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

THE PATTERN AND SHORT TERM FUNCTIONAL STATUES OF PATIENT DISCHARGED/TRANSFERRED FROM PICU AT TASH IN ADDIS ABABA,ETHIOPIA 1-YEAR PROSPECTIVE STUDY, 2024 GC

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ADDIS ABABA, ETHIOPIA

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A RESERCH PAPER SUBMITTED TO THE DEPARTMENT OF PEDIATRICS AND CHILD HEALTH OF ADDISABABA UNIVERSITY IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE SPECIALITY CERTIFICATE IN PEDIATRICS AND CHILD HEALTH

FEBRUARY, 2024 GC

ADDIS ABABA, ETHIOPIA

Declaration

Title: pattern and short term functional statues of patient discharged/transferred from PICU at TASH in Addis Ababa, Ethiopia:

A 1- Year CROSS SECTIONAL Study, 2024GC

Name of the Principal Investigator: Tigist Mehandis (MD, pediatrics and child health resident)

A. Declaration by the Student

I do hereby declare that this research is submitted for the partial fulfillment of the requirements for the Specialty Certificate in Pediatrics' and Child Health.

Also, I do declare that a complete list of references is provided indicating all the sources of information quoted or cited.

Name and signature of student_____2024 G.C

B. Authority to submit the thesis

Name of Advisor: _____

In my capacity as an advisor, I do hereby authorize the student to submit this research. Signature of the Advisor: _____2024 G.C.

ACKNOWLEDGEMENTS

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Contents

List of table and figure

ABREVIATIONS & ACRONYMS

CNS.....…...Central nervous system

ETB……Ethiopian birr

PICU……..Pediatrics Intensive Care Unit

OS……...Overall survival

FSS……..Functional status scale

LOS……..length of stay

PI…….Principal investigator

SPSS……Statistical Package for Social sciences

ABAS II…….Adaptive Behavior Assessment Systems ,second edition

Abstract

Back ground: An intensive care unit (ICU) is a specially staffed, equipped, and separated area in a hospital dedicated to managing patients with life-threatening illnesses. The major causes of under-five mortality in developing countries are often preventable and curable diseases, provided the care is optimized (WHO). Pediatric Intensive Care Units (PICUs) play a crucial role in reducing child mortality by providing specialized care to critically ill children.

Objective: This study aims to determine the patterns and short term functional status of patients discharged or transferred from the Pediatric Intensive Care Unit (PICU) at Tikur Anbessa Specialized Hospital (TASH), Addis Ababa, Ethiopia, during the year 2024 GC.

Methods: A facility-based prospective cross-sectional study conducted at Tikur Anbessa Specialized Hospital. The study included children admitted to the PICU and discharged between February 1, 2024, and February 1, 2025 GC. Data collection involved reviewing medical records and conducting interviews with parents, children, and caregivers of discharged patients. Collected data included demographic information, admission and discharge diagnoses, length of stay (LOS), interventions received, outcomes and functional statues scale at discharge. Data was entered and analyzed using SPSS version 26. Descriptive analysis was used to summarize the data, including frequencies, percentages, means, and standard deviations. Multivariable logistic regression was used to identify factor associated with functional impairment at discharge. A p-value <0.05 considered statistically significant. Results were presented using tables and figures to illustrate the findings.

Results: The sample consisted of 85 individuals, 54.6% of which were male, with a mean age of 39.44±44.87 months. The overall score of the Functional Status Scale was 13.5[12 - 16.5], and the highest scores were observed in the “motor function” 4 [3 - 4] and “feeding4 [1 - 4] domains. Compared to patients who were not readmitted to the pediatric intensive care unit, patients who were readmitted presented a worse overall score ($p = 0.001$), worse scores in the “motor function” ($p = 0.007$), “feeding” ($p = 0.011$).and “respiratory” domain showed a trend toward worse scores ($p = 0.055$) domains. The most common pattern for admission was a septic shock (28.24%), while Guillian-Barre Syndrome (GBS) was least common (2.35%). The overall PICU mortality was 43.8%. Moreover, mechanical ventilation need Ventilation (COR=11.084, 4.25-28.87, 95%CI :P<0.001),need for inotropic agents (COR= 11.42, 6.72-19.26, 95%CI: P<0.001) comorbidity diseases (COR= 12.53, 7.55-20.79, 95% CI :P=0.001), length of PICU stay from 2 to 7days (COR=2.91, 1.38-5.18, 95%CI: P=0.005) and severe GCS (<8) COR=28, 14.23-55.28, 95%CI :P<0.001) those variables significantly associated with mortality.

Conclusion: The overall mortality rate of at PICU was higher than the study done in different countries of the world. Evaluation of the functional status using the Functional Status Scale indicated moderate

impairment in patients after discharge from the pediatric intensive care unit, mainly in the “motor function” and “feeding” domains; patients who were readmitted to the pediatric intensive care unit demonstrated worse overall functional, motor function, feeding and respiratory scores.

CHAPTER ONE

1. INTRODUCTION

1.1 Back ground

A Pediatric Intensive Care Unit (PICU) is a specialized area within a hospital where critically ill children with life-threatening conditions receive advanced medical care (1). Admission to an intensive care unit (ICU) is often required for patients experiencing hemodynamic instability, requiring frequent monitoring of vital signs, invasive hemodynamic monitoring, rapid titration of intravenous medications, and respiratory support. Such care can significantly improve the quality of treatment and outcomes for critically ill and injured patients, particularly in high-resource settings (2).

In developing nations, critical care practice is challenging due to health needs frequently exceeding available resources. Many critical healthcare institutions in these regions are still in their early stages of development (3) . Patterns of admission and treatment outcomes in the PICU vary globally. Common reasons for pediatric PICU admissions include trauma, postoperative treatment, complicated meningitis, cardiovascular and neurological conditions, acute respiratory distress syndrome (ARDS), and septic shock (4).

ICU outcomes are influenced by several factors, including the patient's clinical condition at admission, age, comorbidities, level of pre-hospital and emergency trauma care, and specific factors noted during ICU admission such as the use of mechanical ventilation, level of consciousness, duration of ICU stay, and complications like circulatory and ventilator-related respiratory issues (5) .

In many African countries, the shortage of basic healthcare facilities leads to a distinct continuum of clinical problems. The pattern of ICU admissions in sub-Saharan Africa varies significantly by country and region (6). Mortality rates for critically ill patients in resource-limited ICUs are often high due to a lack of skilled personnel, equipment, and supplies. According to the WHO, major causes of death among children under five in developing countries are preventable and treatable diseases, provided that treatment is optimized. Well-equipped and staffed intensive care units can reduce mortality rates by 15–60% (7) (8) (9) (10) (11) (12).

1.2 Statement of the problem

The Pediatric Intensive Care Unit (PICU) plays a critical role in managing severely ill children who require intensive monitoring and advanced medical interventions. Despite improvements in PICU survival rates, there is limited data on short-term functional out comes of patients post-discharge, particularly in resource limited settings.

A crucial yet underexplored aspect of PICU care is the development of functional impairments acquired during PICU stay and their impact on short-term recovery post-discharge. These impairments may include physical disabilities, cognitive impairments, and other health issues that affect the child's quality of life and overall development. It is also essential to explore how various characteristics of the PICU illness, such as the severity of the condition, types of interventions, and duration of the PICU stay, influence these outcomes.

In low resource settings like Ethiopia, where healthcare resources are limited and PICUs are still developing, the lack of comprehensive data on these aspects further compounds the challenge. Without detailed insights into how PICU care affects short-term outcomes, it is difficult to optimize care practices and improve the quality of life for discharged patients.

This study aims to provide a detailed analysis of the patterns of PICU admission and short term functional outcomes of discharged patients at Tikur Anbessa Specialized Hospital (TASH). It examines the functional morbidities developed during the PICU stay and how these are associated with the patient's condition prior to admission and characteristics of the illness and treatment received.

1.3 Significance of the Study

This study is essential in addressing a critical gap in the literature regarding the short-term outcomes of pediatric patients discharged from PICUs in low-resource settings. By examining functional morbidities acquired during PICU stay and their relationship with baseline conditions and PICU characteristics, this study provides valuable insights that are currently lacking in the Ethiopian context. Understanding the functional statues of PICU patients post-discharge will help to inform and improve clinical practices. This knowledge can guide healthcare providers in developing targeted interventions and follow-up care strategies to address and mitigate new functional morbidities.

The findings of this study were instrumental in shaping health policies and resource allocation for pediatric critical care. By highlighting the specific needs and outcomes of PICU patients, the study supported the development of more effective and resource-efficient care models in Ethiopia and similar settings.

