



**ARSI UNIVERSITY COLLEGE OF HEALTH SCIENCES
DEPARTMENT OF PEDIATRICS AND CHILD HEALTH**

**PATIENT PROFILE, TREATMENT OUTCOME, AND
ASSOCIATED FACTORS OF PEDIATRIC EMERGENCY
DEPARTMENT VISITS AT ASSELA REFERRAL AND
TEACHING HOSPITAL: A 3-YEAR RETROSPECTIVE STUDY**

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ABSTRACT

Background: Pediatric emergency patients require special attention because of their vulnerability. Over recent decades, utilization of pediatric emergency departments has increased globally. However, data on patient profiles, associated factors, and outcomes of pediatric emergency care remain limited in low- and middle-income countries.

Objective: To characterize the epidemiologic profile, associated factors, and outcomes of pediatric patients attending the pediatric emergency department (PED) of Assela referral and teaching hospital

Methods: A retrospective chart review was conducted among pediatric patients presenting to the PED of Assela referral and teaching hospital, Arsi University, from September 10, 2022, to September 10, 2025. A total of 407 patient records were reviewed. Data were analyzed using SPSS version 27. Bivariate and multivariable logistic regression analyses were performed to identify factors associated with escalated care. Statistical significance was determined at a p-value < 0.05.

Results: Male children accounted for 63.9% of visits, 55.3% were from rural areas, and 75.9% were under five years of age. Factors independently associated with escalated care include altered mental status(AOR = 5.75; 95% CI: 1.67–19.83), comorbidity(AOR = 7.30; 95% CI: 1.30–40.94), danger signs(AOR = 2.06; 95% CI: 1.09–3.86), malnutrition (AOR = 13.25; 95% CI: 3.40–51.61), referral case (AOR = 1.91; 95% CI: 1.05–3.46), true emergency (AOR = 7.59; 95% CI: 2.59–22.20), delayed presentation of illness (1–3 days(AOR = 2.23, >3 days: AOR = 5.66) and diarrhea case have six fold odds of escalated care.

Conclusion: Pediatric emergency utilization at ARTH reflects a high burden of acute illnesses, particularly among under-five children from rural settings. Clinical severity indicators were the strongest predictors of escalated care. Strengthening pediatric emergency triage systems and early risk identification is strongly recommended.

Keywords: Pediatric emergency department, Patient profile, Clinical outcomes, associated factors, Assela referral and teaching hospital, Ethiopia

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ABBREVIATIONS AND ACRONYMS

AGE.....	Acute gastro enteritis
AOR.....	Adjusted Odds Ratio
ARDS.....	Acute Respiratory Distress Syndrome
ARTH.....	Assela referral and teaching hospital
CDC.....	Communicable Disease Control
COI.....	Children opportunity index
COR.....	Crude odd ratio
CoHS.....	College of health science
DURH.....	Dillaa university referral hospital
DM.....	Diabetes mellitus
ED.....	Emergency department
EDHS.....	Ethiopian demographic health statistics
LAMIC.....	Low and middle-income countries
LIC.....	Low-income countries
LRI.....	Lower respiratory infection
PI.....	Principal investigator
MDGs.....	Millennium Development Goals
OR.....	Odd ratio
PED.....	Pediatric emergency department
SDGs.....	Sustainable Development Goals
SSA.....	Sub-Saharan Africa
TB.....	Tuberculosis
U5MR.....	Under Five Mortality Rate
USA.....	United States of America
WHO.....	World Health Organization
UNICEF.....	United Nations International Children's Emergency Fun

CHAPTER ONE INTRODUCTION

1.1 Background

A Pediatric Emergency is a specialized section of a hospital or health facility that focuses on the immediate assessment, stabilization, and treatment of acutely ill or injured children. It is designed to handle medical and surgical emergencies. Majority of patient who visit pediatric emergency are under five children. With early recognition and treatment majority of patient get improvement and survived[1–3].

Although child mortality has significantly decreased over the past 20 years, thanks in part to the United Nations' Millennium Development Goals (MDGs) and Sustainable Development Goals (SDGs)[4, 5]. Nonetheless, low-income countries (LICs), particularly those in Sub-Saharan Africa, continue to have high child mortality rates. Sub-Saharan Africa (SSA) continues to be the region with the highest U5 mortality rate in the world 71 deaths per 1,000 live births. In 2022, 1 in 14 children in SSA died before reaching their fifth birthday 15 times higher than the risk for children born in high-income countries [1, 5]

The study on profile of pediatric emergencies presentation is important to understand how to optimize resource allocation, healthcare facilities and formulate modern PED which is a structured emergency care system that could further improve emergency visit outcome[2, 6, 7].

However, pediatric care services still represent the weakest links in the healthcare systems chain, with pediatric emergency services still being an understudied field[8, 9]. In Ethiopia, as in other sub-Saharan countries, the health care system is extremely diverse.

Ethiopia has approximately 25000, healthcare facilities (including health posts, health centers, district hospitals, Zonal hospitals, and referral/central hospitals) distributed across the country[10]. The majority,90% of these facilities deliver primary care (i.e., essential preventive and curative health. Approximately 31 tertiary-care referral hospitals exist nationwide, majority have dedicated Pediatric Emergency service[10]. One of which is in ARTH, which is located in Arsi zone, Assela town. In 2019 EDHS report, the under-5 and neonatal mortality rates in Oromia were 72 per 1,000 and 39 per 1,000 live births, respectively[11].

In Ethiopia and, similar LICs, epidemiological data on pediatric presentations to the PED is scarce. This data is important to develop tailored strategies to improve the management of acutely and critically ill children, in order to further reduce child mortality.

Thus the present study aims to describe the profile and outcomes of pediatric presentations to a referral care PED in Assela over three years. Further this study also aims to characterize determinants of hospitalization and death, eventually suggesting strategies to improve pediatric emergency care services.

1.2 Statement of the problem

The pediatric emergency department (PED) serves as the first point of contact for critically ill children requiring immediate and life-saving interventions. Understanding the characteristics and outcomes of children presenting to these departments is essential for improving the quality, efficiency, and responsiveness of pediatric emergency services[12, 13]. The World Health Organization estimates that significant amount of under-five deaths occur in emergency settings due to delays in triage, assessment, and initiation of treatment for common childhood illnesses such as pneumonia, diarrhea, sepsis, malaria, and severe malnutrition[1, 6]. Infectious diseases, including pneumonia, diarrhea, and malaria, remain a leading cause emergency visit and under-five deaths, along with preterm birth and intra partum-related complications[6].

Efficacious and structured PED help to improve outcome of emergency visit, one of which was to decrease death. Although there was a significant decrease in under 5 mortality recently, the World Health Organization estimates that over 80% of deaths among children under five worldwide occur in South Asia and sub-Saharan Africa[6]. According to UNICEF in 2023, 4.9 million children under 5 years of age died, which is equivalent to 13,400 children under the age of 5 dying every day in 2023[6].

This mortality is largely driven by preventable conditions such as pneumonia and diarrhea, both of which frequently prompt visits to emergency departments. Although in Ethiopia, studies on outcome and patient profiles related to PED visits is scarce, some related study reveals Socio socio-demographic and preventable infectious diseases affect pediatric emergency visits and outcomes.

A study at Jimma University hospital found that more than 60% of pediatric ED visits were due to infectious conditions, many of which burden the system and could have been managed through primary health care[14]. A study at TASH, Dillaa university

hospital, and a study at different comprehensive hospitals in SNNP also support the same[15–17]. Children visit pediatric emergency not only for emergent cases. The study done in TASH shows that about 9%,26%,61% of patient visit ED for non-emergent, emergent and urgent cases respectively[15]. The study from TASH, jimma and Dillaa shows about one third of PED death occurs within 24 hours[15, 17, 18].This enables targeted interventions like optimization of triage protocols, allocation of staffs, redirecting non urgent to primary hospitals.

Knowing the trends, outcome of pediatric emergency visit, and associated factor supports to have well-structured pediatric emergency and triage which is a base to decrease child mortality and morbidity.

1.3 Significance of the study

The pediatric emergency department is one of the very important place where there is much challenge for health professionals, and as well as the institution should pay attention.

Child mortality has significantly decreased in the past two decades, still significant amount of child mortality in LAMIC is occurring from preventable causes. Ethiopia still faces staggeringly high child mortality, with recent estimates showing 46 deaths per 1,000 live births among under-five children in 2022, this remains nearly double the national Sustainable Development Goal (SDG) target of 25 by 2030[19, 20].

The study of the profile and outcome of pediatric emergencies is important to understand how to optimize resource allocation and healthcare facilities to develop a structured emergency care system that could further reduce child mortality. Further this study can also serve as a baseline for others who want to conduct a study regarding patient profiles and outcome related to pediatric emergency visits. The study will help the hospital as guidance to improve its service.

CHAPTER 2 LITERATURE REVIEW

2.1 Patient profile related to pediatric emergency visit

There is variation in patient profiles visiting pediatric emergency departments in different parts of the world. However, there is also a similarity in why and the outcome of emergency visits. The study done in Pakistan, which is a review study, found that Respiratory system diseases were the most common (37.3%), with upper and lower respiratory tract infections such as pharyngitis, tonsillitis, bronchitis, bronchiolitis, and pneumonia accounting for the majority of the illnesses in this category (88.4%). The second most common system involved was gastrointestinal (16.4%), with acute gastroenteritis accounting for most of the diagnoses (92.0%). When children with upper and lower respiratory tract infections and acute gastroenteritis were compared for seasonal presentation, we found that respiratory tract infections were most common during the last quarter of the year (October to December), with 23,289 of 56,561 respiratory tract infection presentations (41.2%) during these winter months. Acute gastroenteritis presentations were most common during the second quarter of the year (April to June), with 10,008 of 25,881 cases (38.7%) registered during these hot summer months[21].

According to study from Egypt the profile of patients visiting the emergency service in El-Behera Hospitals (Damanhour Teaching Hospital, Central Abohommos Hospital, and General Kafr Eldawar Hospital), describing the epidemiology of patient presentations and outcome in the ED Infants (1 month to 1 year) represented the largest age group (52.5%), and boys represented the majority of cases (51.5%). The main presentation was cough (25%) and respiratory distress (21%), followed by fever (15.5%), diarrhea (11%), wheezy chest (11.5%), and then convulsion (4%). Long-term illnesses were predominantly bronchial asthma (9%), hemolytic anemia (1%), congenital heart disease (0.5%), down syndrome (0.5%), and failure to thrive (0.5). It concludes that respiratory emergencies are the leading cause of attending ED,

representing 390 (65%) cases. Rural attendees are more than urban [375 (62.5%) vs 225 (37.5%)]. Chronic disorder is one of the causes of attending the ED. The rate of hospitalization is low at 72 (12%) cases. Most patients attended the ED in the evening, representing 285 (47.5%) cases[22].

