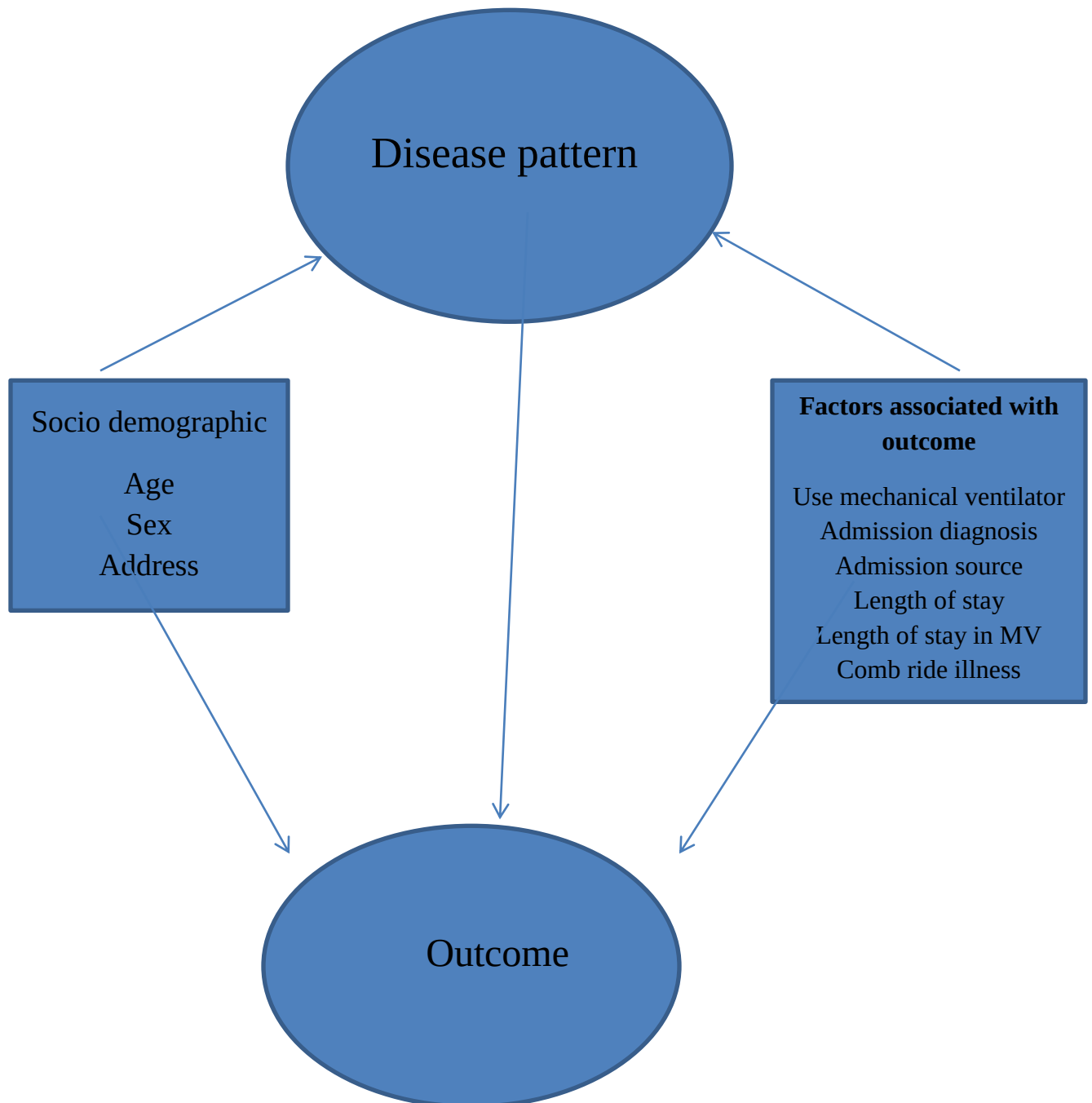


Figure 1: conceptual frame work reflects relationship b/n disease outcome and associated factors adopted from different literatures.