Additionally, this study contributed to the global knowledge on pediatric critical care by providing data from a low-resource setting. This helped in comparing outcomes across different regions and understanding the broader

implications of PICU care on short-term functional status. Ultimately, this study aims to improve the quality of life and outcomes for pediatric patients in PICUs by identifying and addressing the factors that contribute to functional morbidities. This knowledge will enhance the overall effectiveness of PICU care and supports the development of better care strategies for critically ill children.

1.4 Literature Review

Prospective cohort study at Centre Hospitaller Universitario Sainte-Justine followed 132 children admitted to PICU for greater than or equal to 4 days or requiring greater than or equal to 2 days of invasive ventilation, from October 2018 to September 2020 (13).

At 2 months the follow-up pediatric intensivists assessed the children. They were asked to fill out validated questionnaires.

The most common PICU diagnoses were respiratory illness (40.9%), head trauma, and septic shock (7.6%). Average length of PICU stay was 28.5 ± 84.2 days (median 7 d). Sixty-one percent were intubated. Symptoms reported by families were as follows: fatigue (9.9%), sleep disturbances (20.5%), feeding difficulties (12.1%), and voice change and/or stridor (9.8%). Twenty-one percent of school-aged children reported school delays. Twenty-seven children demonstrated communication delays, 45% gross motor function delays, 41% fine motor delays, 37% delays in problem-solving, and 49% delays in personal-social functioning. Quality of Life scores were 78.1 ± 20.5 and 80.0 ± 17.5 for physical and psychosocial aspects, respectively. Fourteen percent of parents reported financial difficulties, 42% reported symptoms of anxiety, 29% symptoms of depression. PICU survivors and their families experience significant physical and psychosocial morbidities after their critical illness. PICU follow-up is crucial to determine the outcome of these children and develop interventions (13).

A study from the Trichotomous Outcome Prediction in Critical Care cohort assessed long term functional status. Long-term functional status was measured with the Functional Status Scale and categorized by comparison to hospital discharge Functional Status Scale. Improvement or new morbidity was based on a change in Functional Status Scale of greater than or equal to 2 in a single domain. Overall, 56% (n = 71) improved, 15% (n = 19) did not change, 9% (n = 11) developed a new morbidity, and 21% (n = 26) died. The shortest median follow-up time from PICU discharge was 1.4 years for those who died and the longest was 4.0 years for those improved. Functional status at baseline (pre-acute illness) was different among the outcome groups with those that improved having the highest frequency of baseline normal status or only mild dysfunction. Of the long-term survivors with improvement, 82% (n = 58) improved to normal status or mild dysfunction, 11% (n = 8) improved to moderate dysfunction, and 7% (n = 5) improved to severe dysfunction. Trauma patients improved and cancer patients died more frequently than other diagnoses. The long-term outcome groups were not associated with hospital discharge functional status.

A majority of PICU survivors discharged with significant new functional morbidity with follow-up after 6 or more months improved, many to normal status or only mild dysfunction, while 29% died or developed new morbidity. Of the long-term survivors, 70% had significant improvement after a median follow-up time of 4.0 years (14).

This study aimed to assess the admission pattern, outcomes, and associated factors of patients admitted to the PICU of St Paul's Hospital Millennium Medical College, Addis Ababa, Ethiopia.

Institutional-based cross-sectional study was done. Data was collected through chart abstraction from patients admitted to the PICU between January 2017 and December 2018. SPSS 20.0 was used to analyse the data. Descriptive statistics, cross-tabulations, and logistic regressions were used.

A total of 260 pediatric patients were analysed. The mean age at admission was 48.13 ± 53.65 months, with M: F ratio of 1.4:1. The mean and median duration of PICU stay was 7.26 ±6.87 days, and 6.0 days respectively. The

most commonly affected organ systems were the central nervous system (79, 33.2%) and respiratory system (55, 23.1%). Mechanical ventilation and admission after cardiopulmonary resuscitation ($p < 0.001$) were independent predictors of mortality. Infectious causes of illnesses were the leading causes of admission and death in the PICU. The mortality rate of our PICU was 21.1 %. In this study, post-cardiopulmonary resuscitation admission and use of mechanical ventilation were statistically significant predictors of mortality indicating the need for well equipping and staffing the PICU to improve the outcome of such critically sick patients. (15)

1.5 conceptual frame works

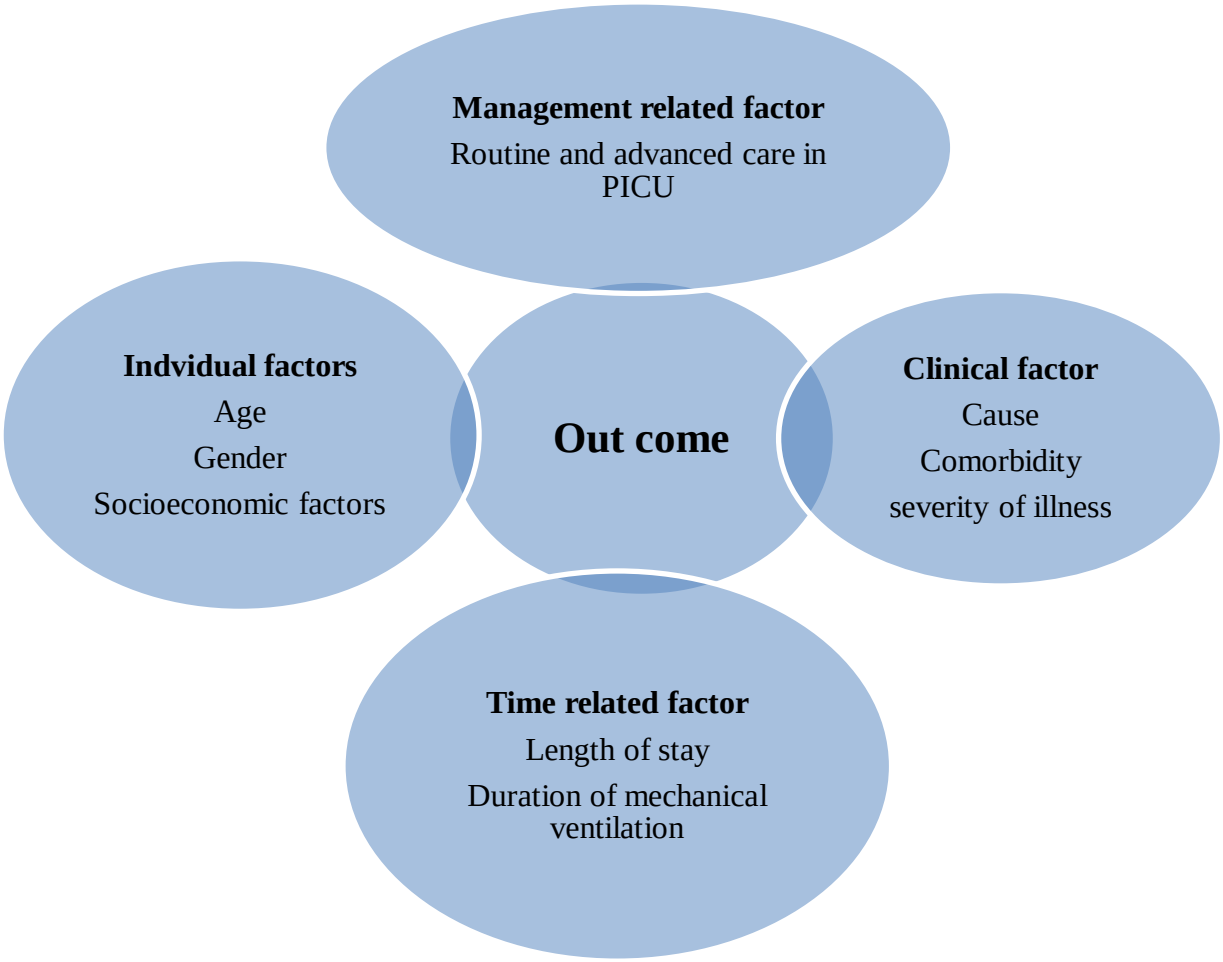

Figure 1conceptual frame works

CHAPTER TWO

2. OBJECTIVES

2.1 General objective

To analyze the patterns and functional status of patients discharged or transferred from the Pediatric Intensive Care Unit (PICU) at Tikur Anbessa Specialized Hospital (TASH), Addis Ababa, Ethiopia, during the year 2024 GC.

2.2 Specific Objectives

1. To characterize the patterns of patient discharge or transfer from the PICU at TASH.
2. To evaluate the outcomes of patients discharged or transferred from PICU at TASH.
3. To identify and analyze factors associated with the outcomes of patients discharged or transferred from the PICU at TASH.

