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Clinical Profile And Outcome Of Patients Admitted To Pediatric Intensive Care Unit In A Tertiary Care Hospital Of Assam

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Abstract:
Background*: This study was conducted to know about the clinical profile and outcome of patients admitted in pediatric ICU (PICU) in a tertiary care teaching hospital of Assam.*
Methods*: This is a hospital based, retrospective, descriptive study, done on patients admitted to PICU of Assam Medical College & Hospital ,Dibrugarh, Assam from Jan 2018 - Dec 2019 (24 months). The results are tabulated in Microsoft excel.*
Results*: Out of total 1342 patients, males were 776(57.82%) and females were 566(42.18%). Male and female ratio was 1.37: 1. Number of admissions in < 12 months, 12 months to 23 months,24 months to 59 months and >60 months age groups were 692(51.56%), 145(10.80%),171(12.74%) and 334(24.89%) respectively. Overallmortality of PICU was25.78%. Mortality was seen highest (29.33%) among <1year age group. Major indications for admission to the PICU were respiratory system problems 546(40.68%) followed by neurological 394(29.36%) and then sepsis162(12.07%). Pneumonia was most common diagnosis 449(33.46%). Sepsis(29.62%) was the most cause of death. Mechanical ventilation was done in 14.97% patients. 55.36% patients were received inotropes.Out of total patients 845(62.96%) were discharged,151(11.25%) were LAMA and346(25.78%) were expired.*
Conclusion*:Respiratory (40.68%), nervous system (29.36%) and sepsis (12.07%) were the major causes for admission to the PICU.*
Key words*: PICU,Clinical profile, Mortality rate, Outcome.*

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I. Introduction:

The pediatric intensive care (PICU) is a part of the hospital where critically ill pediatric patients who require advanced airway, respiratory, and hemodynamic supports are usually admitted with the aim of achieving an outcome better than if the patients were admitted into other parts of the hospital. Care of critically ill children remains one of the most demanding and challenging aspects in the field of pediatrics. According to World Health Organisation (WHO), the major causes of death in under - five children in developing countries are preventable and curable diseases, if the care is optimized.The principle objective of Pediatric critical care is not only to decrease the mortality, but also to restore the child who is suffering from a life threatening condition to health with aminimum pain anxiety and complications and to provide comfort and guidance to the child's family[1].PICU primarily functions for the maintenance of the vital organ function in seriously-ill children[2].The outcome of these patients can evaluate and assess the efficacy of treatment, making it possible to take better decisions to ensure the effective management of the high-level resources and optimize the resource utilization. This study is, therefore, conducted to audit the pattern of cases being admitted to our PICU and their outcome[3].

Aims and Objectives:

The aim of the present study was to describe the clinical profile and the outcome of patients admitted in PICU, and also to highlight the probable modifications that can be done which will lead to better outcome of critically ill children.

II. MATERIALS AND METHODS:

This is a Hospital based, retrospective, descriptive study, in a tertiary care centre in Dibrugarh , Assam.India. Children admitted and treated in PICU in pediatric department from January 2018 - December 2019 (24 months) in Assam medical college hospital & Hospital(AMCH),Assam, were the participants. The patients needed for this study were identified by reviewing our PICU nominal register. The hospital records of these patients admitted to PICU were retrieved from the medical records department following due permission. Out of 1427 patients admitted to PICU, 85 were excluded. The remaining 1342 patients were included for analysis. Quantitative variable was clinical profile and outcome pattern. Statistical analysis used was simple proportion test. The results are tabulated in Microsoft excel.

Inclusion Criteria :

Children less than 13 years(excluding neonates) who were admitted to PICU with complete patient information and investigation reports in the medical records were included in the study.

Exclusion Criteria:

Patients with incomplete medical records were excluded.The patients who were died on arrival (within 2 hour of admission).