3. OBJECTIVE OF THE STUDY

3.1 General Objective

To assess the disease pattern, outcome and associated factors of patients admitted to PICU of Tikur Anbessa Specialized Teaching Hospital, Addis Ababa Ethiopia from January 2017 To January 2019.

3.2 Specific Objectives.

- To assess disease pattern of PICU patients.
- To identify outcome of patients admitted in PICU.
- To identify the factors that are associated with outcome of patients in PICU

4: METHODOLOGY

4.1 Study Area and period

The study was conducted at Tikur Anbessa Specialized Hospital PICU, Addis Ababa Ethiopia from March 11- April 8, 2019.

The hospital was established in 1965 E.C and run by the ministry of health before it was handed over to Addis Ababa University in 1991 E.C. as a referral hospital. Tikur Anbessa specialized hospital is the largest referral and teaching hospital in Addis Ababa Ethiopia. Tikur Anbessa Specialized Hospital provides service in the internal medicine, surgical, pediatric, neonatology, gynecological and obstetrics, Oncology and rehabilitation department. The hospital provides a tertiary level referral treatment and is open 24 hours for emergency services. Specifically, the study place will be the pediatrics ICU which has a total of 4 beds for all kind of patients (medical and surgical).It has 16 Nurses and 2 pediatric residents besides the 2 pediatrician specialized in critical care.

4.2 Study Design:

An institutional based cross-sectional study was conducted.

4.3 Source Population:

All pediatrics patients admitted to pediatrics ICU in Tikur Anbessa Specialized Hospital.

4.4 Study population

All pediatrics patients admitted to pediatrics ICU in Tikur Anbessa Specialized Hospital from January 1st 2017 to January 1st 2019

4.5 Inclusion and exclusion criteria

4.5.1 Inclusion criteria

All medical record cards with full information was included

4.5.2 Exclusion criteria

Incomplete cards was excluded from the study

Death on arrival at PICU

4.6 Variables

4.6.1 Dependent variables

Disease pattern

Clinical outcome

4.6.2 Independent variables: age, sex, average length of stay in PICU, diagnosis at admission, use mechanical ventilator, length of stay mechanical ventilation, comorbid illness.

4.7 Sample size and Sampling procedures

All patients who were admitted at pediatrics ICU from January 2017 to January 2019 and met the criteria were included in this study.

4.8 Data Collection tools and materials

Data was collected from the study population using adapted questionnaire by reviewing different literature. Data was collected through detail chart review and registration book during the study period.

4.9 Data quality assurance

Four data collectors and two supervisors that was hired contras. The data collectors have previous data collection skill. The data collectors was mainly composed of health professionals (BSc nurses and MSc nurses) Data collectors was given 2 days training and closely supervised during data collection and entry.

4.10 Data analysis

Clean up and cross-checking of data was done before analysis. Data was checked for completeness and coded manually and entered to SPSS version 20 for analysis. A descriptive procedure was utilized. Descriptive statistics like percentage, mean, median standard deviation. Tables and graphs will be also used for data presentation.. Binary logistic regression was used to estimate the crude odds ratio of all independent variables on outcome with p-value of <0.25 . And Multiple logistic regression was also be used to estimate the adjusted odds ratio of outcome to control confounders and predict the final predictor at 95% confidence interval and 0.05 level of significance.

4.11 Dissemination of the result

The result of this study was submitted to Addis Ababa University College of Health Sciences Department of Emergency medicine and Department of Pediatrics. The copies of this result will also be given to Tikur Anbessa Specialized Hospital PICU and hospital management so they can use the result for planning and implementation of intervention program, attempt to present in different workshop and Attempt to publish the study in different journals will be made.

4.12. Ethical consideration

The ethical clearance was obtained from Addis Ababa University College of health sciences department of emergency medicine. Additionally confidentiality of all the data to be gained was seriously respected. Confidentiality was ensured by not mentioning patient's names in the questioner.