CHAPTER THREE

3. METHODS AND MATERIALS

3.1 Study Setting

The study conducted was at Tikur Anbessa Specialized Hospital (TASH), the largest tertiary hospital in Addis Ababa, Ethiopia. TASH has over 800 beds distributed across various departments, including surgical, gynecology and obstetrics, internal medicine, pediatrics, and emergency services. The pediatric Intensive Care Unit (PICU), where this study was conducted, has six beds and provides specialized critical care for critically ill pediatric patient. TASH serves an estimated 400,000 to 500,000 patients annually, with the pediatrics department alone managing approximately 14,660 patients per year. The pediatrics department has a total of 183 beds, and an average of 1221 pediatric patients are admitted each month across all units..

3.2 Study Period

Data collection was conducted from February 2024GC to February 2025 GC. The study include pediatrics patients discharged or transferred from the PICU, as well as data obtained from their caregivers and medical records.

3.3 Source population

All pediatric patients admitted to the PICU at TASH.

3.4 Study population

All patients discharged /transferred from PICU during study period who meet inclusion criteria.

3.5 Study Design

The study used an institutional-based prospective cross-sectional design. This approach allowed for the examination of patient functional status and clinical outcomes at point discharge or transfer from the PICU.

3.6 Sampling Technique

All patients meeting the inclusion criteria and discharged or transferred from the PICU during the study period were including in the study.

3.7 Sample Size Determination

The sample size determined using a standard formula for estimating sample sizes in cross-sectional studies:

$$n = \frac{Z^2 \times P \times (1 - P)}{d^2}$$

Where:

- ✓ Z = 1.96 (Z-value for a 95% confidence level)
- ✓ P = 0.054 (prevalence estimate from previous studies)
- ✓ d = 0.05 (margin of error)

Substituting these values:

$$n = \frac{1.96^2 \times 0.054 \times (1 - 0.054)}{0.05^2} = 78$$

Adding a 10% adjustment for non-response: Adjusted Sample Size=78 + (0.10×78) = 85

3.8 Inclusion and Exclusion Criteria

3.8.1 Inclusion Criteria

Critically ill pediatric patients (both genders) admitted to and discharged or transferred from the PICU at TASH during the study period.

3.9 Exclusion Criteria

Patients with incomplete data or lost medical records. Patients who died in the PICU.

3.10 Operational Definition

Clinical outcome

Refers to whether a patient survived or died within 3 month of discharge.

Survived

Those transferred to pediatric ward or discharged.

Non-survived

Patients who died within three months of post-discharge.

Left against medical advice

Those left against medical advice after being transferred to ward.

Referred

Those transferred to another hospital after being stabilized in the pediatric ward.

Length of ICU Stays (LOS)

A period in hours, days, or months the patients stayed in ICU from admission to discharge time.

ICU Intervention: lifesaving treatment provided in the PICU.

ICU Mortality: was calculated as the number of deaths of patients given particular diagnoses divided by the total number of PICU admission.

Comorbidity/coexisting disease-chronic or long term conditions more than one disease or condition is present in the same person at the same time.

Short term: within three months post -discharge.

Functional statues scale: standardized tool to evaluate functional status across six domains.

Meningitis –clinical criteria (sign and symptoms) fever>38^0c, headache, altered mentation, neck stiffness and laboratory findings (elevated WBC, or positive CSF culture).

Sepsis - strong clinical suspicion of infection, organ dysfunction and/or laboratory confirmed of sepsis.

3.11 Data Collection and Measurements

A structured questionnaire incorporating functional status scale was used to collect the data from patients' attendants and from chart review. Patient discharged from PICU in the study period were enrolled, and there functional statues evaluated within 3 months post- discharge. A Pilot study was conducted on 10 patients to refine of the questionnaire. These subjects not included in the study results. Findings from the pilot study utilized to modify questions on the standard questionnaire if necessary. The data collector was principal investigator.

3.11.1 Data Handling

The collected data was cleaned, stored and checked for completeness and internal consistency. The soft copies of the data stored on the hard drive and backup copy stored on separate drives. Hard copies were stored securely to ensure confidentiality.

3.11.2 Data Quality Assurance

During data collection, regular quality checks were made in order to promote and confirm quality and completeness by the primary investigator. Any incomplete or inconsistent data was verified and corrected.

3.11.3 Data Analysis and Interpretation

After data cleaning and entry, analysis was done using the Statistical Package for Social Sciences version 26 (SPSS). Descriptive analysis like mean, standard deviation, frequency and percentage were used to present result. To determine factor associated with functional status logistic regression were used. Statistically significant association was taken for p -values < 0.05.

3.12 Ethical consideration

Ethical Clearance was obtained from Addis Ababa University, College of health sciences, and department of pediatrics and child health research and publication committee. Both written and verbal permissions were secured to undertake the study from Tikur Anbessa Specialized Hospital pediatric intensive care unit. All the study participants were informed about the objective and importance of the study and their informed consent was obtained before conducting data collection. They were also informed about their right of not participating in the study or drop from a study at any time. Privacy and confidentiality of the information was kept and the data was collected anonymously.

3.13 Dissemination of Findings

The result of the study will be presented on the research defense day and a formal report will be submitted to the Department of Pediatrics and Child Health. The research output will also be published in local or international peer-reviewed scientific journals and will be shared with the hospital, and governmental agencies to allow for improvements and to provide essential care and support for children discharge from the PICU.

CHAPTER FOUR

RESULTS AND DISCUSSION

4.1 Socio-demographic and clinical characteristic of pediatric patients admitted to PICU of Tikur anbessa specialized hospital

A total of 85 charts were reviewed 46 (54.6%) males male to female ratio were 1.12:1.The median length of PICU stay was 3 days. The mean age at admission was 39.44±44.87 months. Pediatric ward took the high source of PICU admission 31(36.3%) followed by emergency pediatric ward 25(29.1%), operation room 21(24.9%), Surgical ward 4(5%), and recovery room 4(4.7%). Of all 75(88.1%), were admitted for the first time while 10(11.9%) of patients were readmitted to PICU. The majority of the pediatric patients stay in PICU for 1-7 days. Thirty seven 43.8% were died; from these, 20(23.27%) were males and 17(20.23%) were females. From the total study participant 80% of patient come from different regions and 20 % of them are from Addis Ababa. Around 15 % of parents were not attending formal education. The rest 85% of the participants had medium to high income.

Table 1 Socio-demographic characteristics and outcomes of pediatric patients admitted to PICU of TASH from February 2024GC to February 2025 GC (n=85)

Variable	Admission	Survive	Death
Age:			
Birth-1 Month	18(21.34%)	8(9.7%)	10(11.64%)
1 Month-2 years	28(32.68%)	18(20.2 %)	11(12.48%)
2 Years-12 years	39(45.98%)	22(26.3%)	17(19.68%)
Total	85(100%)	48(56.2%)	37(43.8%)
Gender:			
Male	46(54.6%)	27(31.31%)	20(23.27%)
Female	39(45.4%)	21(24.93%)	17(20.50%)
Total	85(100%)	48(56.2%)	37(43.8%)
Address			
Tigiray	5(5.9%)	4(4.71%)	1(1.18%)
Afar	2(2.35%)	2(2.35%)	0(0%)
Amhara	13(15.3%)	5(5.88%)	8(9.41%)
Oromia	17(20%)	9(10.59%)	8(9.41%)
Somalia	8(9.4%)	5(5.88%)	3(3.53%)
SNNP	9(10.6%)	7(8.24%)	2(2.35%)
Benishangule gumze	3(3.53%)	2(2.35%)	1(1.18%)
Gambela	2(2.35%)	0(0%)	2(2.35%)
Harari	4(4.71%)	3(3.53%)	1(1.18%)
Addis abeba	20(23.51%)	10(11.76%)	10(11.76%)
Dire dawa	2(2.35%)	1(1.18%)	1(1.18%)
Total	85(100%)	48(56.2%)	37(43.8%)

Length of ICU stay			
Less than 2 days	11(13.02%)	6(7.48%)	5(5.54%)
2-7 days	30(35.46%)	15(17.72%)	15(17.72%)
7-14 days	24(27.98%)	14(16.06%)	10(11.91%)
14-28days	9(10.52%)	4(5.26%)	4(5.26%)
Greater than 28 days	11(13.02%)	8(9.70%)	3(3.32%)
Total	100%	48(56.2%)	37(43.8%)

Occupation	**N%**
Public servant	35(41%)
Private worker	20(23.5%)
Farmer	20(23.5%)
House wife	10(12%)
Total	85(100%)

Educational statues	**N %**
No formal learning	13(15.3%)
Below high school	16(18.8%)
9^{th} -12^{th}	17(20%)
College diploma	25(29.4%)
University degree and above	14(16.5%)
Total	85(100%)

Monthly income	N %
<5000 birr	13(15.3%)
5000-10000 birr	29(34.1%)
10000-15000 birr	28(33%)
>15,000 birr	15(17.6%)
Total	85(100%)

4.2 Diagnosis at Admission

From our result the common reason of admission in our setup were septic shock 24(28.24%), meningitis 16(18.82%), CVD 10(11.76%), post-operative 8(9.41%), sever pneumonia, 5(5.88%), UAO 4(4.71%), TBI 4(4.71%), ARDS 4(4.71%), Cardiogenic shock 3(3.53%), AGN 3(3.53%) , GBS 2(2.35%), and Asthma 2(2.35%).

