



# The Clinical Profile and Outcome of patients admitted in Pediatric Intensive Care Unit at Tertiary care hospital

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## ABSTRACT

### Background

The care of critically ill children remains one of the most demanding and challenging aspects of the field of Pediatrics.

### Objectives

- To assess the clinical profile of the patients admitted to the Pediatric intensive care unit.
- To determine the outcome of patients admitted to the Pediatric intensive care unit.

### Methodology

An observational cross-sectional study was conducted among 100 patients admitted to the Pediatric Intensive care unit of the Department of Pediatrics at a tertiary care hospital from September to October 2022. Patients who were below 18 years of age and admitted to the Pediatric Intensive care unit were included. Ethical permission was obtained. Informed consent was obtained from parents/guardians of all the study participants before administering the questionnaire. Data was entered in Microsoft Excel worksheet and analysis was done by using SPSS software.

### Results

Out of 100 participants 55% were male and 45% were female. The maximum number of children admitted to PICU belonged to the group 1-5 years constituting 36% of the total cases. The majority of children admitted to PICU were due to respiratory causes about 37% followed by hematological (30%) and central nervous system causes (18%). About 74% of the cases were discharged and 2% died and the remaining cases were LAMA or referred cases.

### Conclusion

The common causes identified for admission into PICU were respiratory diseases, hematological disorders and central nervous disorders.

**Keywords:** Clinical profile, outcome, PICU

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## INTRODUCTION

According to the World Health Organization (WHO), the major causes of death in under-five children in developing countries are preventable and curable diseases, if the care is optimized.<sup>[1]</sup> But despite all the measures, the Intensive care unit is one of the sites where medical errors are most likely to occur because of the complexity of the diseases, and multiple interventions.<sup>[2]</sup> With advancements in intensive care facilities, there is a dramatic increase in the survival of critically ill children.<sup>[3]</sup> The pediatric intensive care unit (PICU) is part of the hospital where critically ill pediatric patients who need advanced airway, cardiac, and respiratory diseases and who need hemodynamic aids are widely admitted to achieve better results than admitting patients to other areas of the hospital. The care of critically ill children remains one of the most demanding and challenging aspects of the field of Pediatrics.<sup>[4]</sup> In critical care medicine, intensive care unit results can be assessed based on outcomes such as "death" or "survival" using indicators such as mortality rates.<sup>[5]</sup> There have been a limited number of studies on the outcomes of patients admitted to the Pediatric intensive care unit in this region. Therefore, the present study aimed to determine the clinical profile and outcome of patients admitted to the Pediatric intensive care unit. So that it may help in optimum utilization of scarce resources for the most effective preventive and early management strategies.

### AIMS & OBJECTIVES

- To assess the clinical profile of the patients admitted in Pediatric intensive care unit.
- To determine outcome of patients admitted in Pediatric intensive care unit.

### Methodology

**Study type & study design:** An observational cross-sectional study

**Study setting:** Patients admitted in the Pediatric Intensive care unit of the Department of Pediatrics at a tertiary care hospital.

**Study population:** Patients who are below 18 years of age admitted to Pediatric Intensive care unit.

### Inclusion Criteria:

- All patients admitted in the Pediatric Intensive care unit below 18 years.
- Both gender groups.

### Exclusion criteria:

- Patients below 1 month age group.
- Parents and guardians from whom consent could not be obtained.
- Case sheets with incomplete information

**Sample size:** A study done by Baiju Kumar et al.,<sup>[6]</sup> found that 57.14% of the study population survived (major outcome). According to this percentage, considering the allowable error of 10% at a 95% confidence interval the sample size was calculated by using the formula

$$N = Z^2_{\alpha} PQ/L^2$$

Where,  $Z_{\alpha}$  = Standard normal table value

$P = 57.14\%$ ,  $Q = 100 - P$  and  $L =$  allowable error (10%).

Sample size (N) =  $Z^2_{\alpha} PQ/L^2$

$$= [(1.96)^2 \times 57.14 \times 42.86] / (10 \times 10) = 94$$

Hence, N = 100 patients.