4.13 Operational definition

Pediatric Intensive care unit is a specialized section of a hospital that provides comprehensive and continuous cares for pediatric who are critically ill and who can benefit from such treatment.

Pediatric age group – refers to 28 days to 12 years of age.

Outcome is something that happens as a result of an activity or process.

Discharge – is any patient who has improved or left against medical advice.

Death – is the cessation of all biological function that sustains an organism.

Disease pattern is concerned with the study of factor determining and influencing the frequency and distribution of disease, injury and other health-related events and their cause in a defined humane population, also the sum of knowledge gained in such study.

Complete patient record file – is any patient file who include most of valuable information about the patient like admission diagnosis, length of stay and outcome of the patient

Incomplete patient record file – is any patient fine who miss valuable information like admission diagnosis, length of stay and outcome of the patient

5: Results

5.1 Socio demographic characteristics of patients admitted in PICU

There were 332 patients admitted to PICU during the study period but in this study 317 patients met the inclusion criteria was included in the study. Among 317 patients admitted in the study period the total admitted patients 50.5% were female. Most of the study subjects were in the age range of less than 1 year 97(30.6%).The mean age of admission was 4.5 ± 3 years. From the study participants, 132 (41.6%) were from Addis Ababa

Table 1: Socio demographic of patient admitted to TASH PICU from Jan 2017- Jan 2019, Addis Ababa, Ethiopia

Characteristics		Frequency	Percent
Age	<1 year	97	30.6
	1 - 2 year	41	12.9
	2 - 5year	79	24.9
	5-11 year	83	26.2
	>11years	17	5.4
Sex	Female	160	50.5
	Male	157	49.5
Address	Addis Ababa	132	41.6
	Oromia	126	39.7
	Amhara	16	5.1
	SNNP	26	8.2
	Others	17	5.4

5.2 Disease pattern

A majority 124(39.1%) were admitted from EOPD, 112(35.3%) a transferred from ward. The mean PICU length of stay was 7.18 ± 9.12 days. Majority (94.6%) of them staying for 1–20 days. The vast majority of patients admitted to PICU 71(22.4%) were due to respiratory problems and 62 (19.6%) neurology diseases. Gastrointestinal disease is least admission diagnosis 10 (3.2%) as shown in Table 2.

Table 2: Admission characteristic of patient admitted to TASH PICU from Jan 2017- Jan 2019, Addis Ababa, Ethiopia

Admission characteristic		Frequency	Percent%
Source of patient admission	Pediatric ward	112	35.3
	NICU	13	4.1
	Emergency	124	39.1
	OR	68	21.5
Admission diagnosis	Renal disease	32	9.8
	Respiratory disease	71	22.4
	Neurology disease	62	19.6
	Cardiac disease	56	17.7
	Hematology disease	12	3.8
	Trauma	35	11
	Gastrointestinal disease	10	3.2
	Other	39	12.3
Length of stay	1-20 days	300	94.6
	21-40 days	12	3.8
	41-60 days	3	0.9
	61-90 days	2	0.6