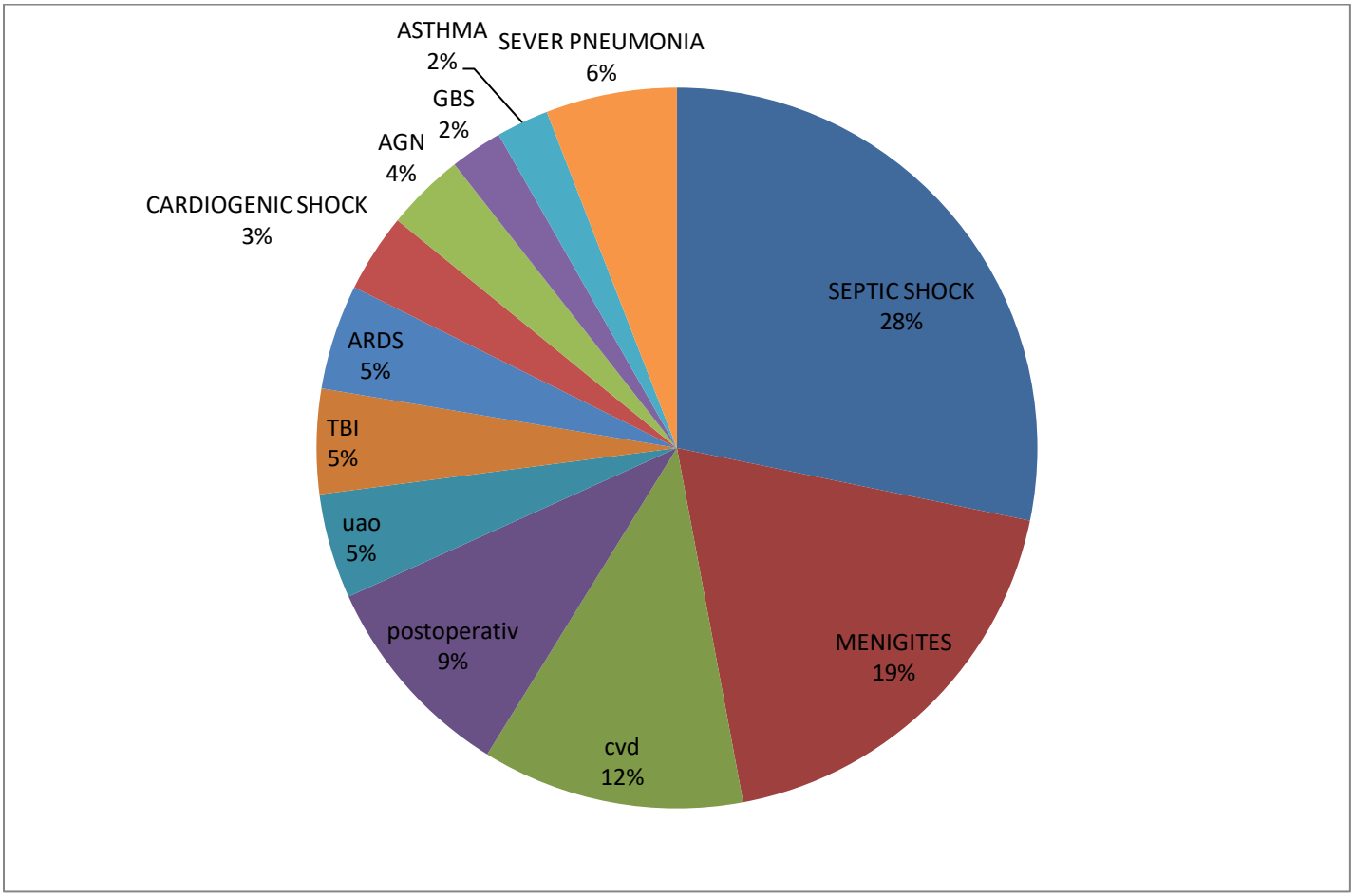

Figure 2 , Admission diagnosis of pediatrics patients admitted to PICU of Tibur Anbessa Specialized Hospital from February 1, 2024 to February 1, 2025 GC (n=85)

4.3 Common Cause of Death

In the current study the common cause of death were septic shock 15(17.14%), meningitis 10(11.76%), CVD 6(6.65%), post-operative 2(2.22%), severe pneumonia 0 (0.00).

Table 2 Top five causes of admission and outcomes among pediatric patients admitted to the PICU of Tikur anbessa specialized hospital from February 2024GC to February 2025 GC (n =85).

Causes of Admission	**Admission %**	**Death%**	**Case fatality**
Septic shock	24(28.24%)	15(17.45%)	62.5%
Meningitis	16(18.56%)	10(11.36%)	61.25%
CVD	10(12.19%)	6(6.65%)	60%
Post-operative	8(9.42%)	2(2.22%)	25%
Severe pneumonia	5(6.09%)	0(0.00%)	0

4.4. Nutritional status

The nutrition status is as shown below 13(15.29%) of the patients was under normal diet condition and 31(37.29%) of the patients was under moderate condition and the rests was in the malnutrition condition.

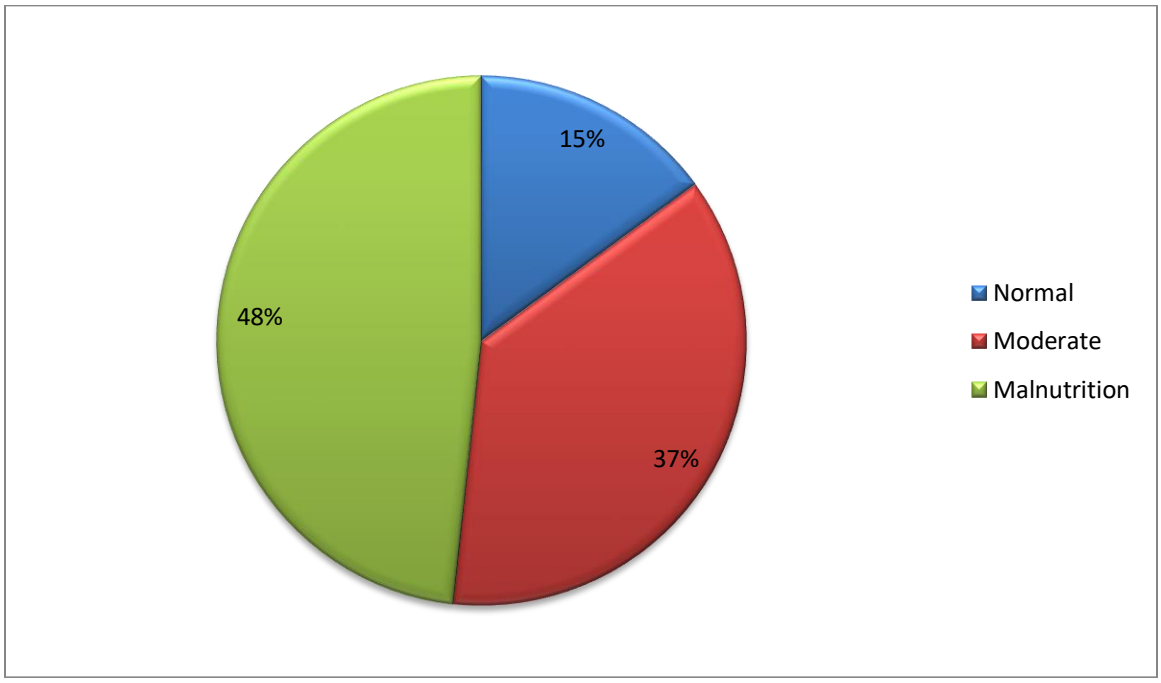

Figure 3nutritional statues of pediatrics patients admitted to PICU of Tikur Anbessa Specialized Hospital from February 1, 2024 to February 1, 2025 *GC (n=85)*

4.5. Clinical outcome on discharge from PICU

Among pediatric patients admitted to PICU of Tikur anbessa specialized hospital 50.69% were improved and transferred to the wards, 43.8% have died, 3.60% were left against medical advice and 1.9% was referred to other hospitals.