**Study period:** 2 months

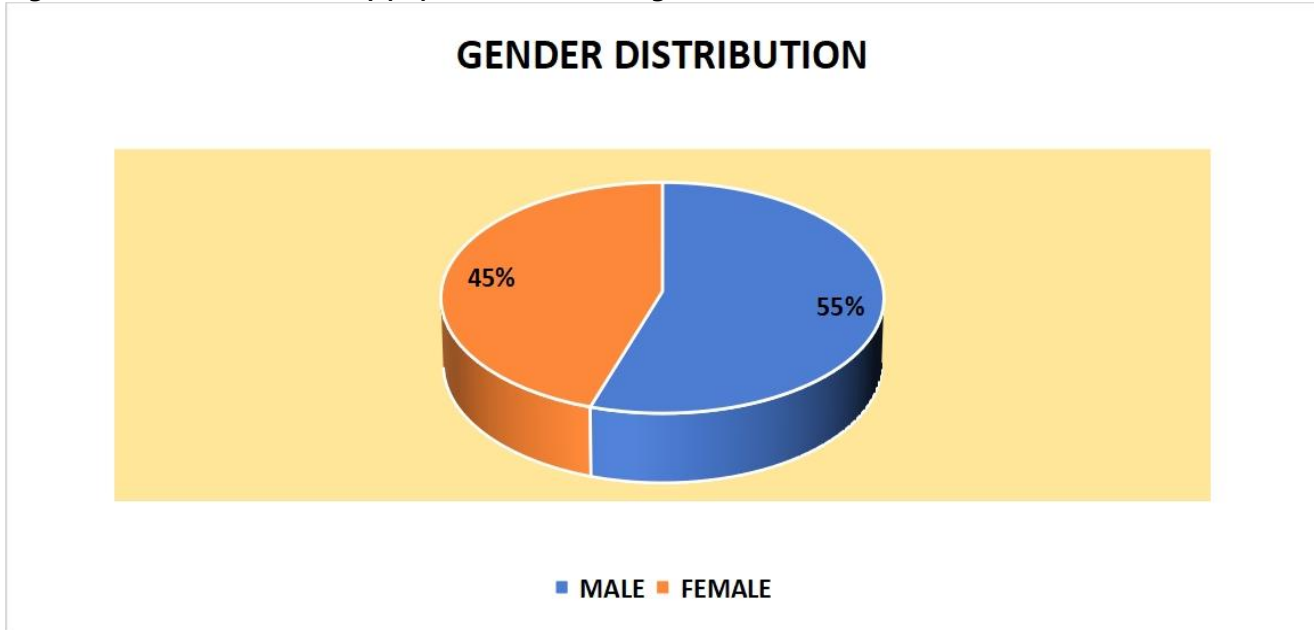
**Method of data collection & study tools:** The data was collected after obtaining permission from the Institutional Ethical Committee. The pretested questionnaire was administered after obtaining informed consent from the parent or guardian. The questionnaire contains socio-demographic details of the study subjects like income of the family, socioeconomic status. History, details of examination, and investigations like complete blood count, C-reactive protein, liver function test, renal function test, and Chest X-ray were collected using case report form.

**Ethical consideration:** After obtaining clearance from the Institutional Ethical Committee study was initiated. Informed consent was obtained from parents/guardians of all the study participants before administering the questionnaire.

**Statistical analysis:** Data was entered in a Microsoft Excel worksheet and analysis was done by using SPSS software. Categorical variables were represented as proportions or percentages and quantitative variables were represented as means and standard deviation. Chi chi-square test was done to find out the significance of the association. P value < 0.05 is considered as statistical significance at 95% confidence interval.