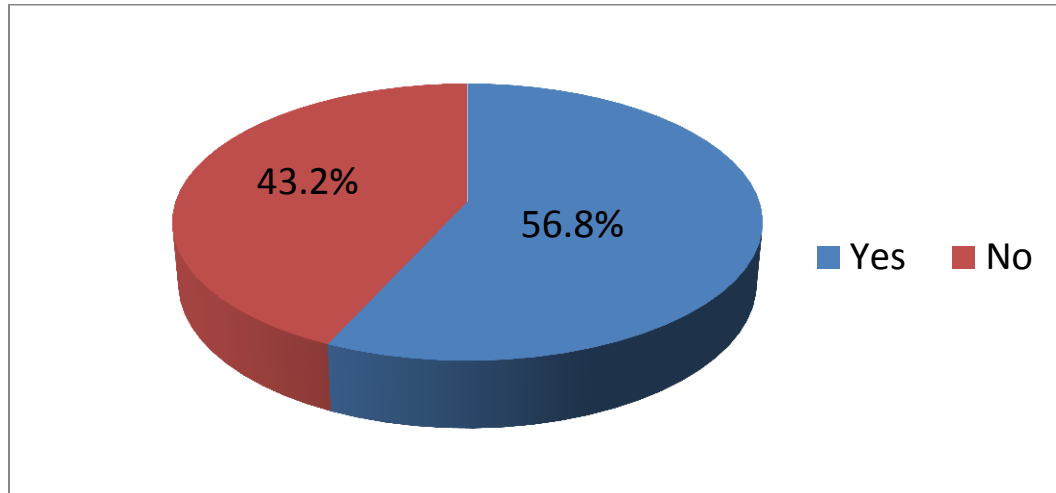


Figure 2. Need for Mechanical ventilator patient admitted in PICU of TASH, from Jan 2017- Jan 2019, Addis Ababa, Ethiopia, 2019.

5.3 Clinical outcome of patient admitted in PICU

During the study period 317pt were admitted in PICU, from these patient 190(59.9%) patients transferred to ward, and the mortality rate is, 125(39.3%) as shown table, as shown in figure.

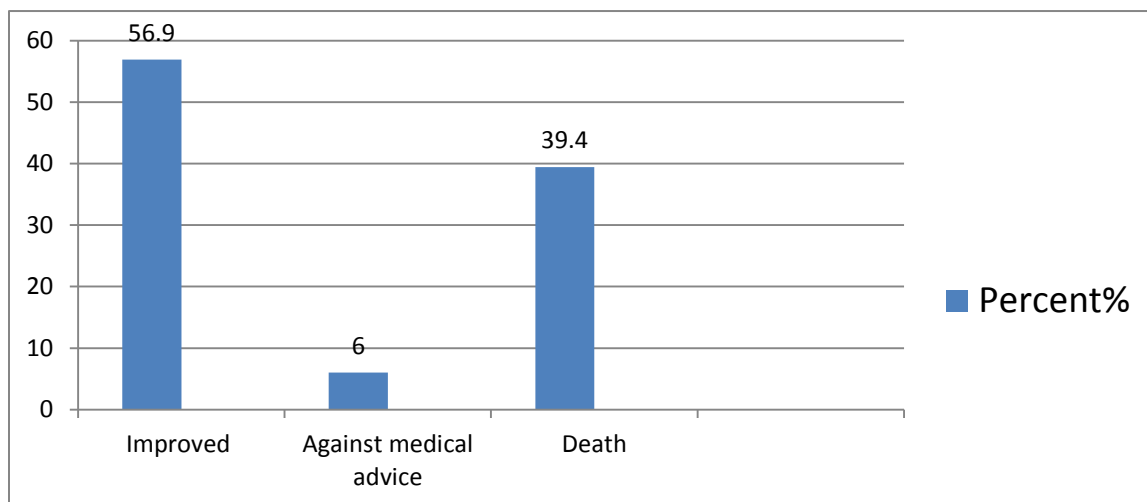


Figure 3 :- Outcome of patient admitted to TASH PICU Jan 2017- Jan 2019, Addis Ababa, Ethiopia, 2019

From the study 180(56%) patients were a candidate for mechanical ventilation and 93(29.3) % of them was died. Study participants with comorbid illness account 36 (11.4%). Mortality was higher in those patients without comorbid illness, 86.4%. The reviled outcome of patients discharged from PICU is 24.2% of respiratory disease followed by 21.6% neurology disease. The main cause of death is cardiovascular disease (25.6%) and respiratory disease (20.0%) shows in figure 3 below.