There is a report that depicts patients also visiting the emergency department for non-emergent cases. The descriptive study done in Indonesia university of udayana; The results of this study showed that male patients more than female patients, the most common age of patients are in 5-10 year age group, there were many false emergency cases than emergency cases, the most common working diagnosis is fever, patients were treated less than 30 minutes[23]. The study from Germany, retrospective cohort study also support the non-emergent visit which shows that more than half of unscheduled pediatric Emergency Department visits (69%) at the University Hospital in Bonn are for non-urgent reasons, with short living distance being a factor to present children to a pediatric Emergency Department, even with minor complaints[24].

There is also a retrospective study at King Fahd Hospital of the Imam Abdulrahman Bin Faisal University in the Eastern Province of Saudi Arabia, the most common age group was toddlers, and 92.4% of the total sample were Saudis. The most common complaint was fever (26.9%), followed by respiratory symptoms (24.9%). Triage I had a very high odds of admission, whereas triage V was associated with a very low odds of admission (OR = 0.30, 95%CI = 0.23–0.38)[25].

In low and middle-income countries, the majority of causes of death and emergency visits are preventable causes. A four year retrospective review from Nigeria shows there were more males (1866; 57.9%) and more toddlers (1181; 36.6%). The highest admissions were during the wet season (1962; 60.9%). There was an overall mortality rate of 7%; complicated malaria, gastroenteritis, and meningitis were the leading causes of death. It concludes major causes of death in the study area are preventable with more of these amongst the children under the age of 5 years. There are seasonal and age-related patterns to admissions[26].

There is also a study of the hospitalized population at the pediatric emergency service of the mother and child hospital, Marrakech, Morocco retrospective study says the characterization of the studied population by sex and age showed a predominance of males with a sex ratio of 1.36, with 625 patients. The most frequent pathologies affected the respiratory system in 28% of cases, then the digestive system (11.3%), while infectious pathologies represented 10.7% of admissions. The death rate in the emergency department was 7.4%. Multivariate analysis of the data showed a statistically significant relationship between the final diagnosis and age, season, and weight. Thus, for an association between the digestive system diseases and weight (AOR=1.052, 95% CI=1.019-1.086, $p=0.02$). While for the skin and subcutaneous tissue diseases and the autumn season (AOR=11.37, 95% CI=1.272-101.777, $p=0.03$) and age have a negative significance for most diseases[27].

Generally, almost profiles of patient visiting pediatric emergency are similar in LMIC. The epidemiological profile study done Maroua Regional Hospital, Cameroon, supports this. The study was done on 1027 patients; the sex ratio was 1.2 infants under 2 years represented 54.33%. The main reasons for consultation were fever (62.22%) and seizures (30.18%). The most common pathologies were severe malaria (45.18%), bronco-pulmonary infections (15.48%), and bacterial meningitis (12.26%). There were 68 deaths, representing 6.67%, and 86% of the deaths occurred within 24 hours of admission. The leading cause of death was severe malaria, with 28 (41.17%) cases[28].

In our country most of patients who visit PED are under five. Most of the morbidity and causes of mortality are preventable causes. The institutional review study at TASH depicts; the majority of the participants were male (157, 58.6%), with a median age of 3 years. The study revealed that 180 participants (67.2%) experienced a prolonged length of stay[15].

The Institutional based cross-sectional retrospective study done from January 2020 to

January 2022 done at different public hospital in Addis Ababa on Outcomes of emergency admissions and associated factors among children admitted to the pediatric emergency unit also shows the majority 236 (77.9%) of children were aged less 5 years. The mean ($\pm$ S. D) age of the children admitted to pediatrics emergency department of selected hospitals during the study period is 37.47 ($\pm$ 40.6) months. Of the total admitted patients 163(53.8%) were males and 140(46.2%) were females. The male to female ratio of pediatric emergency unit admissions was 1.16: 1. Over two-thirds 208 (68.6%) of the admitted children were from urban areas[29].

A case-control study at pediatrics emergency of comprehensive specialized hospitals Wolaita Sodo University comprehensive specialized hospital, Wachamo university Nigist Eleni Mohammad memorial comprehensive specialized hospital and worabe comprehensive specialized hospital of South nation nationalities and people region, found that delayed diagnosis and treatment [AOR = 2.088, 95% of CI (1.128, 3.864)], acute respiratory distress syndrome [AOR = 2.804, 95% of CI (1.487, 5.250)], dehydration [AOR = 3.323, 95% of CI (1.260, 8.761)], meningitis [AOR = 5.282, 95% of CI (2.707, 10.310)], sepsis [AOR = 4.224, 95% of CI (2.220, 8.040)], accidental injury [AOR = 3.603, 95% of CI (1.877, 6.916)] and duration of sign/symptoms [AOR = 5.481, 95% of CI (2.457, 12.230)] were significantly associated with pediatric emergency mortality[30].

2.2 outcome and Factors associated with pediatric emergency visit

Numerous factors are associated with PED visit and affect the outcome. These factors differ for high and LAMIC countries. In high income countries the majority of factor associated with PED visit are Noninfectious disease like (accident/trauma, chronic disease like (Asthma, DM, Epilepsy, Psychiatric), from infectious (gastroenteritis and upper respiratory tract infections), Non-emergency cases due to primary care gaps and other social and economic factors. A Systematic Review and Meta-Analysis of

Observational Studies done and more than 58 studies analyzed and found Social determinants of health, particularly race, socioeconomic deprivation, proximity to an ED, and language, play important roles in ED care-seeking pattern of children and families. Increased utilization of ED services by children from racial minority and lower socioeconomic status groups may reflect barriers to health insurance and access to health care, including primary and subspecialty care, and/or poorer overall health, necessitating ED care[31].

The retrospective cohort study done by Pediatric Health Information Systems, a database from 49 United States children's hospitals done to assess emergency visit depending on Children's opportunity index concludes LRI visits were more likely among children from very low compared with very high COI (1 LRI visit: odds ratio [OR] 1.35 [1.17–1.56]; ≥ 2 LRI visits: OR 1.97 [1.66–2.33]; ≥ 3 LRI visits: OR 2.4 [1.71–3.39]). ED utilization was more likely among children from very low compared with very high COI (≥ 2 ED visits: OR 1.73 [1.51–1.99]; ≥ 3 ED visits: OR 2.22 [1.69–2.91]). Risk of hospital admission from the ED was lower for children from very low compared with very high COI (OR 0.77 [0.65–0.99]) [32].

In LAMIC factors differ from that of developed countries. Common factors are infectious and trauma related. The retrospective study done in Mozambique shows that Complaints were injury-related in 33% of cases and medical in 67%. Reson presentation were, respiratory diseases (29.3%), fever (26.7%), and gastrointestinal disorders (14.2%) were the most common. Overall, (20.1%) encounters resulted in hospitalization. Mortality in the PED was 1.6% (62% within 4 hours from arrival) and was the highest in neonates. A younger age, especially younger than 28 days, living in the extra-urban area and being referred to the PED by a health care provider were all significantly associated with both hospitalization and death in the PED at the multivariable analysis. Being previously visiting emergency and diagnosis with more than one causes is also associated with return visit[33]. According to retrospective Study done at Tertiary Hospital in Southeast Nigeria More returns were observed

within the 0-5- year-old age group. Also, more male children (68.4%) returned to the ED. Patients diagnosed with more than one condition had a higher prevalence of return visits than those with a single diagnosis[34].

In Ethiopia like other LAMIC countries the factors associated with PED visit and outcome have variability. The retrospective cross-sectional study done in different public hospital in Addis Ababa (TASH, ZMH, yekatit12, st peters) from 2020 to 2022, revealed that the most common causes of emergency admission were pneumonia (22.4%), surgical emergencies (14.5%), and late-onset sepsis (9.2%), respectively. More than half (53.8%) of children were admitted to the Pediatric Emergency Department for less than 24 hours, and the mean length of stay was 2 days. 39.6% of children were discharged with clinical improvement. Known comorbidity (AOR=4.65, 95% CI (1.23-17.64)) and length of stay less than 24 hours (AOR=4.2, 95% CI (1.2-14.7)) were strongly associated with the outcome[29]. The other study done in dillaa university hospital show the magnitude of patients improved, transferred, died, referred and discharged against medical advice was 51%, 40.9%, 7.6%, 0.1% and 0.4%, respectively. Children presented with diarrhea, severe respiratory distress, coma, comorbidity and delay to seek healthcare were significantly associated factors with emergency unit mortality, whereas pneumonia (AOR=1.76, 95% CI 1.16 to 2.65) and severe acute malnutrition (AOR=3.46, 95% CI 2.06 to 5.81) were significantly associated factors with intra hospital unit/ward transfer[17].