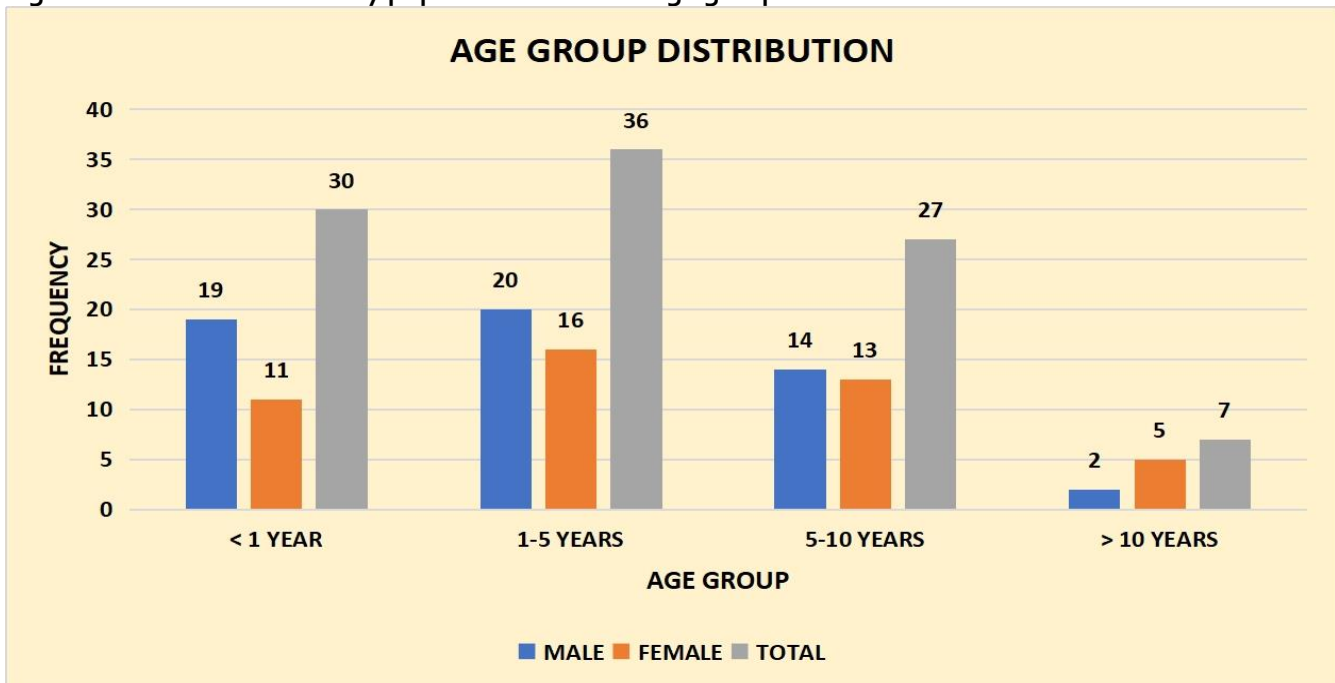
**Observations & results:** A total of 100 children were admitted in PICU, of which 55 were male and 45 were female.

Figure 1: Distribution of study population based on gender



The maximum number of patients admitted were male which constituted 55% of the total cases and the remaining were female patients 45%.

Figure 2: Distribution of study population based on age group



The maximum number of children admitted to PICU belonged to the group 1-5 years constituting 36% of the total cases followed by the group <1 year constituting 30%. The age group of range 5-10 years constitutes 27%. Children greater than 10 years old constitute 7%. On comparison of gender with age group, more male children were in the age group 1- 5 years (36.4%) followed by < 1 year (34.5%). Out of 45

female children, 16(35.5%) were in 1 – 5 years followed by 5-10 years 13(28.8%) and < 1 year 11(24.4%). The mean age of the total study population was  $4.12 \pm 3.78$  years. Among male children the mean age was  $3.62 \pm 3.39$  years and among female children was  $4.73 \pm 4.16$  years and this difference observed between them was found to be statistically not significant.

**Table 1: Distribution based on system involved in children admitted in PICU**

System involved	Male	Female	Total
Respiratory System	24 (43.6%)	13 (28.8%)	37 (37%)
Hematological	12 (21.8%)	18 (40%)	30 (30%)
Central Nervous System	10 (18.1%)	8 (17.7%)	18 (18%)
Gastrointestinal Tract	2 (3.7%)	1 (2.3%)	3 (3%)
Renal system	2 (3.7%)	1 (2.3%)	3 (3%)
Cardiovascular System	2 (3.7%)	-	2 (2%)
Sepsis/Infections	1 (1.8%)	1 (2.3%)	2 (2%)
Endocrine System	1 (1.8%)	-	1 (1%)
Musculoskeletal System	-	1 (2.3%)	1 (1%)
Miscellaneous	1 (1%)	2 (4.3%)	3 (3%)
Total	55 (100%)	45 (100%)	100 (100%)

Table 1 shows the majority of children admitted to PICU were due to respiratory causes about 37% followed by hematological (30%) and central nervous system causes (18%). Gastrointestinal and renal causes constitute about 3% each, and Cardiovascular system and sepsis separately constitute about 2%.

Endocrine and Musculoskeletal system constitutes about 1% each. In a comparison of gender with the cause of illness majority of male children the cause of illness was respiratory system 24(43.6%) whereas among female children cause of illness was hematological system 18(40%).