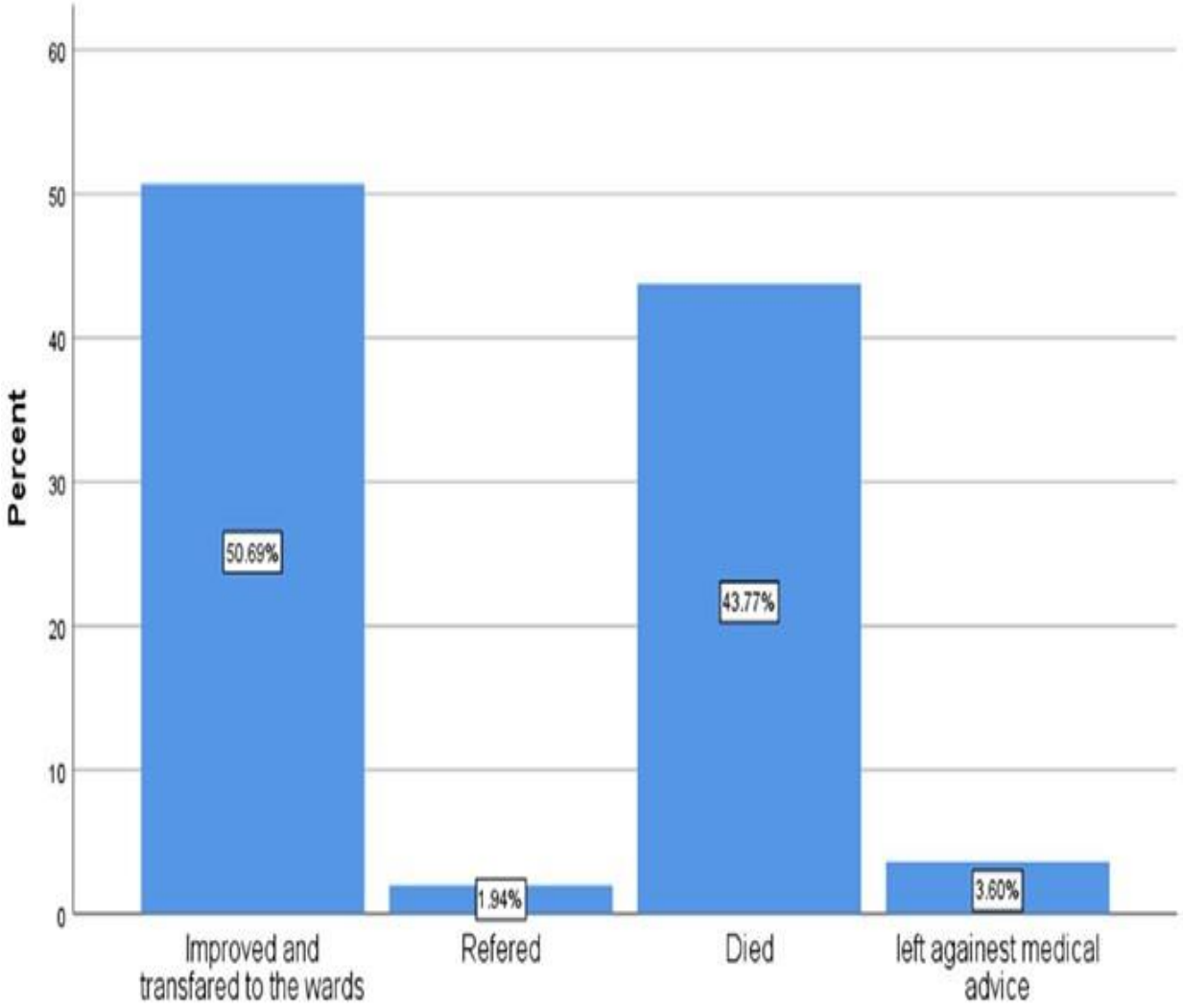

Figure 4 clinical out come on discharge of pediatrics patients admitted to picu of Tikur anbessa specialized hospital from February 1, 2024 to February 1, 2025 GC.

CHAPTER FIVE

5. FACTORS ASSOCIATED WITH MORTALITY

5.1 Results of Bivariate Analysis

The mortality rate was 6 times higher in septic shock (COR=5.85, 2.39-14.30, 95%CI, P<0.001), 5 times higher in meningitis (COR=5.12, 2.01-13.02, 95% P=0.01), and about 4 times higher in CVD (COR=3.90, 1.44-10.49, 95%CI P=0.007) than those who were admitted to PICU from the operation room.

Mortality was 3 times higher in patients stay in PICU for 2-7 days (COR=2.91, 1.38-5.18, 95%CI P=0.005), than patients who were staying in PICU for greater than 28 days. Death was more likely increased by 28 times in study participants with a severe level of consciousness (GCS<8) (COR=28, 14.23-55.28, 95%CI P<0.001) and 4 times in moderate level of consciousness (GCS, 9-12) (COR=3.39, 1.89-6.07, 95%CI P<0.001) more likely higher than participants with a mild level of consciousness.

The odd of death of pediatrics with co-existing diseases admitted to PICU of TASH 42 (49.03%) with the coexisting disease was 12.5 times higher than those without coexisting diseases (COR= 12.53, 7.55-20.79, 95% CI, P=0.001). Regarding patients needed for mechanical ventilation 49(57.89%) were requiring mechanical ventilation. Mortality was 18 times more likely to happen in those patients who were requiring mechanical ventilation. Concerning needed for Inotropic patients who required inotropic (COR= 11.42, 6.72-19.26, 95%CI P<0.001) had approximately 11.5 times higher mortality rate than those who did not require inotropic during PICU stay.

5.1.1 Results of multivariate analysis

The findings of a bivariate binary logistic regression study show that moderate and severe GCS, admission diagnosis (septic shock, meningitis, and cardiovascular disease), length of PICU stay, comorbidities, need for mechanical ventilation, and need for inotropic were associated with mortality.

Patients who were staying in PICU for 2-7 days (AOR=7.3, 1.73-30.55, CI=95%, p=0.007) had 7 times more likely to die than those who stay in PICU for greater than 28 days. Death was increased by 10 times in study participants with a lower level of consciousness (GCS<8) (AOR=10.518, 3.80-29.05, 95%CI P=0.001), and 4 times in moderate level of consciousness (GCS, 9-12) (AOR=4.185, 1.47-11.99, 95%CI P=0.007) as compared to participants with a mild level of consciousness. Coexisting disease 71.75% vs 16.84% (AOR= 8.377, 3.40-20.51, 95%CI p<0.001).Patients needed mechanical ventilation 49(57.89%) were requiring mechanical ventilation. Mortality was 11 times more likely to happen in those patients who were requiring mechanical Ventilation (AOR=11.084, 4.25-28.87, 95%CI P<0.001) than those who did not require mechanical ventilation. Concerning needed for inotropes; patients who required inotropic agent had a 10.7 times mortality rate than those who did not require inotropes during PICU Stay (see table 4 below). Among pediatric patients admitted to PICU of TASH 42(49.03%) were with the coexisting disease. Mortality was 7 times in patients with coexisting disease as compared to patients without.

Table3 Factors associated with mortality pediatric patients admitted to the PICU of Tikur anbessa specialized hospital from February 1, 2024, to February 1, 2025(n = 85).

Variable	Outcome				
	Survived	Dead	COR	AOR (95%CI)	P-value
Level of GCS					
12-15	34(39.88%)	8(9.14%)	1	1	
9-12	11(12.47%)	8(9.70%)	3.39(1.89-6.07)	4.185(1.47-11.99)	0.007**
Less than 9	3(3.89%)	21(24.93%)	28(14.23-55.28	10.51(3.81-29.05)	<0.001**
Admission diagnosis					
Septic shock	8(9.69%)	15(17.45%)	5.85(2.39-14.30)	51.05(0.22-.93)	0.942
Meningitis	6(7.20)	10(11.36%)	5.12(2.01-13.02)	1.61(0.32-7.97)	0.55
CVD	5(5.54%)	6(6.65%)	3.90(1.44-10.49)	2.38(0.07-2.59)	0.35
Severe Pneumonia	5(5.82%)	0(0.27%)	6.45(0.02—1.34)	30(0.001-1.81)	0.095
UAO	4(5.26%	0(0%)			
TBI	3(3.87%)	1(1.11%)	1.08(0.23-3.63)	6.06(0.02-1.35)	0.094
ARDS	2(2.77%)	1(1.94%)	2.27(0.65-7.93)	1.9(0.78-3.66)	0.52
Cardiogenic shock	2(2.77%)	0(0.00)	1.02(0.215-4.43)	6.2(0.007-3.93)	0.266
AGN	1(1.93%)	0(0.00)	1.39(0.29-6.67)	5.18(0.02-2.35)	00.99.197
GBS	2(2.50%)	0(0.00%)	2.77(0.24-3.30)	9.9(0.007-1.81)	
Asthma	1(1.66%)	0(0.00%)	1.62(0.33-8.02)	2.139(0.21-21.27)	0.517
Post-operative	6(7.20%)	2(2.22%)	1	1	
LOS					
Less than 2 days	6(7.48%)	5(5.54%)	2.16(0.90-5.17)	5.81(1.07-31.34)	0.041**
2-7 days	15(17.72%)	15(17.72%)	2.91(1.38-5.18)	7.27(1.73-30.55)	0.007**
7-14 days	14(16.06%)	10(11.91%)	2.16(1-4.64)	5.42(1.18-24.80)	0.029**
14-28 days	4(5.26)	4(5.26%)	2.91(1.17-7.27)	7.02(1.08-45.19)	0.04**
>28 days	5(5.70%)	3(3.32%)	1	1	
Comorbid illness					
No	36(42.38%)	7(8.59%)	1	1	
Yes	12(13.85%)	30(35.18%)	12.53(7.55-20.79)	8.38(3.42-20.5)	<0.001**