2.3 Conceptual frame work

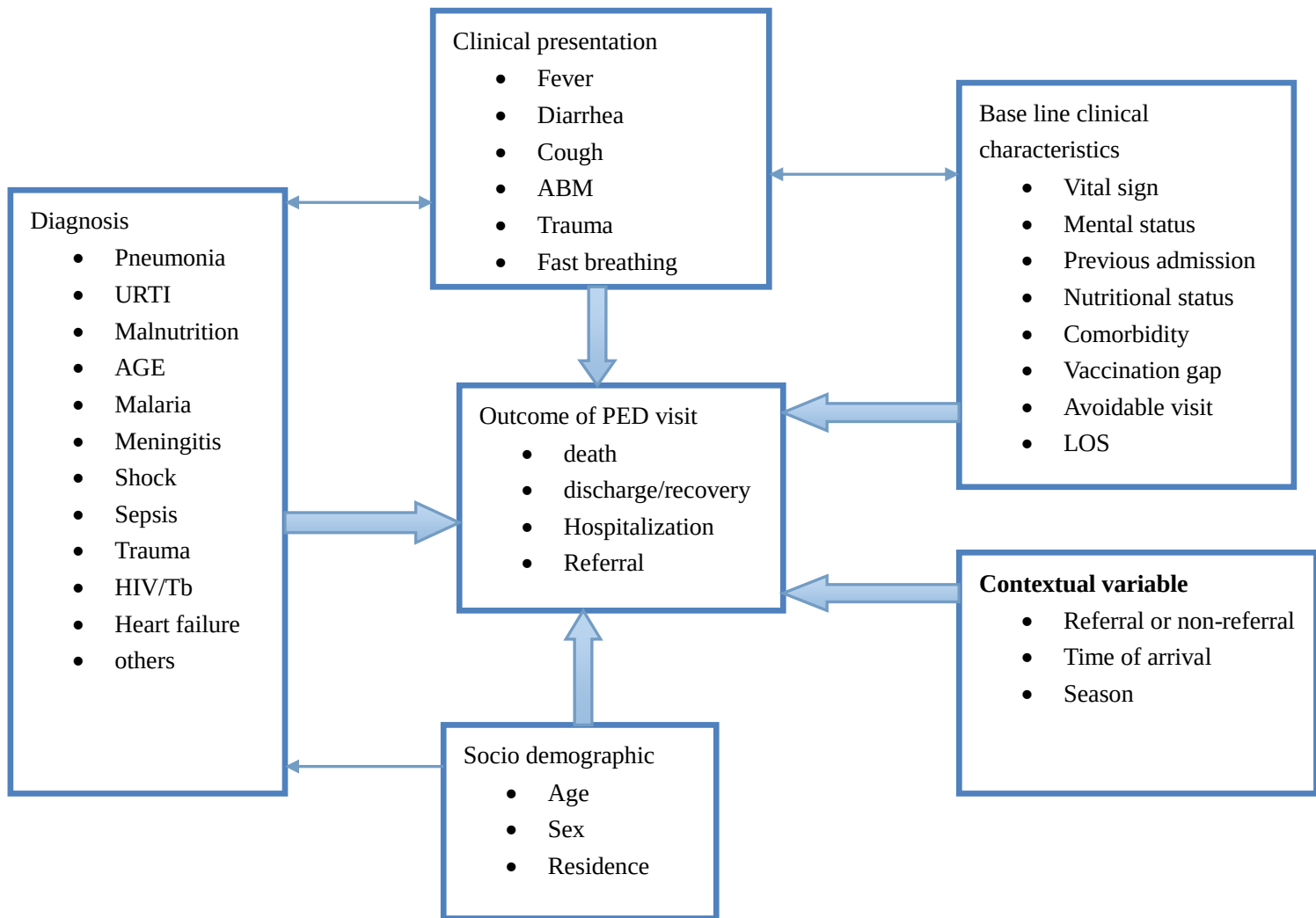


Figure 1: Conceptual frame work on patient profile, outcome and factors associated to PED visit at ARTH,Assela,2025

This conceptual framework describing profile and clinical outcome and factors associated to PED visit. Developed by the investigator after literature review reference.

CHAPTER 3 OBJECTIVE

3.1 General objective

To characterize the epidemiologic profile, treatment outcomes and associated factor of PED visit at Assela Referral and Teaching Hospital, Ethiopia.

3.2 Specific Objectives

To describe the profile of presentation to pediatric emergency at Assela referral and teaching hospital from September 10,2022 – September 10,2025 in Assela, Ethiopia.

To determine the clinical outcomes of PED visits at Assela referral and teaching hospital from September 10 ,2022 – September 10,2025 in Assela, Ethiopia. .

To identify factors associated with outcomes of children visited PED at Assela referral and teaching hospital from September 10,2022 – September 10,2025 in Assela, Ethiopia

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CHAPTER 4 METHODOLOGY

4.1 Study area

The study was conducted at Arsi University, College of health sciences (CoHS), Assela hospital which is Located in the town of Assela. Assela is a town in central Ethiopia which is located in Arsi Zone of Oromia Region about 175 kilometers from Addis Ababa, the capital city of the country. The hospital gives health services at inpatient and outpatient level as a tertiary hospital catchment area. The pediatric and child health department provides services through four primary sub-units with 112 beds for the pediatric ward (42 NICU, 54 Pediatric general ward, 15 for PED and main ICU 6) and outpatient department. The hospital has been improving its health service delivery, currently has modern investigation modalities like Digital X-rays, portable X-ray, different types of Ultrasound, Echocardiography, Computerized tomography scan and culture service. The Department of Pediatrics and Child Health has a separate pediatric emergency which is 24 hours functional. The monthly pediatrics patient flow averages around 350. The PED rests its services on 14 specialists, 23 residents, 14 nurses.

4.2 Study design and study period

A retrospective chart review was conducted from August, 2025-January, 2026.

4.3 Study period

August, 2025 – January, 2026 in Assela, Ethiopia

4.4 Source population and Study population

4.4.1 Source population

All pediatric patients visited the pediatric Emergency department at ARTH during September 10, 2022 to September 10, 2025

4.4.2 Study population

All documented ARTH pediatric Emergency visits meeting inclusion criteria

September 10, 2022 to September 10, 2025

4.4.3 Study subjects

Systematically sampled pediatric patients visited ARTH pediatric Emergency department from September 10, 2022 to September 10, 2025

4.5 Eligibility Criteria

4.5.1 Inclusion criteria

Age 29 days to 14 years

4.5.2 Exclusion criteria

Age less than 29 days and greater than 14 years

Patient with incomplete documentation of medical history or charts lost.

4.6 Sample size determination and Sampling technique

The sample size for this study was determined using single population proportion formula considering the following assumption; based on a retrospective institutional cross sectional study done from January 2020 to January 2022 at different public hospital in Addis Ababa on outcomes of emergency admissions and associated factors among children admitted to the pediatric emergency unit shows 39.6% of children were discharged with clinical improvement[29]. Calculated sample size was 407 considering common outcome of PED admission being discharge upon improvement. so the sample size for this study was 407

$$N = 1.96^2 * 0.396(1-0.396) = 367$$

$$N_{final} = (n_i / 1 - 10\%) = 367 / 1 - 0.1 \rightarrow 367 / 0.9 = 407.37 \sim 407$$

With adding 10% non-respondent

$$n_i = \frac{(z_{\alpha/2})^2 * p(1 - p)}{d^2}$$

The level of significance to be 5% ($\alpha=0.05$), so $\alpha/2=1.96$ by assuming a 95% confidence interval, the margin of error to be 5%

4.7 Sampling procedure

Systematic random sampling technique based on pediatric emergency HIMS registries card number was utilized with $K = N/n$ $k =$ interval (N: source population, n: sample population). A total of 12,750 patients visited PED and sample size 407.

$K = 12750/407 = 31.32 \sim 31$ so, after arranging the card in order, a lottery was drawn out the 1st 31 cards, then by adding on it 31 the cards was sampled until the required size was got.

4.8 Variable

4.8.1 Dependent variable

Outcome of Pediatric emergency visits

4.8.2 Independent variable

Socio demographic characteristics of the child

Clinical presentation

Base line clinical characteristics

Diagnosis

Contextual variables like referral status, season of visit, time of arrival to PED

4.9 Operational definition

Avoidable visit: A pediatric emergency department (PED) visit that does not require urgent or emergent care and could have been managed at a primary care or outpatient setting without risking the patient's health[35].

Treatment outcome: refers to the final patient disposition status at the end of the pediatric emergency department visit[17]

Delayed referral: A referral to the pediatric emergency department that is made more than 24 hours after the onset of signs and symptoms of a serious condition, and where the delay negatively impacts the child's clinical outcome[36].

Incomplete chart: This was the absence of necessary information (i.e., triage papers, discharge summaries, patients' full histories and physician orders) about patients based on the standard formats. Absence of at least one of these was considered incomplete and dropped[37]

Prolonged(LOS):A hospital stay that exceeds the expected average duration for a given diagnosis or treatment, typically defined as more than 24hours in the emergency department[38]

Patient profile: patient profile refers to the distribution of individual characteristics such as demographic, clinical, and behavioral factors within a study population, which helps to describe patterns of disease occurrence, health service utilization, and outcomes among specific groups[39]

Good/stable outcome: Is outcome when patient was discharged after basic emergency treatment and care was given[40].

Escalated outcome: Is an outcome in which patient required further care after emergency treatments and care which could be admission to general ward or ICU, and referral[41].

4.10 Data quality control

Structured checklist adapted from WHO emergency care assessment tool was prepared[42, 43]. Data extraction tools was developed in English version and then the data was collected by trained nurses and medical interns, after one day training on data collection procedure, and supervised by PI. A format that contains study variables of interest was prepared. Pretest was done on 5% of the sample before the actual data collection started in ARTH and it was excluded from main study.

4.11 Data collection procedure

The data was collected by nurses and medical interns from patients' chart documented by the clinicians. The principal investigator monitored the process of data collection using KoBo data collect tool. The data collectors' retrieved charts of patient from the archive based on the sampling interval until achieving the required sample size, recording all data in Kobo collect.

4.12 Data processing and analysis

Data was collected using KoboCollect a free data entry mobile app, a secure digital tool integrated with the KoboToolbox platform. Upon completion of field entry, data were synchronized and deployed to the central server. The final dataset was then exported to IBM SPSS Statistics version 27 for comprehensive statistical analysis. Descriptive statistics such as percentage and frequency was computed, and the mean with standard deviation used to summarize the continuous variables accordingly. Both bivariate and multivariable logistic regressions were performed to identify significant factors associated with pediatrics emergency visits. Those variables with p-value <

0.25 in bivariate analysis were entered to multivariable logistic regression analysis to control the effect of confounding variables. Multicollinearity was checked among independent variables using variance inflation factors and VIF found to be all <5. The model fitness was checked by using the Hosmer-Lemeshow goodness of fit test and is 0.45 which is fit. The strength of associations was expressed using adjusted odds ratios (AORs) with 95% confidence intervals, and the significance of associations was declared at a p-value of less than 0.05. The finally result presented by text, table, Pie-chart, or Graph

4.13 Ethical consideration

This study will be approved by Arsi University's Health Research Ethical Review Committee, accreditation number CoHS/R/224/2025. There was no direct human contact with the respondents in this study.

4.13.1Consent

Since this study involved data abstraction, no written consent was obtained from the study participants for using their records.

4.14 Dissemination of the result

The result of the study will be submitted and presented to Arsi University, College of Health Sciences, the School of Post Graduate and Department of Pediatrics and Child Health, as partial fulfillment for the requirements of Specialty Certificate in Pediatrics and Child Health. The final result of this thesis will be accessed from Arsi University, Health Sciences College library as the source for future learning. It will be submitted as hard copy for Assela hospital which will be used as an input for health care professional training and development. Finally, efforts will be done to publish on reputable peer reviewed national or international journal

CHAPTER 5 RESULT

5.1 Socio demographic characteristics

A total of 407 patients were included in this study. Male children predominated, accounting for 259 (63.6%) of visits, while 148 (36.4%) were female. Regarding age distribution, children aged 1–5 years constituted the largest proportion of emergency visits (186, 45.7%), followed by infants younger than one year (123, 30.2%). Children aged 6–10 years accounted for 72 (17.7%), while those 10–14 years represented the smallest group (26, 6.4%). Overall, more than three-quarters (75.9%) of emergency visits occurred among children younger than five years. From this 225 (55.3%) of the children were from rural areas, whereas 182 (44.7%) were from urban setting (Table 1).