III. RESULTS:

In present study which was conducted for a period of 2 years from January 2018 to december2019 in the department of Pediatric Intensive Care Unit(PICU), AMCH. Out of total 1342 patients, males were 776(57.82%) and females were 566(42.18%). Number of admission in < 12 months, 12 months to 23 months,24 months to 59 months and>60 months age groups were 692(51.56%), 145(10.80%),171(12.74%) and 334(24.89%) respectively. Overall mortality was25.78%. Mortality was seen highest(29.33%) among <1year age group. Most of the admissions were due to respiratory system problems 546(40.68%) followed by neurological 394(29.36%). Clinical profile Showed Pneumonia was most common diagnosis 449(33.46%). Sepsis(29.62%) was the most cause of death, which was followed by neurological(28.43%) and after that respiratory(25.27%). Most of the death occurred in <1day becauseofcriticalstageat presentation.Out of total patients 845(62.96%) were discharged,151(11.25%) were LAMA and346(25.78%) were expired.

Table 1:Sociodemographic data of patients(n=1342)

data	Number(n=1342)	Percentage(%)	expired	Overall Mortality 25.78%
<12 months	692	51.56	203(29.33%)	
12 months to 23 months	145	10.80	30(20.69%)	
24 months to 59 months	171	12.74	55(32.16%)	
>60 months	334	24.89	58(17.36%)	
	Total= 1342		Total=346(25.78%)	
Male	776	57.82	221(28.27%)	
Female	566	42.18	125(22.08%)	

Age distribution of patients showed that < 12 months admission were 692(51.56%) and mortality 29.33%, 12months to 23 months admission were 145(10.80%)and mortality 20.69% , 24 months to 59 months admission were 171(12.74%)) and mortality 32.16%,>60 months admission were 334(24.89%) and mortality 17.36%. Out of 1342 patients male were 776(57.82%) and out of 776 male 221(28.27%) were expired .Total number of female were566 (42.18%) and out of them 125(22.08%) were expired. Male and female ratio was 1.37:1 .Overall mortality was 25.78%.

Table2: Morbidity and Mortality pattern in total admission according to system involved/cause

diagnosis	No. of patient	Age group in months				Expired
		<12	12-23	24-59	>60	
Neurological	394(29.36%)	179	102	89	26	112(28.43%)
Respiratory	546(40.68%)	257	189	89	11	138(25.27%)
Cardiovascular	103(7.67%)	56	35	10	2	21(20.38%)
Renal	25(1.82%)	2	8	12	3	3(12%)
Gastrointestinal	48(3.57%)	5	25	15	3	12(25%)
Sepsis	162(12.07%)	77	45	25	15	48(29.62%)
Hematological	49(3.65%)	2	25	18	4	9(18.37%)
Endocrinal	4(0.29%)	0	0	2	2	0(0%)
Miscellaneous	11(0.81%)	2	4	3	2	3(27.27%)

Table2 shows Respiratorysystem 546(40.68%) problems were maximum indicationfor admission,followed by Neurological 394(29.36%).Highest mortality were seen in sepsis(29.62%),followed by Neurological 28.43%, then miscellaneous cause 27.27%, and then Respiratory 25.27%.

Table 3: Distribution of PICU patients according to clinical profile(n=1342)

Diagnosis	Number(n)	Percentage(%)
AES	145	10.80
Severe pneumonia	449	33.46
Bronchiolitis	2	0.14
Sepsis	162	12.07
Seizure disorder	102	7.60
Croup	2	0.14
Traumatic Head injury	2	0.14
Scrub Typhus	8	0.59
CCF	26	1.94
ALF	13	0.97
Metabolic	15	1.12
AGE	25	1.86
Severe anemia	42	3.13
Pleural effusion	26	1.94
ICH	21	1.56
Malignancy	15	1.12
Asthma	36	2.68
Anaphylaxis	2	0.14
ARF	5	0.37
AGN	7	0.52
Nephrotic	4	0.29
Meningitis	85	6.33
Foreign body	4	0.29
Poisoning	33	2.46
Bleeding	9	0.67
Kawasaki Disease	2	0.14
Severe acute malnutrition	14	1.04
Others	14	1.04

Table 3 defines the clinical profile of the study patients. Severe pneumonia was the most common diagnosis 449(33.46%).This was followed by sepsis 162(12.07%) and AES 145(10.80%).Although few percentages, some other disease like Seizure disorder102(7.60%), Meningits6. 85(6.33%), severe anemia 42(3.13%), Asthma 36(2.68%), CCF 26(1.94%) and also other diseases as shown in table needed PICU support.