Need for MV					
No	32(37.67%)	4(4.43%)	1	1	
Yes	16(18.56%)	33(39.34%)	18.02(9.95-32.63)	11.08(4.25-28.87)	<0.001**
Need for inotropes					
No	42(49.03)	14(16.34%)	1	1	
Yes	6(7.20%)	23(27.43%)	11.42(6.72-19.26)	10.67(4.09-27.81)	<0.001**
Blood transfusion					
No	43(50.14%)	31(36.56%)	1	1	
Yes	5(6.09%)	6(7.20%)	1.62(0.88-2.98)	1.24(0.39-3.93)	<0.001**
Need for vasopressor					
No	41(48.48%)	19(22.16%)	1	1	
Yes	7(7.75%)	18(21.61%)	6.1(3.67-10.1)	1.56(0.58-4.22)	0.37

** Statistically significant

5.2 FSS Domains of Functioning in the Functional Status Scale (FSS)

The evaluation of the functional status was performed by the FSS, which was applied to all participants of the study within 3 months of discharge from the PICU. The functional scale is composed of six domains: mental

status, sensory, communication, motor function, feeding and respiratory. Each domain is categorized from normal (1) to very severe dysfunction (5), and the total score ranges from 6 to 30.

The overall FSS scores are categorized as follows: 6 - 7 normal; 8 - 9, mild dysfunction; 10 - 15, moderate dysfunction; 16 - 21, severe dysfunction; and more than 21 points, very severe dysfunction.

A total of 85 patients with a mean FSS of 10.3 (standard deviation 4.4) were studied. 20% had the minimum possible FSS = 6, 17.65 % had FSS >7, 15.29% had FSS ≥ 10, 23.53% had a FSS ≥ 15, and 23.53% had FSS scores ≥ 20. Each FSS domain was associated with mean ABAS II ($p<.0001$). Cells in each domain were collapsed and reweighted, which improved correlations with ABAS II from −0.58 to −0.62 in the estimation sample, and −0.60 to −0.63 in the validation sample ($p<0.001$ for improvements). Discrimination was very good for moderate and severe dysfunction (ABAS II categories) and improved with FSS weighting (area under the ROC curve > 0.8). Interclass correlations of original and weighted total FSS were 0.95 and 0.94 respectively, as shown table below.

Table 4 functional status scale of pediatric patients discharge from PICU of Tikur anbessa specialized hospital (n=85)

FSS	**Number of patients**	**Percent**
Normal (6-7)	17	20
Mild dysfunction (8-9)	15	17.65
Moderate dysfunction (10-15)	13	15.29
Severe dysfunction (16-21)	20	23.53
Very severe dysfunction(>21)	20	23.53

During the study period, 12% of the patients were readmitted to the PICU. A comparison of the functional score of the FSS in relation to the occurrence of readmission to the PICU overall score ($p=0.00117$), motor function ($p=0.011$) and feeding ($p=0.011$) show statically significant difference between readmission and non-readmission groups, but in mental status, sensory, communication and respiratory function ($p>0.05$) shows no statically significant difference between readmission and admission (as shown in table 6).

Table 5 Functional Status Scale, functional scores in the readmission and non-readmission groups

Variables	**Readmission (n = 10)**	**Non-readmission (n = 75)**	**p value**
Overall score	13.5[12 - 16.5]	8 [6 - 12.2]	0.00117*
Mental status	1 [1 - 2]	1 [1 - 1.2]	0.810
Sensory	1 [1 - 2]	1 [1 - 1]	0.172
Communication	1.5 [1 - 2]	1 [1 - 1.25]	0.30
Motor function	4 [3 - 4]	1 [1 - 3]	0.007*
Feeding	4 [4 - 4]	1.5 [1 - 4]	0.011*
Respiratory	2 [1 - 2.7]	1 [1 - 2]	0.055*

* $p < 0.05$. Mann-Whitney U test. The results are expressed as the median [interquartile 25-75].

A comparison of the length of hospital stay and IMV time between the groups with the lowest and highest overall functional impairment ,patient with greater functional impairment have significantly longer hospital stays and longer IMV support(P=0.012,P=0.045 respectively), than those with normal to mild functional status as shown in table 7.

Table 6 Comparison of length of hospital stays and time of invasive mechanical ventilation between the groups with the lowest and highest overall functional impairment

Overall FSS score			
	Normal-mild (n =32)	**Moderate-very severe (n=53)**	**p value**
Length of hospital stay (days)	3.5 [2.00 - 4.25]	6 [5.5- 12]	0.012*
IMV time (days)	1[1 - 2]	2 [2.5 - 5]	0.045*

FSS - Functional Status Scale, IMV - invasive mechanical ventilation. * $p < 0.05$. Mann-Whitney U test. The results are expressed as the median [interquartile 25-75].

CHAPTER SIX

6. DISCUSSION

The main aim of this study was to analysis the pattern and short term functional statues of patient discharged or transferred from PICU and treatment outcome with its predictors. The determinants of the ICU outcome were based on the seriousness of the condition, patient age, comorbidities, the quality of pre-hospital and emergency trauma care, and factors reported during ICU admission, such as the use of mechanical ventilation, level of consciousness, duration of ICU stay, as well as complications during ICU stay, such as circulatory and ventilator- related respiratory complications (7) (8) (9) (10). It is challenging to give effective and adequate care for the children admitted to PICU without knowing the causes of admission; Hence for the health system to be successful, it is important to know the key obstacles in the way to improve the patient health and how this challenge can be overcome (15).

The mean age of the study participants admitted to TASH was 39.44+44.87 months with a 1.2:1 male to female ratio and the majority of the children were under 5 years. The mean age in our study was lower than the study done in months (8), India (54.26 ± 49.93), Greek (40.01±45.79) (9), and Ayder referral (62.99+60.94). This is maybe due to narrow age distribution (from birth to 12 years) was used and most of the study participants were under five in our study. The male predominance (54.6%) in our study was similar to research done in India (55.9%), Ayder referral hospital (53.8), Gondor University (57.8), and general ICU in Jimma University specialized hospital (54.7%) (2) (7) (8) (9).

Fifty nine percent of pediatrics patients admitted to TASH were with a medical diagnosis like Septic shock 28.24%, meningitis 18.56%, and cardiovascular disease 12.19%, which is in line with studies done in Greek and Ayder referral hospitals in which common reasons of admission were pathological disease (6) (16). This was also in line with a study conducted in Eritirea, which states that the vast majority of PICU admissions were due to medical problems (80.5%) and out of this infectious diseases accounted for 50% of the cases (17). The cause of admission in our setup was different from a study done in general ICU in Jimma University specialized hospital (54.7%) where surgical and trauma patients were the dominant reason for admission (5). this might be due to the difference in the study population, we studied pediatrics and they studied the general intensive care unit or this difference may be attributed to the fact that our study was carried out in the biggest referral hospital in the country of the total patients admitted to PICU 57.89% were ventilated mechanically which was higher than the study done in Nepal (30%), the general intensive care unit in Jimma university specialized hospital (37.1%), Ayder referral hospital (4%), and Gondor university hospital (10%) (1) (5) (6) (18).

The high proportion needed for Mechanical ventilation in our setup can be explained by the reality our hospital is among the specialized hospital where critical patients admitted from the district, Zonal, regional, and even from other tertiary and specialized hospitals. Mortality among patients on mechanical ventilation was 67.34%

which is in line with research done in Nepal (68%) (18) and somehow higher than a study done in Gondar(60.6%)**.** The need for mechanical ventilation was an independent predictor of mortality with p<0.001. The high mortality rate in our setup might be related to resource scarcity and our hospital is among the specialized hospital where critical patients admitted from the district, Zonal, regional, and even from other tertiary and specialized hospitals result in delayed admission. Our implication is that well equipping the PICU with both experts, and material resources, prompt management for primary presenting disease as well co-existing diseases are crucial to improve the PICU care.