Table 1 The frequency and percentile of socio demographic characteristic of PED visit at ARTH, Assela 2025

Variables	Categories	Frequency	Percentage
Age in years	Less than 1 years	123	30.2
	1-5 years	186	45.7
	6-10 years	72	17.7
	10-14 years	26	6.4
SEX	Female	148	36.4
	Male	259	63.6
Residence	Urban	182	44.7
	Rural	225	55.3

5.2 Contextual variable

More than half of the pediatric patients were self-referred to the emergency department (237, 58.2%), while 170 (41.8%) were referred from other health facilities. The evening period accounted for the highest proportion of visits time (150, 36.9%), followed by daytime arrivals (118, 29.0%) and morning hours (104, 25.6%). Only 35 (8.6%) patients presented during the night. Regarding seasonal variation, 287 (70.5%)

visits occurred during the dry season, whereas 120 (29.5%) were recorded in the rainy season (Table 2)

Table 2: The contextual variable (referral status, time of arrival and season) of PED visit at ARTH, Assela 2025

Variable		Frequency	Percentage
Referral status	Referred	170	41.8%
	Self-referral	237	58.2%
Time of arrival	Morning	104	25.6%
	Day time	118	29.0%
	Evening	150	36.9%
	Night	35	8.6%
Season	Rainy	120	29.5%
	Dry	287	70.5%

5.3 Base line clinical characteristics

Most children had no previous hospital admission (362, 88.9%), while 45 (11.1%) reported at least one prior admission. Regarding nutritional status, 344 (84.5%) were well nourished, whereas 63 (15.5%) were malnourished. The majority of children were alert on presentation (351, 86.2%), while 52 (12.8%) were lethargic, and 4 (1.0%) were in coma. With respect to comorbidity status, 368 (90.4%) had no comorbid conditions, whereas 39 (9.6%) had at least one comorbidity. Vaccination status showed that 319 (78.4%) children were fully vaccinated for age, 28 (6.9%) were partially vaccinated, 23 (5.7%) were unvaccinated, and vaccination status was unknown in 37 (9.1%) children. Nearly half of the children stayed in the pediatric emergency department for less than 24 hours (190, 46.7%), while 188 (46.2%) stayed for 1–3 days. A smaller proportion (29, 7.1%) required a stay of more than three days. Coming to visit appropriateness, 306 (75.2%) visits were classified as true emergencies, whereas 101 (24.8%) were avoidable visits. More than half of the

children (246, 60.4%) presented with at least one danger sign, while 161 (39.6%) had no documented danger sign (Table 3).

Table 3: Baseline clinical characteristics of PED visit at ARTH, Assela 2025

Variable		Frequency	Percent (%)
		N=407	
Previous admission	No	362	88.9
	Yes	45	11.1
Nutritional status	No Malnutrition	344	84.5
	Malnourished	63	15.5
Comorbidity	Yes	368	90.4
	No	39	9.6
	Alert	351	86.2
Mental status	Lethargic	52	12.8
	Coma	4	1.0
	Full vaccination	319	78.4
Vaccination status	Partial vaccination	28	6.9
	Un vaccination	23	5.7
	Unknown	37	9.1
Length of emergency stay	Less than 24 hours	190	46.7
	1-3 days	188	46.2
	more than 3 days	29	7.1
Avoidable visit status	Not emergency	101	24.8
	True emergency	306	75.2
Danger sign	No	161	39.6
	Yes	246	60.4

5.4 Clinical characteristics

Among children with true emergency conditions, the most common presentations were respiratory distress (97, 23.8%), followed by dehydration (50, 12.3%) and bleeding (20, 4.9%). Other notable emergencies include convulsions (4.4%), shock (3.4%), scald burns (2.7%), and acute abdomen (2.5%)(Table 4). Similarly, among documented danger signs, respiratory distress was the most frequent (85, 20.9%), followed by dehydration (10.6%), change in mental status (5.9%), bleeding (3.9%), convulsions (3.4%), and shock (2.9%)(Figure 2).

Table 4: True emergency and avoidable visit of PED visit at ARTH, Assela 2025

Variable		Frequency(N=407)	Percent(%)
True Emergency	Respiratory distress	97	23.8
	Dehydration	50	12.3
	Bleeding	20	4.9
	Change in mentation	13	3.2
	Convulsion	18	4.4
	Shock	14	3.4
	Scald burn	11	2.7
	Acute abdomen	10	2.5
	Other	71	17.4
Avoidable Visit		101	24.8

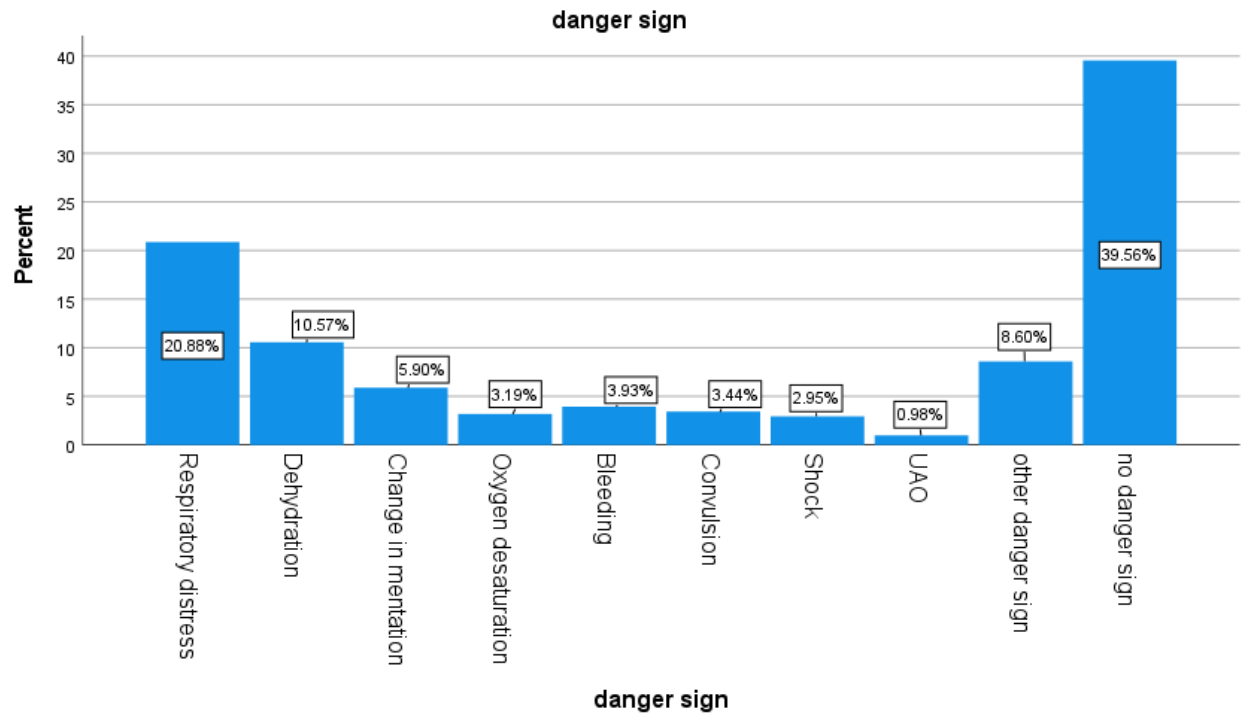


Figure 2: danger sign, among PED visit at ARTH ,Assela 2025

5.5 Presenting complaint and Diagnosis

The most common presenting complaint was cough (115, 28.3%), followed by fever (81, 19.9%). Trauma accounted for 37 (9.1%) presentations, while vomiting (6.9%), diarrhea (6.4%), and fast breathing (5.2%) were also frequent (Table 5). Regarding primary diagnosis, pneumonia was the leading diagnosis (78, 19.2%), followed by trauma (9.8%), acute gastroenteritis (9.6%), and malnutrition (6.9%) (Table 6). Other diagnoses included shock, meningitis, late-onset sepsis, and measles. More than half of the children (54.8%) had no secondary diagnosis, while pneumonia (9.8%) and acute gastroenteritis (6.9%) were the most common secondary diagnoses (Figure 3)

Table 5: Showing presentation complaint of PED visit at ARTH, Assela 2025

Variables	Frequency	Percent (%)
	N=407	
Cough	115	28.3
Fever	81	19.9
Diarrhea	26	6.4
Vomiting	28	6.9
Fast breathing	21	5.2
Trauma	37	9.1
Convulsion	14	3.4
Scald burn	12	2.9
Abdominal pain	8	2.0
Dog bite	8	2.0
Nasal foreign body	8	2.0
Others	49	12.0
Total	407	100.0

Table 6: Primary clinical diagnosis of PED visit at ARTH, Assela 2025

Variables	Frequency	Percentage
	N=407	(%)
Pneumonia	78	19.2
Trauma	40	9.8
AGE	39	9.6
Malnutrition	28	6.9
URTI	19	4.7
Shock	17	4.2
Meningitis	17	4.2
Late onset sepsis	17	4.2
Tuberculosis	7	1.7
Heart failure	7	1.7
Malaria	6	1.5
Scald burn	15	3.7
Measles	13	3.2
Animal bite	10	2.5
UTI	10	2.5
Acute abdomen	10	2.5
Febrile seizure	9	2.2
Nasal foreign body	9	2.2
Others	56	13.8
Total	407	100.0