**Table 2: Distribution of outcome based on the age group of children admitted to PICU**

AGE	OUTCOME				
	Discharged	Referred	LAMA	Death	Total
<1 year	17 (56.7%)	-	12 (40%)	1 (3.3%)	30(100%)
1-5 years	27 (75%)	3 (8.3%)	5 (13.9%)	1 (2.8%)	36(100%)
5-10 years	23 (85.1%)	1 (3.8%)	3 (11.1%)	-	27(100%)
>10 years	4 (57.1%)	-	3 (42.9%)	-	7(100%)

Chi square value:12.5, p value:0.18

Majority of cases discharged were in the age group 5 to 10 years i.e. 23(85.1%) and 1 to 5 years 27(75%). A total of 2 cases died and both cases were in less than

5 years. The difference observed between groups was found to be statistically not significant.( $p>0.05$ ).

**Table 3 : Outcome based on gender distribution**

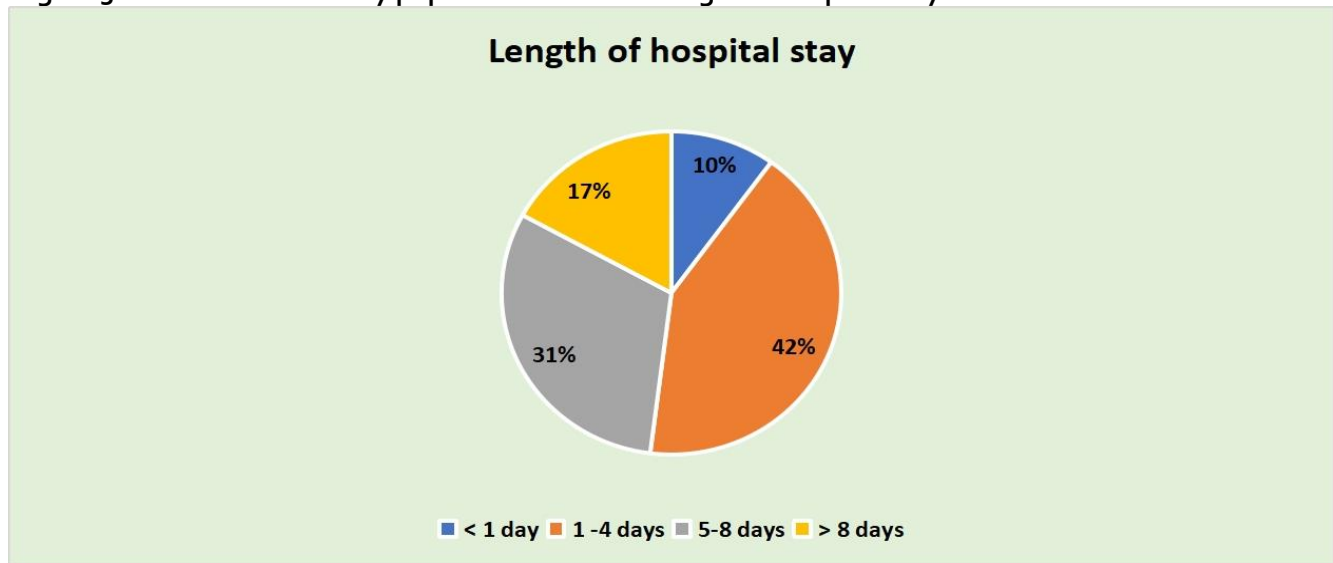
GENDER	OUTCOME				Total
	Discharged	Referred	LAMA	Death	
Male	37 (67.2%)	2(3.7%)	15 (27.2%)	1 (1.9%)	55(100%)
Female	34 (75.6%)	2 (4.4%)	8 (17.8%)	1 (2.2%)	45 (100%)

Chi square value:1.26, p value:0.73

From the table 3, on comparison of gender with outcome, 75.6% of male children were discharged where as 67.2% of male children were discharged.

About 1.9% of male and 2.2% of female children were died. The difference observed between the groups was found to be statistically not significant.( $p>0.05$ ).