Usually Intensive care unit admitted patients have coexisting disease in addition to the cause of admission (19). Coexisting diseases have been a remarkable effect on acute illness, complications in PICU, and clinical outcomes (20). Among pediatric patients admitted to PICU 42(49.03%) were with coexisting disease and their odd of death were 7 times those without coexisting diseases (AOR=8.38, 3.42-20.5, 95%CI P<0.001). The overall mortality rate of patients with co-morbidity was 71.42% which was higher than a study done in the west of Scotland (24%- 53%) (21). The difference might be due to resource scarcity and lack of early treatment for comorbidities in our setup.

Length of PICU stays 2-7 days was an independent effect on mortality with p=0.007. Patients who were staying in PICU for 2-7 days 7 times more likely to die than those who stay in PICU for greater than 28 days which was different from a study done in Ayder referral hospital which stated mortality was higher in patients stay greater than 28 days (8). The difference is due to most patients who stay in PICU for 2-7 days were on mechanical ventilation in our study.

We further found that the patients who required inotropic had more likely about 11 times mortality rate than those who did not require inotropic during PICU Stay which is in line with studies done in different parts of the world (5) (6). Death was increased by nearly 10 times in our study participants with a severe level of consciousness (GCS<8) than those with a mild level of consciousness (AOR=10.51, 3.80- 29.05,95% P=0.001) which is similar to study done in Ethiopia Ayder referral hospital (8).

In this study, the majority of subjects presented an overall functional status of moderate dysfunction when evaluated by the FSS within 3 months of discharge from the PICU. The greatest functional impairment was demonstrated in the domains of “motor function” and “feeding”. The current study showed that patients who were readmitted to the PICU had worse overall functional status and specifically worse motor function, feeding and breathing scores than those who were not readmitted. Additionally, a longer time of hospitalization in the PICU and greater permanence of IMV were observed in individuals who presented greater overall functional impairment.

The main cause of admission in our study was respiratory failure, but when evaluated after discharge from the PICU, most of the individuals did not present a significant impairment in this domain, which indicates that the patients recover almost completely regarding the ventilatory domain and are weaned from ventilatory support prior to transfer to the pediatric inpatient unit. This was similar to study done at Brazil (22)**.**

An analysis of patients readmitted to the PICU indicated that patients with a worse overall FSS score and impairment in the "motor function", "feeding" and "respiratory" domains at discharge were readmitted to this unit. To our knowledge no other studies have evaluated the relationship between the occurrence of readmissions and functional scores after discharge in the pediatric population.

The association of the motor and cognitive functional assessment scales of the pediatric outcome performance category (POPC) and pediatric cerebral performance category (PCPC) with the length of stay in the PICU. A study by Alievi et al (23), using the POPC and PCPC, verified a nonlinear increase in a comparison of the functional scores and length of stay in the PICU. In our study, the group of individuals who presented a moderate to very severe overall FSS score had a significantly longer stay in the PICU and a longer IMV time. To my knowledge, no other studies have evaluated FSS scores regarding the length of hospital stay and IMV time.

CHAPTER SEVEN

CONCLUSION AND RECOMMENDATION

7. CONCLUSION

The overall mortality rate was higher compared to studies from other countries monge survivors, significant proportions were discharged home, while others required transfer to step-down units or other hospitals for continued care. Evaluation of functional outcomes using the Functional Status Scale (FSS) revealed moderate impairment in discharged patients, especially in motor function, feeding, and respiratory domains. Patients requiring readmission exhibited significantly worse functional scores, indicating a higher burden of post-PICU morbidity. Additionally, prolonged mechanical ventilation and extended PICU stays were associated with poorer functional outcomes.

7.1 RECOMMENDATION

The Federal Ministry of Health and the Addis Ababa Health Bureau, in collaboration with TASH, should raise community awareness programs emphasizing early hospital visit before conditions become sever. Strengthen referral systems to ensure timely admission and reduce delays from district and regional hospitals. Additionally, TASH should expand PICU capacity to provide patients with life-threatening diseases sufficient treatment. Establish structured post-PICU rehabilitation programs focusing on motor function, feeding, and respiratory support. Ensure proper transition to step –down units or outpatient care with clear follow up instruction. Conduct longitudinal studies comparing functional status scale (FSS) scores at admission and discharge to identify new morbidities.

7.2 LIMITATION

The nature of cross-sectional study design limits the degree of cause and effect association among variables. We can note the evaluation of functional status at single moment at discharge from the PICU as limitation.

7.3 STRENGTH

A significant number of patients were analyzed which may reduce possible biases from incomplete patients records.

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Questioners

Demographics

1. Age _____(in yrs)

   <_1

   2-5

   6-10

   11-14

2. Sex

   Male ☐ Female ☐

3. MRN _____

4. Maternal Age _____(in yrs)

5. Maternal Education Status

   None (Illitertate) ☐ Read and Write ☐ Grade 1-8 ☐

   Grade 9-12 ☐ College And Abo ☐

6. Paternal Age _____(in yrs)

7. Paternal Education Status

   None (Illitertate) ☐ Read and Write ☐ Grade 1-8 ☐

   Grade 9-12 ☐ College And Above ☐

8. Religion

   Orthodox ☐ Protestant ☐ Muslim ☐

   Catholic ☐ Others ☐

9. Region

   Amhara ☐ Oromo ☐ Tigray ☐ Benshangul ☐ ☐

   Afar ☐ Harar ☐ Diredawa ☐ Addis Ababa ☐ ☐

10. Number of children_____

11. Birth Order _____

12. Monthly Income _____birr

    a. <5000
    b. 5000-10000
    c. 10000-15000
    d. >15000

13. Source of admission

1. Pediatrics emergency
2. Pediatrics ward
3. OR

14.Length of ICU stay

e. <2 days
f. 2-7 days
g. 7-14 days
h. 14-28 days
i. >28 days

Physical Finding

15.Anthropometry weight ___ height ____ BMI____

16. Level of GCS

12-15
9-12
<8

Admission diagnosis

1. SEPTIC SHOCK yes no
2. MENIGITIES Yes no
3. CVD YES NO
4. SEVER PNEUMONIA YES NO
5. ARDS YES NO
6. UAO YES NO
7. TBI YES NO
8. CARDIOGENIC SHOCK YES NO
9. DKA
10. ONCOLOGIC EMERGENCY
11. GBS
12. STATUS EPILIPTICUS
13. POISONIG
14. TETANUS

15. AGN
16. ASTHMA
17. POST-OPERATIVE
18. Any Comorbidities yes no
19. Need Intubation yes no
20. Inotropic Need yes no
21. Transfusion Need

yes no

22. Cardiopulmonary Resuscitation on Admission yes no

FSS Domains of Functioning in the Functional Status Scale (FSS)

	1	**2**	**3**	**4**	**5**
	NORMAL	**MILD DYSFUNCTION**	**MODERATE DYSFUNCTION**	**SEVERE DYSFUNCTION**	**VERY SEVERE DYSFUNCTION**
MENTAL STATUS	Normal sleep/wake; appropriate responsivity	Sleepy but arousable to noise/touch/movement and/or periods of social nonresponsivity	lethargic and/or irritable	Minimal arousal to stimulus (stupor)	Unresponsive and/or Coma and/or Vegetative
SENSORY	Intact hearing and vision and responsive to touch	Suspected hearing or Suspected vision loss.	Not reactive to auditory stimuli or Not reactive to visional stimuli	Not reactive to auditory stimuli and Not reactive to visional stimuli	Abnormal response to pain or t
COMMUNICATION	**Appropriate non-crying vocalizations, interactive**	**Diminished Vocalization Diminished Facial Expression**	**Absence of attention getting behavior**	**No demonstration of discomfort**	**Absence of communication**

	facial expressiveness, or gestures	**and/or social responsiveness**			
motor function	**Coordinated body movements and Normal muscle control and Awareness of action and why it's being done**	**1 limb functionally impaired**	**2 or more limb functionally impaired**	**Poor head control**	**Diffuse Spasticity, Paralysis, Decerebrate/ Decorticate Posturing**
FEEDING	**All food taken by mouth with age appropriate help**	**NPO or need for age-inappropriate help with feeding**	**Oral and tube feedings**	**Parenteral Nutrition with oral or tube feedings**	**All parenteral nutrition**
RESPIRATORY	**Room air and no artificial support or aids**	**Oxygen and/or Suctioning**	**Tracheostomy**	**CPAP for all or part of the day and/or Mechanical ventilator support for part of the day**	**Mechanical ventilatory support for all of the day and night**

FSS DEFINATON

MENTAL STATUS

Mental Status: Normal

- Normal Sleep and wake periods;
- Appropriate social responsively

Sleep refers to a restful state without over-reaction (crying, agitation) to noises in the environment. Awake refers to awareness with behavior appropriate for age. Infants and children in this state should be appropriately aware, alert and responsive of self and environment.