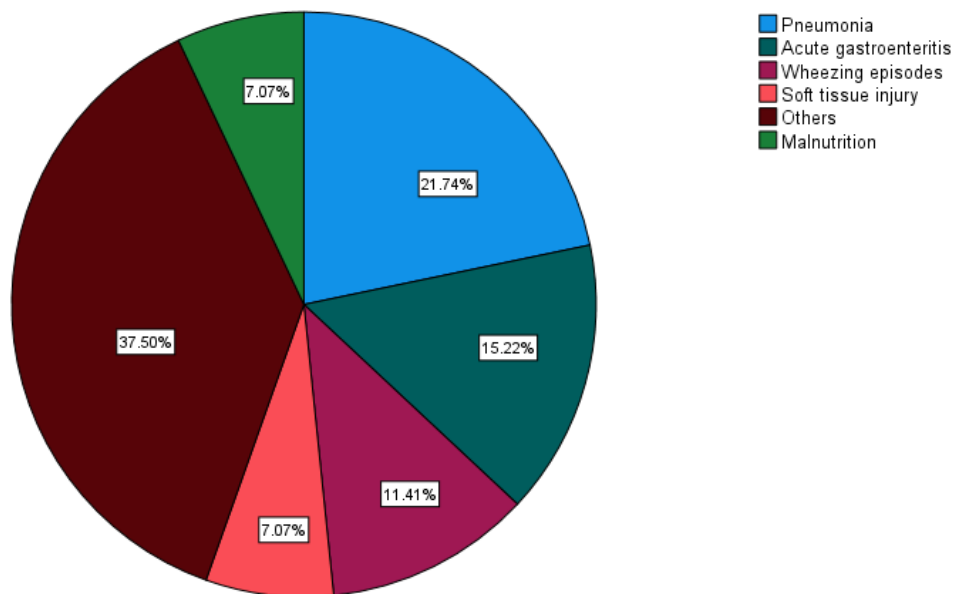


Figure 3: Secondary clinical diagnosis of PED visit at ARTH, Assela 2025

5.6 Outcome of PED visit

Regarding outcomes, 205 (50.4%) children were discharged with improvement, while 185 (45.5%) required hospital admission, including 177 admissions to the pediatric ward and 8 admissions to the PICU. Nine children (2.2%) died during emergency care, and six (1.5%) were referred to other facilities. (Table 7)

Table 7: Outcome of PED visit at ARTH, Assela 2025

Variables	Frequency N=407	Percent (%)
Discharged/improved	205	50.4
Admission/hospitalized	Pediatric ward	177
	PICU	8
Death	9	2.2
Referred	6	1.5

5.6 Factors associated with pediatric emergency clinical outcome

Table 8: Bivariate and multivariable logistic regression of factors associated with escalated care among pediatric emergency department visitors at ARTH, Assela, 2025

Variables	Category	Outcome		COR(95% CI)	AOR(95% CI)
		Stable/Good outcome	Escalated care outcome		
Age	<1year	49	74	1.71(0.99-2.92)	0.93 (0.38-2.24)
	1-5 years	104	82	0.89(0.54-1.46)	0.83(0.38-1.83)
	>5years	52	46	1	1
Referral status	Referred	147	90	3.15(2.09-4.76)	1.91(1.05-3.46)*
	Not referral	58	112	1	1
Residence	Rural	117	65	2.80(1.87-4.20)	1.29(0.71-2.34)
	Urban	88	137	1	1
Mental status	Affected	5	51	13.51(5.26-34.67)	5.75(1.67-19.83)**
	Normal	200	151	1	1
Comorbidity	Present	3	36	14.60(4.42-48.26)	7.30(1.30-40.94)*
	Absent	202	166	1	1
Nutritional status	Malnourished	4	59	20.73(7.36-58.37)	13.25(3.40-51.61)***
	Well nourished	201	143	1	1
Danger sign	Present	76	170	9.02(5.62-14.45)	2.06(1.09-3.86)*
	Absent	129	32		
Visit status	True emergency visit	117	189	10.94(5.85-20.46)	7.59(2.59-22.20)***
	Avoidable visit	88	13	1	1
Duration	1-3days	102	97	2.51(1.50-4.21)	2.23(1.03-4.83)*

Presenting complaint	of illness >3days	29	77	6.02(3.81-12.80)	5.66(2.22-14.40)**
	<24 hours	74	28	1	1
	Cough	47	68	5.42(2.59-11.34)	1.43(0.45-4.53)
	Fever	45	36	3.00(1.38-6.49)	0.45(0.13-1.50)
	Diarrhea	5	21	15.75(4.91-56.48)	5.99(1.09-39.30)*
	Vomiting	12	16	5.00(1.87-13.36)	1.15(0.25-5.21)
	Fast breathing	13	8	2.31(0.78-6.84)	1.18(0.29-4.78)
	Other	38	41	4.05(1.86-8.78)	3.42(0.92-9.58)
	Trauma	45	12	1	1
	Partial	11	17	1.65(0.75-3.64)	0.88(0.22-3.51)
Vaccination status	vaccination				
	Not	5	18	3.86(1.39-10.64)	1.28(0.28-5.76)
	Vaccination				
	Un known	24	13	0.58(0.28-1.18)	0.65(0.21-2.08)
LOS at PED	Full	165	154	1	1
	vaccination				
	1-3 days	76	112	2.42(1.60-3.65)	0.75(0.39-1.45)
	>3 days	11	18	2.68(1.20-6.00)	0.38(0.12-1.24)
	<24 hours	118	72	1	1

Note: COR = Crude Odds Ratio; AOR = Adjusted Odds Ratio; CI = Confidence Interval. * Significant at $p < 0.05$ (Significant) ** Significant at $p < 0.01$ (Highly Significant) *** Significant at $p \leq 0.001$ (Strongly Significant)

“N.B: Initially, multinomial logistic regression was considered; however, the frequency of death and referral events was insufficient for a robust model. Therefore, binary model was adopted using the epidemiologic definition of 'Escalated Care' as a composite outcome, which includes admission, referral, and death, to ensure statistical validity”

Bivariate and multivariable logistic regression analyses were performed to identify factors associated with escalated care outcomes among pediatric patients visited the

emergency department. Variables with a p-value <0.25 in the bivariate analysis were entered into the multivariable logistic regression model. Adjusted odds ratios (AOR) with 95% confidence intervals (CI) were used to determine independent predictors of escalated care. Multicollinearity test was done among independent variable and VIF was less than 5. Model fitness was checked with Hosmer and Lemeshow Test and it was 0.45 and is fit.

In the bivariate analysis, children aged less than one year showed higher crude odds of escalated care compared with those older than five years (COR = 1.71; 95% CI: 0.99–2.92). However, this association was attenuated and lost statistical significance in the multivariable analysis. After adjustment, children aged <1 year (AOR = 0.93; 95% CI: 0.38–2.24; $p = 0.860$) as well as those aged 1–5 years (AOR = 0.83; 95% CI: 0.38–1.83; $p = 0.650$) showed no independent association with escalated care outcomes compared with children older than five years (Table 8).

Referred children had significantly higher odds of escalated care in the bivariate analysis (COR = 3.15; 95% CI: 2.09–4.76). This association remained statistically significant after adjustment, although the magnitude of effect was reduced (AOR = 1.91; 95% CI: 1.05–3.46; $p = 0.033$). Children from rural residences also had higher odds of escalated care in the bivariate analysis (COR = 2.80; 95% CI: 1.87–4.20); however, residence was not independently associated with escalated care in the multivariable model (AOR = 1.29; 95% CI: 0.71–2.34; $p = 0.402$) (Table 8).

Clinical condition at presentation showed strong independent associations with escalated care. Children presenting with altered mental status had markedly higher odds of escalated care in the bivariate analysis (COR = 13.51; 95% CI: 5.26–34.67). This association persisted after adjustment (AOR = 5.75; 95% CI: 1.67–19.83; $p = 0.006$). Similarly, the presence of comorbidity was strongly associated with escalated care at the bivariate level (COR = 14.60; 95% CI: 4.42–48.26) and remained independently associated after adjustment (AOR = 7.30; 95% CI: 1.30–40.94; $p = 0.024$). Malnourished children had markedly increased odds of escalated care

compared with well-nourished children (AOR = 13.25; 95% CI: 3.40–51.61; $p = 0.001$). The presence of danger signs was also independently associated with escalated care outcome, with children exhibiting danger signs having approximately twice the odds of escalated care compared with those without danger signs (AOR = 2.06; 95% CI: 1.09–3.86; $p = 0.026$). Similarly, Children presenting with true emergency visits had significantly higher odds of escalated care compared to avoidable visits in the bivariate analysis (COR = 10.94; 95% CI: 5.85–20.46). This association remained strong and statistically significant after adjustment (AOR = 7.59; 95% CI: 2.59–22.20; $p = 0.001$). Regarding duration of illness, children presenting after 1–3 days (COR = 2.51; 95% CI: 1.50–4.21) and those presenting after more than 3 days (COR = 6.02; 95% CI: 3.81–12.80) had increased odds of escalated care in the bivariate analysis. These associations remained significant in the multivariable model for both 1–3 days (AOR = 2.23; 95% CI: 1.03–4.83; $p = 0.042$) and more than 3 days (AOR = 5.66; 95% CI: 2.22–14.40; $p = 0.001$) (Table 8).

Several presenting complaints showed significant crude associations with escalated care. Children presenting with cough (COR = 5.42; 95% CI: 2.59–11.34), fever (COR = 3.00; 95% CI: 1.38–6.49), diarrhea (COR = 15.75; 95% CI: 4.91–56.48), vomiting (COR = 5.00; 95% CI: 1.87–13.36), and other complaints (COR = 4.05; 95% CI: 1.86–8.78) had higher odds of escalated care compared to trauma cases. However, after adjustment, only diarrhea remained significantly associated with escalated care (AOR = 5.99; 95% CI: 1.09–39.30; $p = 0.032$), while other presenting complaints were no longer statistically significant. Vaccination status did not show a statistically significant association with escalated care in multivariable analyses. Length of stay in the pediatric emergency department was significantly associated with escalated care in the bivariate analysis for stays of 1–3 days (COR = 2.42; 95% CI: 1.60–3.65) and more than 3 days (COR = 2.68; 95% CI: 1.20–6.00). However, these associations lost statistical significance after adjustment, suggesting that prolonged stay was more likely a consequence rather than a predictor of escalated care (Table 8).

CHAPTER 6 DISCUSSION

This study was to characterize the epidemiologic profile, clinical outcomes and associated factors of PED visit. In this study on socio demographic feature male was found to be higher among patient visiting PED, 63.6% of visits. Most of patients were from rural setting 55.3%. Regarding age distribution age <5 years is common age of presentation with 75.9%. This finding is similar to study done in morocco in which male was 57.8%.[27] From our country data study in Dillaa university(56.4% and 43,6%), Different public hospital in Addis Ababa(53.6,46.4) have found male and female admission with male predominant respectively[17, 29]. Similarly toddlers or age less than 2 years are the predominant to visit PED. Age less than 5 years is 75.9% in this study. From study at DURH and different public hospital in Addis Ababa it was 87.2% and 77.9% are less than 5 years[17, 29]. Most of the patient in this study was from rural areas 225(55.3%) and is comparable with study done in TASH in which 54.9% where rural residents[44]. This consistency suggests that pediatric emergency departments in Ethiopia predominantly serve young children, reflecting the higher vulnerability and disease burden in this age group and rural populations continue to represent a significant proportion of patients accessing tertiary emergency care, likely due to limited emergency primary healthcare services and supplies in rural areas.