**Figure 3: Distribution of study population based on length of hospital stay**



**Table 4: Mean duration of hospital stay Vs Gender**

GENDER	MEAN (Days)	S.D	P value
MALE	3.98	3.41	0.01
FEMALE	6.09	4.83	
TOTAL	4.98	4.25	

From the table 4, The mean duration of hospital stay of total study population was  $4.98 \pm 4.25$  days. Among male children the mean duration of hospital stay was  $3.98 \pm 3.41$  days and among female children was  $6.09 \pm 4.83$  days and this difference observed between them was found to be statistically significant. ( $p < 0.05$ ).

## DISCUSSION

The PICU is primarily concerned with the care of patients with critical illness and demands a broad based knowledge to cater for all aspects of management of these patients to achieve good outcome.<sup>[5]</sup> Out of 100 cases 55% were male children admitted in PICU. Similar study findings were seen in a study done by Abhulimhen-lyoha et al,<sup>[5]</sup> found that 59.8% of the study population were male. Higher percentages were found in a study conducted by Sarbani Misra Roy et al.,<sup>[7]</sup> about 64.2% of the cases admitted in PICU were male children. But females (58.8%) were outnumbered more than males (41.2%) in a study conducted by Maheshwari K et al<sup>[2]</sup> in PICU admission. Improving national child mortality indicators and improving socioeconomic status in general along with rapid growth of urban population and decreasing family size has created a huge demand for health systems.<sup>[10]</sup> In the present study, maximum percentage of admitted patients belonged to the age group 1-5 years i.e. 36%. Similar study findings were observed in a study done by Maheshwari K et al.,<sup>[2]</sup> the maximum percentage of children were in the 1-5 years age group i.e. 44.3%. Similarly in a study done by Haifu H et al.,<sup>[1]</sup> the maximum percentage of children in the 1-5 years age group 37.25%. The present study findings were inconsistent with Abhulimhen-lyoha et al.,<sup>[5]</sup> where 37.2% of cases admitted in PICU were in < 1 year age group

In the present study, involvement of the respiratory system (37%), hematological system (30%) and Central nervous system (18%) were the most common reasons for PICU admission. Similar findings were observed in a study done by Haifu H et al.,<sup>[1]</sup> identified that respiratory illness (22.5%) was the common cause of admission to PICU. Similarly in Baijukumar et al.,<sup>[6]</sup> study about 34.29% of the study participants admitted due to central nervous system involvement. In a study done by Sarbani Misra Roy et al,<sup>[7]</sup> found that cardiovascular illness (41.1%) was the

commonest cause for admission to PICU. The present study findings were inconsistent with study done by Ashenafi Seifu et al.,<sup>[9]</sup> found that sepsis and other infectious diseases (27.15%) were the common causes for admission to PICU and in a study conducted by Sahoo B et al.,<sup>[3]</sup> 20.7% of children were admitted due to sepsis or other infectious diseases. A special unit mainly dealing with the severely ill is the PICU. Treatment for critical disease patients needs a broad spectrum of expertise to address all aspects of critical disease management. In order to ensure a successful outcome for these patients, the key aim of the PICU is to avoid death by intensively tracking and treating critically ill children deemed to be at high mortality risk.<sup>[4]</sup>

The total mortality in this study was 2%. About 1.9% of male and 2.2% of female children died but the difference observed between the groups was found to be statistically not significant. These findings were consistent with a study done by Abhulimhen-lyoha et al,<sup>[5]</sup> which found that mortality in their center was 2%. But higher mortality was observed in a study done by Arun K sharma et al showed the overall mortality of their PICU was 14.3% and in a study done by Anwarul Haque et al<sup>[11]</sup> reported that 14% of mortality and in study done by Sarbani Misra Roy et al.,<sup>[7]</sup> found that high mortality of 24.32% of their PICU admission. Mortality in patients depends on many factors such as demographic and clinical characteristics of population, infrastructure, non-medical factors (management and organization, time taken to reach health care), admission practice, and also affected by ICU performance.<sup>[12]</sup> PICU requires a vast use of up to date equipment and highly skilled staff and demands a tremendous amount of time and effort on behalf of the medical and nursing staff to treat and improve survival of the critically ill patients. Protocol based management, rational antibiotic policy, early referral to PICU to be implemented to have a low mortality.

## CONCLUSIONS

The common causes identified for admission in PICU were respiratory diseases and hematological disorders and central nervous disorders. About 74% of the cases were discharged and 2% died and remaining cases were LAMA or referred cases. An effective PICU goes a long way in reducing morbidity and mortality.

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