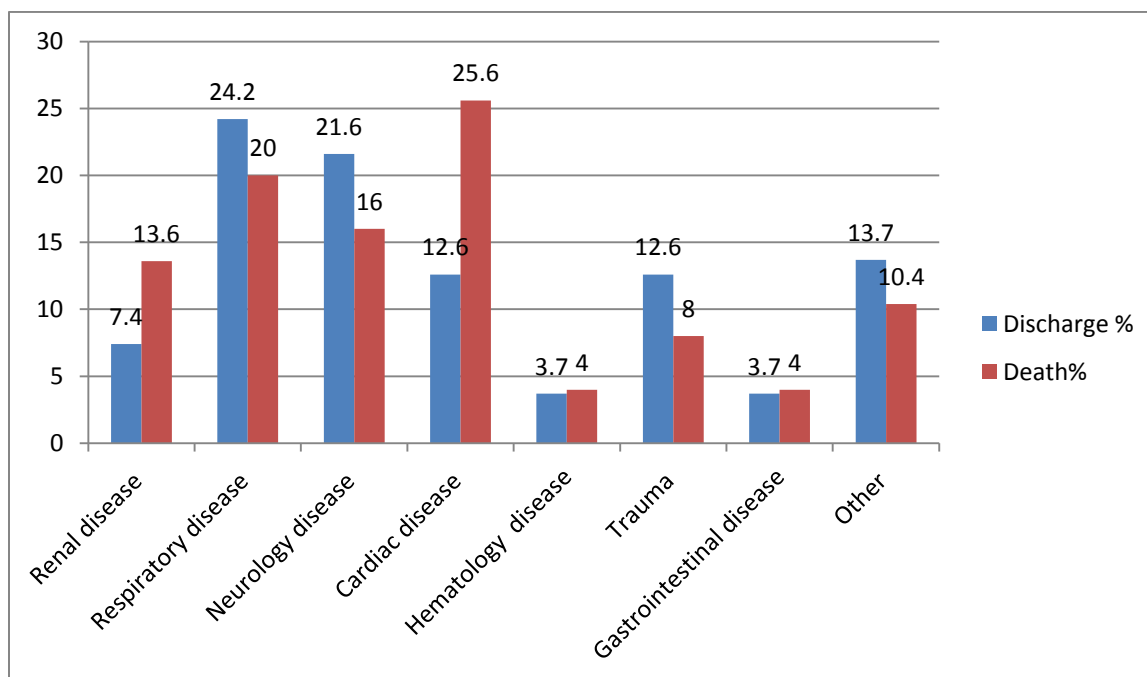


Figure 4:- Outcome of patient related system wise diagnosis patient admitted to PICU of TASH, from Jan 2017- Jan 2019, Addis Ababa, Ethiopia, 2019.

5.4 Factors associated with outcome of patient admitted in PICU

From the independent variable age, sex, address, admission source, admission diagnosis and need for MV were associated with the dependent variable in bivariate logistic regression with P - value of < 0.25 . Admission diagnosis and use for mechanical ventilator has statically significant association with the dependent variable in multivariate logistic regression with P-value of < 0.05 .

Mortality rate was higher in patient who has admission diagnosis of cardiovascular by three times than other system classification AOR 2.869(1.136, 7.248) $P=0.026$. Mortality rate was higher in patient who use mechanical ventilator by four times than who didn't need mechanical ventilator. AOR 3.962(2.320, 6.765) $P=0.000$

Table 3:- Association of characteristics of disease pattern and outcome of admission to TASH PICU from Jan 2017- Jan 2019, Addis Ababa, Ethiopia