Mental Status: Mild Dysfunction

- Sleepy but arousable to noise or touch or movement

and/or

- Periods of reduced social responsivity

Sleeps more of the time than is age appropriate; will sleep much of time if left alone but is able to be aroused with stimulation such as noise, if touched or position changes.

and/or

Decreased responsiveness to social overtures

and/or

Does not consistently focus or follow on a person or object crossing line of vision.

Mental Status: Moderate Dysfunction

- Lethargic

and/or

- Irritable

Lethargic infants and children are drowsy, sluggish, or have an unusual lack of energy. They are arousable, but become less responsive or return to a sleep-like state without frequent stimulation. Irritable infants and children are inconsolable often with an increased sensitivity to stimulation. Infants often react to stimuli with a high-pitched cry.

Mental Status: Severe Dysfunction

- Minimal arousal to stimulus (stupor)

Stuporous infants and children have decreased or impaired consciousness marked by diminution in reactions to environmental stimuli. They may open eyes and focus, but do not maintain any meaningful reaction to physical environment. They make little or no eye contact. They will respond to noxious stimuli with semi-purposeful (i.e. poorly organized) movements or withdrawal.

Mental Status: Very Severe Dysfunction

- Unresponsive

and/or

- Coma

and/or

- Vegetative

These infants and children are unconscious. Coma is a deep or profound state of unconsciousness from which they cannot be aroused. They do not sense or respond to external stimuli or internal needs. Vegetative infants and children have no evidence of awareness of self or environment. They may have intermittent wakefulness manifested by sleep- wake cycles. There is no evidence of sustained, reproducible, purposeful or voluntary behavioral responses to visual, auditory, tactile, or noxious stimuli.

SENSORY

Sensory: Normal

- Intact hearing

and

- Intact vision

Intact hearing is demonstrated by individuals localizing/moving eyes and/or head toward sound stimulus in room. Intact vision is evidenced by individuals turning gaze to focus on person or object that crosses his visual field.

Sensory: Mild Dysfunction

- Suspected hearing loss

or

- Suspected vision loss

There is suspicion of hearing or vision loss as evidenced by inconsistent focusing or localization of sound. Responsiveness to touch is not impaired.

Sensory: Moderate Dysfunction

- Not reactive to auditory stimuli

or

- Not reactive to visual stimuli

There is lack of evidence for hearing or vision as demonstrated by lack of focusing, or localization of sound. Responsiveness to touch is not impaired.

Sensory: Severe Dysfunction

- Not reactive to auditory stimuli

and

- Not reactive to visual stimuli

There is lack of evidence of hearing or vision as evidenced by lack of tracking, and localization of sound. Responsiveness to touch is not impaired.

Sensory: Very Severe Dysfunction

- Abnormal response to touch

Infant/child has abnormal response to touch or pain as evidenced by the absence of purposeful, or semi-purposeful movements. There may be a withdrawal or spinal response.

COMMUNICATION

Communication: Normal

- Vocalization appropriate for age

and

- Interactive facial expressions or gestures.

Infants make sounds to make presence known. Children use words to convey needs. Interactive facial expressions and gesture are a process of non-verbal communication, often closely associated with emotions.

Communication: Mild Dysfunction

- Diminished Vocalization
- Diminished social expression (facial or verbal)

There is a decrease in socialization and social expression.

Communication: Moderate Dysfunction

- Absence of attention-getting behavior

Infants and children who do not demonstrate behavior that “says” “look at me, here I am”. Children may initiate attention-getting behavior, but cannot communicate their needs.

Communication: Severe Dysfunction

- No demonstration of discomfort

Infants and children do not cry or cry very little with painful procedures or if uncomfortable

Communication: Very Severe Dysfunction

- Absence of communication.

There is no communication using facial expressions, body posture, or voice. There is no communication regarding physiological or psychological needs.

MOTOR FUNCTIONING

Motor Functioning: Voluntary movements: Normal

- Coordinated body movements

and

- Normal muscle control

and

- Awareness of action

Infants and children have coordinated movements with normal muscle control. They are aware of the action and its purpose. e.g., infant kicks limbs, vocalizes when parent enters. Infant can hold rattle and transfer it from one hand to another. Toddler carries object, holds onto stuffed animal, sucks thumb. Child writes or plays with toys.

Motor Functioning: Mild Dysfunction

- 1 limb functionally impaired

There is a partial or complete loss of functionality of the limb. Impairment may be from medical devices such as restraints, IV boards, bandages, or casts, or due to physical issues such as deformities, weakness, stiffness, spasticity, and/or movement disorders. Weakness is demonstrated when infants and children are able to move limb off a surface (against gravity) while holding an object or against resistance. They may be able to perform normal age appropriate activities but with increased effort. Stiffness is demonstrated when one or more limbs have increased resistance to passive motion but are still held in normal position or postures. Stimulation does not result in flexion, extension or arching.

Motor Functioning: Moderate Dysfunction

- 2 or more limbs functionally impaired

There is a partial or complete loss of functionality of 2 or more limbs. Impairment may be from medical devices such as restraints, IV boards, bandages, or casts, or due to physical issues such as deformities, weakness, stiffness, spasticity, and movement disorder. Weakness is demonstrated when infants and children are able to move limb off a surface (against gravity) while holding an object or against resistance. They may be able to perform normal age appropriate activities but with increased effort. Stiffness is demonstrated when one or more limbs have increased resistance to passive motion but are still held in normal position or postures. Stimulation does not result in flexion, extension or arching. Spasticity is abnormally increased muscle tone with involuntary movement. Limb(s) feels tight, rigid and limb reflexes are exaggerated. There is resistance to bending and the neck is hyperextended.

Motor Functioning: Severe Dysfunction

- Poor Head Control

Head control is poor with decreased ability to hold head upright at 90 degrees. Unable or cannot hold head still when less than 90°. If trunk is supported head will fall back, to side or front and he/she is unable to bring head to the upright position if sitting or midline if supine or prone.

Motor Functioning: Very Severe Dysfunction

- Paralyzed
- Decerebrate/Decorticate Posturing

Paralysis is the loss of voluntary motor function. There is abnormal muscle tone. Mental Status may be preserved or altered. Decerebrate posture consists of rigid extension of all extremities with internal rotation. There is downward pointing of toes. Decorticate posture consists of rigid flexion of upper extremities with clenched fists and extension of lower extremities.

FEEDING

Feeding: Normal

- All food taken PO with age appropriate help.

There is no parenteral or gavage feeding. Feeding methods are age appropriate. The number of calories is not part of this category.

Feeding: Mild Dysfunction

- NPO
- Oral feedings with increased caloric density/food

There is no parenteral or tube feeding. Dextrose solutions of 5% or less are not included in parenteral feeding. Increased oral density feeds are special formulas and/or additions to diet.

Feeding: Moderate Dysfunction

- Need for age-inappropriate help with feeding

This consists of feeding by caretaker when independent feeding is expected or use of feeding aid is used at an inappropriate age (e.g., bottle).

Feeding: Severe Dysfunction

- Feeding tube with or without parenteral nutrition.

Parenteral nutrition includes intravenous nutrition via a peripheral or central vein with a dextrose concentration greater than 5%. It usually includes fat and protein. Tube feedings include nasogastric, oral-gastric, and nutrition via small bowel tubes.

Feeding: Very Severe Dysfunction

- All parenteral nutrition

Parenteral nutrition includes intravenous nutrition via a peripheral or central vein with a dextrose concentration greater than 5%. It usually includes fat and protein.

RESPIRATORY STATUS

Respiratory Status: Normal

- Room air and no artificial support or aids

The infant or child is breathing in room air without the need for artificial help including suctioning, oxygen, or mechanical support.

Respiratory Status: Mild Dysfunction

- Oxygen

and/or

- Suctioning

Oxygen is given via any apparatus including blow-by, cannula, face mask, etc. Suctioning includes any oral or tracheal suctioning.

Respiratory Status: Moderate Dysfunction

- Tracheostomy

Respiratory Status: Severe Dysfunction

- CPAP for all or part of the day

and/or

- Mechanical ventilator support for part of the day

CPAP (Continuous positive airway pressure) may be administered through a facemask or tracheostomy. Mechanical support includes positive or negative pressure ventilation devices such as bipap, and positive pressure mechanical ventilation.

Respiratory Status: Very Severe Dysfunction

- Mechanical ventilatory support for all day and night.

Mechanical support includes positive or negative pressure ventilation devices such as bipap, and positive pressure mechanical ventilation.

Outcome of treatment

22.Outcome/current status of patients ?

A. survived? _____
B. not survived_____