Self-referral was more common than referral visit in this study, comprising 237(58.2%), compared to 170 (41.8%) referral visits. This finding align with other studies in Ethiopia, such as one at Dilla university (82% are self-referred) and another in Mekelle (76.5% non-referral)[17, 45]. In contrast, 92.4% of patients were referral case according to study done in TASH[15]. This high non referral in this study may be attributed to its role as sole government hospital serving the town and surrounding woredas, potentially indicating weaker referral connections. Furthermore, the hospital functions not only as a referral center but also provide primary care service.

Most of the patient arrived at emergency unit during evening (36.9%), followed by daytime (29.0%), morning hours (25.6%) and (8.6%) patients presented at night.

Seasonal Variation is there with (70.5%) visits occurred during the dry season, whereas (29.5%) in the rainy season. This finding is on time of arrival is comparable to study done in Saudi Arabiya in which morning, evening and night shift visit are, 29.4%, 46.5% and 24.1% respectively [25]. On study done at TASH was 53.4%, 34.3% and 12.3% for morning, evening and night respectively; the evening visit and night visit are comparable to this study [44]. The reason why evening visit higher in this study could be due to this the only government hospital in the town to give night service until recently.

During dry season visit to emergency in this study is about 2/3 of cases. There is no similar study in Ethiopia on seasonal variation of PED utilization. However, related study in DURH reported nearly equal admission to pediatric emergency is 50.3% and 49.7% on winter and summer respectively. In contrast, in this study about 2/3 visit is during dry season may be attributed to higher respiratory illness during dry season, as well as during this period schooling start, which is associated with increased communicable disease.

Most of patient had no previous admission with 362 (88.9%) and only 11.1% have history of previous admission. This finding is comparable to retrospective multicenter cohort study done in Canada which found return visits to the emergency department occur in 2.7% to 8.1% [46]. The study done in Dilla university referral hospital found 86% of PED visit was 1st visit and repeat visit were 14% which is closely align with this study findings [17]. This pattern reflects the role of PEDs in providing acute care to children presenting with health problems rather than ongoing or chronic care management.

Regarding nutritional status 84.5% were well nourished which is similar to study done in Debre birhan and west wollega community level nutritional status which is 84.2% and 84.8% are well nourished respectively [47, 48]. However, it is critical to note that while malnutrition is not the most common finding in this study, it is the most lethal or highest risk-bearing condition in the PED.

Mental status wise most of patient presented were alert(86.2%),12.8% are lethargic and 4% comatose. There is no similar explanation published study on other LMIC of Africa and Asia. This finding is almost similar to study done in TASH which found 89.6% were alert, while 8.2% were confused and 2.2% were comatose on presentation[44]. This finding could be due to the fact that most majority of emergency visit is due to acute illness like pneumonia and gastroenteritis.

The prevalence of comorbidity in this study was low, with 90.4% had no comorbid conditions and 9.6% has at least one comorbidity. The patient with comorbidity is low in this study as compared to other study done in different public hospital of Addis Ababa in which 19.8% and DURH in which it was around 30%[17, 29]. However, it is a similar range to a multi- center observational study done in Europe in which among pediatric patient who visit emergency only 16% have comorbidity [49]. This slightly lower comorbidity finding in this study could be due to higher non-referral as compared to other studies. This pattern also seen in other studies, suggests that most of patient utilize emergency for acute illness other than chronic causes.

Most patients who visited emergency are fully vaccinated or up-to-date 78.2%. This is followed by 6.9% who were partially vaccinated, 5.7% who were unvaccinated, and 9.1% with unknown vaccination status. This study finding is higher than national immunization coverage data 43% EDHS data 2019[11], but is comparable to other hospital based studies DURH in which 78.9%,9.1%,12% fully vaccinated, partially vaccinated, unvaccinated respectively [17] and about 83% also in urban level vaccination like in Addis Ababa[11]. This finding reveals healthcare-seeking behavior is better among fully vaccinated children contributing to higher PED utilization among well-vaccinated children.

Nearly half (46.7%) of patient stayed less than 24 hours, while 46.25%, and 7.1% stayed 1-3 days and >3 days respectively. Overall, 53.3% of patient stayed more than 24 hours in this study. In comparison with study done in TASH majority of patient 67,2% and study done in woliyita sodo hospital shows 78.9% stayed more than 24

hours[50, 51]. The observed difference may be attributed to low bed number capacity in our emergency department, which has only 8 beds, potentially necessitating earlier patient disposition.

Regarding appropriateness of emergency utilization, 75.2% were classified as true emergencies, while 24.8% of visits were non emergent cases. This finding align with the international pediatric trends, where non emergent visit number typically range from 20-40% of overall visits, as seen in studies from Istanbul, Turkey[52]. In contrast, a study at TASH reported that approximately 90% of cases were emergent or urgent (29.9% and 61.1%, respectively), with only 9% classified as non-emergent [50]. This discrepancy is likely due to the referral status of TASH, which functions as a tertiary center where most patients are pre-screened for emergency intervention.

60.4% of patient in this study have danger sign upon presentation indicating a high burden of clinical severity at presentation. Although direct comparisons with similar published pediatric ED studies not available related research from SNNP region, Ethiopia found that more than 75% pediatric emergency cases presented with multiple signs or symptoms of different severity[16]. This slight difference could be due to high non emergent visit in this study in which 24.8% were non emergent visit; which means emergent case almost all have danger sign.

The leading emergency sign identified in this study were respiratory distress (20.9%), dehydration (10.6), change in mentation (5.9%), bleeding (3.9%) and shock (2.9%) are. These priorities are consistent with findings from DURH[17]. The study from Dakar Senegal support this even though it differ with exact number respiratory distress (56%), dehydration (29%), shock 13% [53]. This shows respiratory and gastrointestinal problem are common cause of PED visits and acute illness are common cause of emergency visit. In this study, the most common presenting complaints were Cough(28.3%), Fever(19.9%), trauma(9.1%), Vomiting(6.9%), Diarrhea(6.4%) and fast breathing(5.2%). When categorized by organ system wise Respiratory system(33.4%), gastrointestinal system(15.2%), Trauma related(11.1), and CNS

related(6.4%).This study finding is consistent with data from Kenyatta national hospital Kenya in which the most common presenting complaints were cough (40%), fever (34%), and nausea/vomiting (19%)[54]. Our results also align closely with a study conducted at a public hospital in Eastern Ethiopia, which reported that respiratory-related complaints (34.69%) and gastroenteritis (23.39%) were the primary reasons for pediatric emergency admission[55].

In this study the most common primary diagnosis is pneumonia 19.2% followed by trauma (9.8%), acute gastroenteritis (9.6%), and malnutrition (6.9%). Other diagnoses included shock, meningitis, late-onset sepsis, and measles. This finding are consistent with findings from different public hospital Addis Ababa, where pneumonia(21.4%),different surgical emergency(14.5%),late onset sepsis(9.2%),Gastroenteritis(8.3%) were the most common diagnosis. Similarly Study from Dillaa university hospital also shows pneumonia is common PED diagnosis with 41.6% followed by gastroenteritis 29.8%[17, 29]. This underscores the persistent burden of the infectious diseases (pneumonia and gastroenteritis) as the primary drivers of pediatric emergency utilization.

Regarding outcomes almost half of PED visit (50.4%) children were discharged with improvement, while (45.5%) required hospital admission with 2% of admissions were to the PICU. Nine children (2.2%) died during emergency care, and six (1.5%) were referred to other facilities. Comparable studies in Ethiopia show similar outcome patterns with some variability. Multicenter pediatric emergency study in different public hospitals in Addis Ababa reported a lower discharge rate (39.6%) and higher mortality rate (5%), whereas Dillaa University Referral Hospital's emergency outcomes showed a discharge rate close to 51% but a higher mortality of 7.6%. A study from Mekelle also documented a lower improvement rate and higher proportions of PICU transfers and deaths (6.8%)[17, 29, 45]. In contrast, emergency mortality (2.2%) is lower than regional reports such as in SNNPR where pediatric emergency mortality was 4.1%[16]. These comparisons suggest that while discharge

proportions in this study are comparable to other Ethiopian PED settings, mortality and PICU admission rates vary by hospitals. Lower ICU admission in our hospital could be due to few bed numbers in ICU which is both for adult and pediatric patients. The observed mortality rate (2.2%) falls within the internationally recognized range for pediatric emergency settings in low-resource environments but lower than many systemic review studies in Ethiopia[56]. This could be due to single centered study and retrospective study in which death chart could have been lost.

In this study, several factors were found to be associated with pediatric emergency department (PED) visit outcomes on bivariate analysis, although some lost significance after adjustment for confounding factors. On multivariable logistic regression analysis, altered mental status (AOR = 5.75; 95% CI: 1.67–19.83; $p = 0.006$), presence of comorbidity (AOR = 7.30; 95% CI: 1.30–40.94; $p = 0.024$), being referral case (AOR = 1.91; 95% CI: 1.05–3.46; $p = 0.033$) and presence of danger signs at presentation (AOR = 2.06; 95% CI: 1.09–3.86; $p = 0.026$) were independently associated with escalated care outcomes. Similarly, presentation as a true emergency (AOR = 7.59; 95% CI: 2.59–22.20; $p = 0.001$), malnourished children (AOR = 13.25; 95% CI: 3.40–51.61; $p = 0.001$) and longer duration of illness 1–3 days (AOR = 2.23; 95% CI: 1.03–4.83; $p = 0.042$) and more than 3 days (AOR = 5.66; 95% CI: 2.22–14.40; $p = 0.001$) were significantly associated with escalated care.

Affected mental status, having comorbid illness and presence danger sign on admission are strongly associated with escalated care outcome. Specifically, children presenting with comorbidities had seven-fold higher odds of escalated care and altered mental status had nearly six-fold increased odd. This finding similar to finding from Mekele in which having comorbidity is 8 times and in study at DURH comorbidity 4 times odds of escalated outcome, danger sign respiratory five times higher odds with poor outcome[17, 45]. These findings underscore the importance of early recognition of clinical severity markers in predicting adverse outcomes.

In this study presentation after 24 hours of illness is associated with higher odds of escalated care. Children presenting with 1-3 days after illness onset had two- fold higher odds, while those presenting more than 3 days had more than fivefold escalated care. This finding aligns with studies from DURH, TASH and hospitals in SNNPR, where delayed presentation was associated with two to five folds increased odds of adverse outcomes[17, 30, 44]. Delayed care-seeking likely contributes to disease progression, increased complications, and greater need for advanced interventions.