Variable	Categories	Death	Discharge	COR(95% C.I)		AOR(95% C.I)	
				P value	n(lower, upper)	P value	n(lower, upper)
Age	<1 year	47 (37.6%)	50 (26%)	0.733	0.836(.298,2.346)	0.476	0.657(.207,2.085)
	1-2 year	15 (12%)	26 (13.5%)	0.253	0.513(.163,.1.611)	0.100	0.348(.099,1.224)
	2.1-5 year	26 (20.8%)	53 (27.6%)	0.125	0.436(.151,1.261)*	0.085	0.358(.111,1.151)
	5.1-11 year	28 (22.4%)	55 (28.6%)	0.141	0.453(.157,1.300)*	0.159	0.434(.136,1.386)
	>11.1 year	9 (7.2%)	8 (4.2%)	0.808	1		
Sex	Female	69 (55.2%)	91 (47.4%)	0.175	1.368(.870,2.150)*	0.158	1.438(.869,2.381)
	male	56 (44.8%)	101 (52.6%)	0.000	1		
address	Addis Ababa	52 (41.6%)	80 (41.7%)	0.744	1.192(.415,3.420)		
	Oromia	51 (40.8%)	75 (39.1%)	0.683	1.247(.433,3.585)		
	Ahmara	7 (5.6%)	9 (4.7%)	0.620	1.426(0.351,5.793)		
	SNNP	9 (7.2%)	17 (8.9%)	0.964	0.971(.269,3.496)		
	Other	6 (4.8%)	11 (5.7%)	0.232	1		

Variable	Categories	Outcome		COR(95% C.I)		AOR(95% C.I)	
		Death	discharge	P value	n(lower, upper)	P value	n(lower, upper)
Admission diagnosis	Renal disease	17(13.6%)	14 (7.3%)	0.061	2.522(.957,6.643)*	0.055	2.800(.977,8.020)
	Respiratory disease	25 (20%)	46 (24%)	0.773	1.129(.496,2.567)	0.919	0.955(.393,2.318)
	Neurological disease	20 (16%)	42 (21.9%)	0.980	0.989(.423-2.312)	0.936	0.963(.386,2.403)
	Cardiovascular disease	32 (25.6%)	24 (12.5%)	0.018	2.769(1.187,6.461)*	0.026	2.869(1.136,7.248)*
	Hematology disease	5 (4%)	7 (3.6%)	0.560	1.484(.394,5.580)	0.536	1.594(.364,6.984)
	Gastrointestinal disease	3 (2.4%)	7 (3.6%)	0.880	0.890(.197,4.012)	0.936	1.070(.204,5.624)
	trauma	10 (8%)	25 (13%)	0.713	0.831(.309,2.231)	0.434	0.652(.224,1.903)
	Other disease	13(10.4%)	27 (14.1%)	0.030	1	0.062	0.265
Use MV	Yes	93 (74.4%)	87 (45.3%)	0.000	3.508(2.144,5.737)*	0.000	3.974(2.316,6.816)*
	No	32 (25.6%)	105(54.7%)	0.000	1		
Comorbid illness	yes	17 (13.6%)	19 (9.9%)	0.312	1.433(.714,2.878)		
	No	108 (86.4%)	173 (90.1%)	0.000	1		
Length of stay in PICU	1-20 days	122 (97.6%)	178 (92.7%)	0.999	1107237324.945(.)		
	21-40 days	3 (2.4%)	9 (4.7%)	0.999	538492469.509		
	41-60 days	0 (0.0%)	3 (3.4%)	1.000	1.000		
	61-90 days	0 (0.0%)	2 (2.3%)	0.999	0.000		
Length of stay in MV	1-20 days	93(100%)	76 (87.4%)	0.999	1976832980.582		
	21-40 days	0(0%)	6 (6.9%)	1.000	1.000		
	41-60 days	0(0%)	5 (5.7%)	0.999	0.000		
Admission source	Pedi ward	45(36%)	67(34.9%)	0.146	1.612(.847,3.069)*	0.273	1.503(.725,3.114)
	NICU	6(4.8%)	7(3.6%)	0.242	2.057(0.614,6.890)*	0.934	1.057(.285,3.929)
	ER	54(43.2%)	70(36%)	0.056	1.851(0.985,3.480)	0.155	1.677(.823,3.419)
	OR	20(16%)	48(25%)	0.001	1		

COR (95% C.I)* $P < 0.25$; AOR (95% C.I) ** $P < 0.05$

6. DISCUSSION

The PICU is a special unit primarily concerned with the care of patients with critical illness and demands a broad-based knowledge to achieve good outcome. Respiratory and cardiovascular is the leading cause of hospital admission and mortality in this study. As a result, knowing the pattern of disease, outcome and cause of death would be essential in bringing change and reduction of burden.

During the 24 months study period, 317 children were admitted to the 4 beds which are not in line with study done in tertiary level PICUs in the other country. Majority of the patients were female (50.5%) a finding different to that of Ayder Referral Hospital and Eastern India (4),(8). The mean ages patient was 4.5 ± 3 years (54.1 ± 36.0 month), the mean age were higher in our PICU than studies done in Greece (54.26 ± 49.93 months) and India (40.01 ± 45.79 months (9, 10). This Maximum number of patients belonged to the age group > 1 year (30.6%) followed by age group of 5 to 11 years (26.2%) this result is less likely similar a study done in Nepal , Maximum number of patients belonged to the age group of 1 month–1 year (31.3%) followed by age group of 1-5 year (21.7%)(14). The mean PICU stay was 7.18 ± 9.129 days with a majority (94.6%) of them staying for 1–20 days, of similar study shows in East India length of stay in the PICU was 3.7 ± 2.5 days (range, 0 - 28 days)(8)

This study revealed that respiratory diseases (22.9%), neurology diseases (19.6%) and Cardiac disease 17.7% were the major causes of admission at TASH PICU were as A study done in in East India shows The three most common disease categories admitted were infectious diseases (20.7%) followed by respiratory diseases (19.1%) and central nervous system diseases (14.3%).(8), In Pakistan study conducted shows The major diagnostic categories of medical patients were neurological (10%), respiratory (10%) and cardiac (8%).(13) and also in study done Nepal shows Respiratory illness (33%), central nervous system disease (18.6%) and infectious diseases (11.3%) were the common diseases requiring PICU admissions(14) This shows respiratory and neurology disease is common admission in TASH PICU.

The Study revealed participants, 180(56%) patients were a candidate for mechanical ventilation and 93(29.3) % of them was dead. Others study in Nepal reveals (17.8%) received mechanical ventilation, of which 23 (56%) survived, 14 (34.1%) died and 4 (9.75) left against medical advice, Out non-ventilated children,(81.4%) improved, (7.9%) died and (7.9%) left against medical advice.(14) also Ayder Hospital Ethiopia result shows 16 (4%) of patients were a candidate for MV, and 3.5% of them were intubated with 35.7% died.(4) This tells there is high need for mechanical ventilator in TASH compared to the other study. This tells there is high need for mechanical ventilator in TASH compared to the other study this may be due to most critically ill pediatric patients who are candidate for mechanical ventilator mostly referred to TASH.

During the study period 317pt were admitted in PICU, from these patient 190(59.9%) patients transferred to ward, and the mortality rate is (39.3%), the main cause of death is cardiovascular disease(25.6%) followed by respiratory disease(20.0%), were as in Pakistan is shows There were 45 deaths giving overall mortality of 14%. The patients (23/45) transferred from ward (13), in Nepal Out of 230 admitted children, (12.6%) died, (8.2%) left against medical advice and (2%) were referred to other centers.(14)

Mortality rate was higher in patient who has admission diagnosis of cardiovascular by three times than other system classification AOR 2.869(1.136, 7.248) P=0.026.

Mortality rate was higher in patient who use mechanical ventilator by four times than who didn't need mechanical ventilator. AOR 3.962(2.320, 6.765) P=0.000 which is comparable with a study done in Ayder hospital that shows Patients used MV were at 17.6 times increased risk of mortality patients than those who did not need MV (4) this might be lack of adequate knowledge and practice on mechanical ventilator with in the health professional and the hospital fails to provide guideline how to use mechanical ventilator.

Age and gender were not statistically significant risk factors for mortality this is also in line with study done in Ayder hospital that shows Age and gender were not statistically significant risk factors for mortality(4).