In this study malnourished patient has 13 times and being referral 2 times odds of escalated care outcome. This finding is similar to study from DURH in which malnourished children have 3.5 times odd of poor outcome as compared with well-nourished children[17]. Regarding referral no associated study from Ethiopia but study from Malawi reveals 1.9 times associated with poor outcome in comparison with self-referral[57].This tells us the fact that malnourished patient have limited physiologic reserve and referral likely represents greater disease severity.

Presenting complaint wise on multivariable model, diarrhea stood out as the only presenting complaint with a strong independent association with escalated care nearly 6-fold higher odds, whereas complaints like cough, fever, vomiting, and fast breathing did not remain significant after adjustment. Clinically, diarrhea in resource-limited settings is often associated with dehydration, electrolyte imbalance, and rapid clinical deterioration(like shock) in young children especially when care is delayed or access to fluids/electrolytes is limited which could explain its independent association. This is comparable to study from DURH in which Children presenting with diarrhea had nearly 3 times higher odds of mortality compared with those without diarrhea[17]. Cough, fever, fast breathing is very common symptoms in pediatric emergency populations and often represents a heterogeneous set of etiologies like viral infections; mild respiratory illnesses this could be why they lost significant association after clinical severity marker are included in the model.

This suggests that it is not the presenting complaint group alone, but rather the severity of presentation and presence of danger signs that determine escalation. This pattern is consistent with evidence from similar LMIC settings where severe clinical manifestations rather than broad complaint are the main predictors of higher-level care[17, 21, 33, 44, 45].

CHAPTER 7 STRENGTH AND LIMITATIONS OF THE STUDY

7.1 Strength

The study employs a standardized sampling approach, a systematic random sampling, which likely improves the representativeness of the results. Furthermore this study gives comprehensive insight to pediatric emergency visit epidemiologic profile with inclusion of multiple variables which was not seen on other related study at once. It is also a 3 year study which is important for representation of population and consensus.

7.2 Limitation of the study

This study was single centered so that may lack generalization all population and is also retrospective chart review study which relies on medical records, which may be incomplete or inaccurate. In this study some variable like comorbidity, Nutritional status and diarrhea showed wide confidence interval which is due to sparse data in this study; so that multicenter study with more sample size study is needed

CHAPTER 8 CONCLUSIONS AND RECOMMENDATIONS

8.1 Conclusion

Overall, pediatric emergency department utilization in this study reflects a high burden of acute and severe childhood illnesses, particularly among under-five children from rural communities. Although most visits were appropriate emergencies, the non-emergent or avoidable visit were more than other studies which need to strength triage to focus on critical cases. Delayed presentation was common and strongly associated with the need for escalated care. Clinical severity markers such as danger signs, altered mental status, comorbidities, malnutrition and diarrheal cases were the strongest predictors of escalated care outcomes, rather than the type of presenting complaint alone. This shows the importance of early identification and prompt management of high-risk children at triage. The relatively lower PICU admission rates which may be due to resource limitations, including restricted ICU capacity.

8.2 Recommendations

To ARTH: 1, Strengthen pediatric emergency triage: implement ETAT(Emergency Triage Assessment and Treatment) system, early risk identification and act accordingly on high risk patients. This should include mandatory, periodic training for all PED staff to ensure the early identification of high-risk patients.

2, Optimize Critical Care Utilization: Establish a "pediatric-specific triage-to-ICU protocol." Given the limited PICU bed capacity identified in this study, this protocol should provide clear, objective criteria to ensure that the few available beds are prioritized for the children identified by this study's model specifically those presenting with altered mental status, severe danger signs, and malnutrition.

3, Standardize Emergency Documentation: Improve data quality by implementing standardized PED medical charts. These charts should have dedicated sections for the mandatory recording of danger signs, triage category, and precise outcomes to facilitate future clinical audits.

To the health professionals: Enhance caregiver awareness and community

engagement by conducting community education on recognition of pediatric danger sign and importance of early care-seeking.

To ORHB and ARTH: To improve early presentation and early referral from rural areas, strengthen linkage between health centers, primary hospitals, and ARTH through clear referral protocols promote early referral for under-five children with danger signs.

To future researcher: Use this study as baseline data for future prospective. Conduct periodic PED utilization and outcome audit.

CHAPTER 9 REFERENCES

- [1] Tagoola A, Hildenwall H. Paediatric Emergency Care in Low-Income Countries—Can Guidelines be Generalized? *Glob Pediatr Heal* 2024; 11: 4–6.
- [2] Newgard CD, Lin A, Goldhaber-Fiebert JD, et al. State and National Estimates of the Cost of Emergency Department Pediatric Readiness and Lives Saved. *JAMA Netw Open* 2024; 7: e2442154.
- [3] Kamau S, Kigo J, Mwaniki P, et al. Comparison between the Smart Triage model and the Emergency Triage Assessment and Treatment guidelines in triaging children presenting to the emergency departments of two public hospitals in Kenya. *PLOS Digit Heal* 2024; 3: 1–15.
- [4] United Nations. The Millennium Development Goals Report. *United Nations* 2015; 72.
- [5] Rigg J. The Sustainable Development Goals (SDGS). *Companion to Dev Stud* 2024; 253–257.
- [6] Group UNI. *Levels & Trends in*. 2024.
- [7] Alsabri M, Okesanya OJ, Emad R, et al. Bridging the Gaps to Pediatric Emergency Care Providers in Low- Resource Settings: Challenges and Pathways to Progress. 2025; 1–17.
- [8] Kula R, Popela S, Klučka J, et al. Modern Paediatric Emergency Department: Potential Improvements in Light of New Evidence. *Child (Basel, Switzerland)*; 10. Epub ahead of print April 2023. DOI: 10.3390/children10040741.
- [9] Barata I, Auerbach M, Badaki-Makun O, et al. A Research Agenda to Advance Pediatric Emergency Care Through Enhanced Collaboration Across Emergency Departments. *Acad Emerg Med* 2018; 25: 1415–1426.
- [10] Ethiopian Ministry of Health. Health Sector Transformation Plan II 2020/2021-2024/2025. *Ethiop Minist Heal* 2021; 25: 1–128.
- [11] Ethiopian Public Health Institute (EPHI), ICF. *Ethiopia Mini Demographic and Health Survey 2019: Final Report*, <https://dhsprogram.com/pubs/pdf/FR363/FR363.pdf> (2021).
- [12] Emergency care saves lives, <https://www.who.int/initiatives/emergency-care-saves-lives> (accessed 21 January 2026).
- [13] Alsabri M, ELKarargy MA, Ata IM, et al. Mortality predictors in pediatric emergency department presentations: a systematic review and meta-analysis. *BMC Emerg Med* 2025; 25: 188.
- [14] Feyissa Mechessa D, Dessalegn D, Melaku T. Drug-related problem and its predictors among pediatric patients with infectious diseases admitted to Jimma University Medical Center, Southwest Ethiopia: Prospective observational study. *SAGE open Med* 2020; 8: 2050312120970734.
- [15] Jofiro G, Jemal K, Beza L, et al. Prevalence and associated factors of pediatric emergency mortality at Tikur Anbessa specialized tertiary hospital: A 5 year

- retrospective case review study. *BMC Pediatr*; 18. Epub ahead of print 2 October 2018. DOI: 10.1186/s12887-018-1287-4.
- [16] Tsegaye H, Demelash A, Aklilu D, et al. Determinants of pediatrics emergency mortality at comprehensive specialized hospitals of South nation nationalities and people region, Ethiopia, 2022: unmatched case-control study. *BMC Pediatr* 2023; 23: 1–9.
 - [17] Dube SJ, Seboka BT, Demeke AD, et al. Admission outcomes and their associated factors among children admitted to the paediatric emergency unit within 24 hours of Dilla University Referral Hospital, Ethiopia, 2023: a cross-sectional study. *BMJ Open* 2025; 15: e091359.
 - [18] Seid SS, Ibro SA, Ahmed AA, et al. Magnitude of admission, premature mortality and potential years of life lost due to acute diseases among pediatric patients admitted to public hospitals in Jimma City, Southwest Ethiopia. *Pan Afr Med J* 2022; 43: 135.
 - [19] who-ethiopia-annual-report-2022.
 - [20] Tefera YG, Ayele AA. Newborns and Under-5 Mortality in Ethiopia: The Necessity to Revitalize Partnership in Post-COVID-19 Era to Meet the SDG Targets. *J Prim Care Community Health* 2021; 12: 2150132721996889.
 - [21] Gowa M, Habib I, Tahir A, et al. Disease Spectrum and Frequency of Illness in Pediatric Emergency: A Retrospective Analysis From Karachi, Pakistan. *Ochsner J* 2019; 19: 340–346.
 - [22] Bazaraa HM, El Houchi S, Rady HI. Profile of patients visiting the pediatric emergency service in an Egyptian University Hospital. *Pediatr Emerg Care* 2012; 28: 148–152.
 - [23] Putu N, Medyantari A, Wati DK. Profile of Pediatric Patients at Emergency Department in Secondary Hospital in July-December 2021. 2021; 119: 128–136.
 - [24] Guckert L, Reutter H, Saleh N, et al. Nonurgent Visits to the Pediatric Emergency Department before and during the First Peak of the COVID-19 Pandemic. *Int J Pediatr* 2022; 2022: 7580546.
 - [25] Al-Qahtani MH, Yousef AA, Awary BH, et al. Correction to: Characteristics of visits and predictors of admission from a paediatric emergency room in Saudi Arabia (BMC Emergency Medicine, (2021), 21, 1, (72), 10.1186/s12873-021-00467-7). *BMC Emerg Med* 2021; 21: 1–8.
 - [26] Agbesanwa TA, Babatola AO, Fatunla OA, et al. Pattern of admissions and outcome in the children emergency department of a tertiary health institution in Southwestern Nigeria: A four-year review. *African J Emerg Med Rev africaine la Med d'urgence* 2023; 13: 45–51.
 - [27] Jbari S, Lahmini W, Eddabbah M, et al. The characterization of a hospitalized population at the pediatric emergency service of Mother and Child Hospital, Marrakech, Morocco. *Pan Afr Med J*; 43. Epub ahead of print 2022. DOI: 10.11604/pamj.2022.43.138.29471.
 - [28] Haman S, H       KS, Dominique E, et al. Epidemiological, Clinical, and Evolutionary Profile of Children Admitted to the Pediatric Emergency