7. Conclusion

Respiratory, Neurology and cardiac disease were the predominant conditions leading to PICU admissions in our setting. Mean length of stay is 7.18 ± 9.12 days and 56.8% of patients used mechanical ventilator. The mortality rate of mechanically ventilated pediatric patients in Tikur Anbesa specialized hospital was high (51.7%).

Mortality rate was higher in patient who has admission diagnosis of cardiovascular by three times than other system classification. Mortality rate was higher in patient who use mechanical ventilator by four times than who didn't use mechanical ventilator. So this can be due to severely limited infrastructure, few trained professional and resource, make it difficult to provide optimum care to critically ill patient and likely to contributing to the outcome of high mortality rate so the concerned bodies must give special attention to solve the problem.

8. Recommendation

The Federal Ministry of Health must also consider expanding PICU in the country to address critically ill patients.

Tikur Anbessa Teaching Specialized Hospital should work more on PICU providing a high-quality intensive care through ongoing training and support focusing on cardiovascular diseases and mechanical ventilator use.

The ICU directorate should work to provide quality care to critically ill patient and work on the contributing associated factor for outcome of mortality.

9. Limitation of the study

Since this study is a retrospective study use of secondary data is an obligation. This limits the quality of data that were collected. The record taking and keeping seems very unsatisfactory and the register books did not contain enough information. In patients' medical record card some files and information were missing, like reason for admission was not clearly stated.

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Annex I

Hospital Consent Form

This is a study that will be conducted in Tikur Anbessa specialized hospital, the main referral specialty hospitals for treatment of critical, medical, surgical, pediatrics and oncology problems in Ethiopia. The main objective of this study is to assess the pattern of disease and outcome of patient admitted at PICU department of this hospital. The results of the study will be used as a basis to improve the quality of care offered to patients admitted good outcome and to PICU. The information will be shared among the hospital. Therefore, the hospital's participation and collaboration is very much helpful in generating the required information and will be very much appreciated.

In this study, data will be collected from the patients' medical record cards retrospectively. Information regarding any specific personal identifiers like the name of the clients will not be collected and information generated will be disclosed in totality. In addition, confidentiality of any personal information will be maintained throughout the study process and no unauthorized access to the information is allowed. Finally, the hospitals have all the right to refuse to participate in this study at any time. If you have any questions or need further information regarding the planned study, you are free to get clarification from the principal investigator, from the institution, or through the following address. Yafet Noah, telephone-0913148686 (principal investigator). Therefore, if you would like to participate in this study, would you please confirm it by signing here? Thank you very much.

Participant Hospital----- principal investigator-----

Annex II

- DATA COLLECTION SHEET DISEASE PATTERNS AND OUTCOME OF PATIENT ADMITTED INTO PEDIATRIC INTENSIVE CARE UNIT (PICU) AT TIKURANBESA SPECIALIZED HOSPITAL ADDIS ABABA, ETHIOPIA DATA COLLECTION SHEET:

Part I Socio demographic patient data

Date

Patient ID number..... Study number

1. Age ____

2. Sex 1) Female 2) Male

3. Address of the patient

1. Addis Ababa 2.Oromia 3.Amhara 4.SNNP 5.Others

Part II. PATTERN FOR DISEASE

1. Admitted to PICU from

A. pediatric ward from TASH B. NICU from TASH C. pediatric ER from TASH

2. Reasons for admission to PICU

1. 2.....

3.....

3. Admission diagnosis _____

4. Co-morbidity 1.No 2. Yes

5. Date of admission in PICU -----//-----//--- (DD/MM/YY)

6. Date of transfer ----//---//--- (DD/MM/YY)

7. Length of stay in PICU_____

8. Used mechanical ventilator Yes No

9. Length of stay on mechanical ventilator _____

Part III .OUTCOME

1. Patient outcome

- A. Discharged from PICU
- B. Referred to another health facility
- C. Left without medical advice
- D. Death