- Department of the Maroua Regional Hospital, Cameroon. *Open J Pediatr* 2024; 14: 878–888.
- [29] Asinakew T, Habte T. Emergency Admissions and Associated Factors among Children Admitted to the Pediatric Emergency Unit at Selected Public Hospitals at Addis Ababa, Ethiopia – A Retrospective Cross-Sectional Study. *J Emerg Med Open Access* 2024; 2: 01–11.
 - [30] Tsegaye H, Demelash A, Aklilu D, et al. Determinants of pediatrics emergency mortality at comprehensive specialized hospitals of South nation nationalities and people region, Ethiopia, 2022: unmatched case-control study. *BMC Pediatr* 2023; 23: 192.
 - [31] Amjad S, Tromburg C, Adesunkanmi M, et al. Social Determinants of Health and Pediatric Emergency Department Outcomes: A Systematic Review and Meta-Analysis of Observational Studies. *Ann Emerg Med* 2024; 83: 291–313.
 - [32] Kaiser S V., Hall M, Bettenhausen JL, et al. Neighborhood Child Opportunity and Emergency Department Utilization. *Pediatrics*; 150. Epub ahead of print 2022. DOI: 10.1542/peds.2021-056098.
 - [33] Brugnolaro V, Fovino LN, Calgaro S, et al. Pediatric emergency care in a low-income country: Characteristics and outcomes of presentations to a tertiary-care emergency department in Mozambique. *PLoS One* 2020; 15: 1–16.
 - [34] Okeke C V, Obaji O V, Ogeh CO, et al. Determinants and Prevalence of Paediatrics Return Visits to the Emergency Department in a Tertiary Hospital in Southeast Nigeria: A Retrospective Study. *Niger Med J* 2025; 66: 174–186.
 - [35] Hsia RY, Niedzwiecki M. Avoidable emergency department visits: a starting point. *Int J Qual Heal care J Int Soc Qual Heal Care* 2017; 29: 642–645.
 - [36] Bekele M, Urgessa M, Kumsa K, et al. Contributing factors of delay in seeking treatment for childhood diarrheal diseases in Berbere Woreda, Ethiopia: an unmatched case–control study. *J Heal Popul Nutr* 2023; 42: 1–8.
 - [37] Lucyk K, Tang K, Quan H. Barriers to data quality resulting from the process of coding health information to administrative data: a qualitative study. *BMC Health Serv Res* 2017; 17: 766.
 - [38] Belayneh AG, Temachu YZ, Messelu MA, et al. Prolonged length of stay and its associated factors at adult emergency department in amhara region comprehensive specialized hospitals, northwest Ethiopia. *BMC Emerg Med* 2023; 23: 1–11.
 - [39] Patient-Level Characterisation | IOMED Data Space Platform, https://docs.iomed.health/docs/data_analysis/standard_studies/patient_level_characterisation.html?utm_source=internet.com (accessed 21 January 2026).
 - [40] Birhan S, Gedamu S, Belay MZ, et al. Treatment Outcome, Pattern of Injuries and Associated Factors Among Traumatic Patients Attending Emergency Department of Dessie City Government Hospitals, Northeast Ethiopia: A Cross-Sectional Study. *Open Access Emerg Med* 2023; 15: 303–312.
 - [41] Ede J, Kent B, Watkinson P, et al. Successfully initiating an escalation of care in acute ward settings—A qualitative observational study. *J Adv Nurs* 2025; 81:

- 887–896.
- [42] WHO. Updated guideline: paediatric emergency triage, assessment and treatment: care of critically-ill children. *World Heal Organ* 2016; 7.
 - [43] Ad INFCH. Who emergency unit form: general.
 - [44] Zeleke TA, Nora WT, Denberu MT, et al. Length of stay and associated factors among pediatric patients in the pediatric emergency unit of the Tikur Anbessa specialized hospital, Addis Ababa, Ethiopia. *BMC Emerg Med*; 24. Epub ahead of print 2024. DOI: 10.1186/s12873-024-01089-5.
 - [45] Of O, Admissions E, Among F, et al. MEKELLE UNIVERSITY COLLEGE OF HEALTH SNCE SCHOOL OF NURSING OUTCOMES OF EMERGENCY ADMISSIONS AND ASSOCIATED FACTORS AMONG CHILDREN ADMITTED TO THE PEDIATRIC EMERGENCY UNIT OF PUBLIC HOSPITALS IN MEKELLE , ETHIOPIA , HEALTH SCIENCE , SCHOOL OF NURSING , IN.
 - [46] Meyer-Macaulay CB, Truong M, Meckler GD, et al. Return visits to the pediatric emergency department: A multicentre retrospective cohort study. *CJEM* 2018; 20: 578–585.
 - [47] Menalu MM, Bayleyegn AD, Tizazu MA, et al. Assessment of prevalence and factors associated with malnutrition among under-five children in debre berhan town, Ethiopia. *Int J Gen Med* 2021; 14: 1683–1697.
 - [48] Dibisa KE, Mengesha G, Kenea G, et al. Prevalence and factors associated with acute malnutrition among children aged 6–59 months in West Wollega, Oromia, Ethiopia, 2024. *J Heal Popul Nutr*; 44. Epub ahead of print 2025. DOI: 10.1186/s41043-025-00928-w.
 - [49] Borensztajn DM, Hagedoorn NN, Carrol ED, et al. Febrile children with comorbidities at the emergency department — a multicentre observational study. *Eur J Pediatr* 2022; 181: 3491–3500.
 - [50] Zeleke TA, Nora WT, Denberu MT, et al. Length of stay and associated factors among pediatric patients in the pediatric emergency unit of the Tikur Anbessa specialized hospital, Addis Ababa, Ethiopia. *BMC Emerg Med* 2024; 24: 170.
 - [51] Negasi KB, Tefera Gonete A, Getachew M, et al. Length of stay in the emergency department and its associated factors among pediatric patients attending Wolaita Sodo University Teaching and Referral Hospital, Southern, Ethiopia. *BMC Emerg Med* 2022; 22: 1–11.
 - [52] Dut R. Usage of Pediatric Emergency Department for Non-Urgent Complaints. *Eurasian J Emerg Med* 2017; 16: 23–28.
 - [53] Thiongane A, Ndongo AA, Sow A, et al. Epidemiology of Admissions in a Pediatric Emergency Department in Albert Royer Hospital Dakar. *Open J Pediatr* 2022; 12: 188–195.
 - [54] Myers JG, Nwakibu UA, Hunold KM, et al. Pediatric Medical Emergencies and Injury Prevention Practices in the Pediatric Emergency Unit of Kenyatta National Hospital, Nairobi, Kenya. *Pediatr Emerg Care*; 38, https://journals.lww.com/pec-online/fulltext/2022/01000/pediatric_medical_emergencies_and_injury.88.aspx (2022).

- [55] Melkamu N, Faris A, Yigezu M, et al. Length of stay in the pediatrics emergency department and associated factors among pediatrics patients in Eastern Ethiopia public hospital, Ethiopia 2022. *PLoS One* 2025; 20: 1–17.
- [56] Messelu MA, Amlak BT, Mekonnen GB, et al. Mortality and its determinants among patients attending in emergency departments. 2024; 1–12.
- [57] Selstø A, King C, Hildenwall H, et al. Association between care-seeking at health centres preceding hospital admission and in-hospital child mortality in rural Malawi. NEW: Association between no referral versus health centres referrals preceding hospital admission and in-hospital child mortal. *F1000Research* 2025; 12: 1053.

ANNEXES I QUESTIONNAIRE

Table 9 Kobo collect questionnaire data entry format for use for PED visit study at ARTH, Assela, 2025

Section	Variable Name	Question (Label)	Response Options	Notes
Section A: Identification & Sociodemographic Data	Medical record number	Record ID	Unique code	
	Date visit	Date of visit		
	Age	Age of child (months/years)	Include children aged 1 month–14 years only	
	Sex	Sex of the child	1=Male; 2=Female	
	Residence	Place of residence	1=Urban; 2=Rural	
Section B: Contextual Variables	Referral status	Referral status	1=Referred; 2=Not referred	
	Time arrival	Time of arrival	1=Morning; 2=Evening; 3=Night	
	Season	Season	1=Rainy; 2=Dry	
	Avoidable visit	Avoidable visit	1=Yes; 2=No; 3=Not recorded	
Section C: Clinical Presentation	Presenting complaints	Main presenting complaint(s)	1=Fever; 2=Diarrhea; 3=Cough; 4=Fast breathing; 5=Convulsion; 6=Vomiting; 7=Trauma; 8=Others	If other specify
	Duration illness	Duration of illness before presentation	in hours/days	
	Danger signs	Danger signs present	1=Yes; 2=No	If Yes, specify below
	Danger signs (specify)	Specify danger signs		Visible only if danger signs=1

Section D: Diagnosis at PED	Primary diagnosis	Primary diagnosis	1=Pneumonia; 2=URTI; 3=Malnutrition; 4=AGE; 5=Malaria; 6=Meningitis; 7=Sepsis; 8=Shock; 9=HIV/TB; 10=Trauma; 11=Heart failure; 12=Other	Select one main diagnosis
				If other specify
	Secondary diagnosis	Secondary diagnosis	1 yes;2 No	Optional
Section E: Baseline Clinical Characteristics	Vitals recorded	Vital signs recorded?	1=Yes; 2=No	
	Mental status	Mental status	1=Alert; 2=Lethargic; 3=Unconscious	
	Nutrition status	Nutritional status	1=Normal; 2=Moderate malnutrition; 3=Severe malnutrition	
	Previous admission	History of previous admission	1=Yes; 2=No	
	Comorbidity	Comorbidities	Specify if any	
	Vaccination	Vaccination up to date	1=Yes; 2=No; 3=Unknown	
	Length stay	Length of stay in PED (hours)		
Section F: Outcome of PED Visit	Final outcome	Outcome of PED visit	1=Discharged/recovered; 2=Hospitalized; 3=Referred; 4=Died	
	Outcome time	Date and time of outcome		
	Ward admitted	hospitalized Ward	1=ICU 2=Pediatric	

ANNEX II DECLARATIONS

Declaration of Investigator

I, Dr Tufa Nugusu the undersigned student of Specialty program of Pediatric and Child Health, declare that this Research thesis is my original work in partial fulfillment of the requirement for the Specialty certificate in Pediatrics and Child Health to my best knowledge.

Name of investigator: Dr Tufa Nugusu

Signature:_____ Date:

Declaration of Advisors

We, the undersigned Advisors, declare that this research thesis is his original work in partial fulfillment of the requirement for the Specialty Certificate in Pediatrics and Child Health for the stated student above to our best knowledge. We confirmed that this thesis is ready for defense with our approval as the university advisor(s).

Date of Submission:

Name of Public Advisor:

Dr Ayalneh Demissie

Signature



Date

27/01/2026

Name of clinical Advisor:

Dr Achalu Mekuria

Signature



Date