Table 4: Relationship between age group and length of stay(Mortality)

Age group(in months)	Death(n)	Length of stay(in days)			
		<1	1-3	4-7	>7
<12months	203	90(44.34%)	84(41.37%)	17(8.37%)	12(5.91%)
12-23 months	30	9(30%)	8(26.67%)	8(26.67%)	6(20%)
24-59 months	55	23(41.81%)	10(18.18%)	12(21.81%)	10(18.18%)
>60 months	58	17(29.31%)	19(32.75%)	13(22.41%)	9(15.52%)

Table 4 shows the length of stay in PICU among different age group of patients. Most of the death occurred < 1 days in age group <12 months 90(44.34%), 12-23 months 9(30%), 24-59 months 23(41.81%) and maximum death seen in >60 months age group 19(32.75%) within 1-3 days.

Table 5: independent risk factors among patients admitted to PICU

independent risk factors	Number(n)	Percentage
Patients on ventilators	201	14.97
Patients on inotropes	743	55.36
GCS <7	382	28.46%

Table 5 showing 201(14.97%) of total patients required mechanical ventilators, 743(55.36%) required inotropes and 382(28.46%) having GCS<7.

Table 6:Number of admissions in throughout the year of 2018 and2019.

	2018	2019	Total(%)
January	44	65	109(8.125)
February	46	72	118 (8.79%)
March	62	35	97(7.22%)
April	39	24	63(4.69%)
May	38	50	88(6.56%)
June	63	46	109(8.12%)
July	60	38	98(7.30%)
August	61	38	99(7.37%)
September	73	52	125(9.31%)
October	74	28	102(7.60%)
November	69	71	140(10.43%)
December	48	49	97(7.22%)

Table 6 shows the number of admission in different months in a year. The peak admission was seen in November months 140(10.43%).

Table 7: Outcome of admitted patients

	n	Percentage(%)
Discharge	845	62.96
LAMA	151	11.25
Death	346	25.78

Table 7 analysis the Outcome of admitted patients, out of total study patients 845(62.96%) were discharged, 151 (11.25%) were LAMA(Left Against Medical Advice) and 346(25.78%) were expired.

IV. Discussion:

In the present study Male outnumbered female. Male and female ratio was 1.37:1 which is similar to the study done by **Praveen et al [4]**. In present study most patients 51.56% were under age <1year which is similar to study done by **Haque A et al [5].** Respiratory system 546(40.68%) problems were maximum for admission, followed by Neurological 394(29.36%) Clinical profile of the study patients shows Severe pneumonia was the most common diagnosis 449(33.46%) . This was followed by sepsis 162(12.07%) and AES 145(10.80%).Although few percentages, some other disease like Seizure disorder102(7.60%), Meningitis 85(6.33%), severe anemia 42(3.13%), Asthma 36(2.68%), CCF 26(1.94%) and also other diseases as shown in table needed PICU support. This study has shown respiratory illness and infectious diseases as the most common clinical profile observed. Similar findings was observed in a study done in Coimbatore in which respiratory illness was the most common reason for PICU admission[6]. **MukhijaG et al.[7]** showed major indication for admission to the PICU was respiratory (46.2%), followed by cardiovascular (41.2%), central nervous system (10.8%).But study conducted in Bihar showed that neurological diseases followed by respiratory illness was the most common reason for admission[8]. The outcome noted was, out 1342 patients admitted to pediatric ICU, 845 (62.96%) were discharged. About 151(11.25) patients went against medical advice(LAMA). But a study conducted in Andhra Pradesh showed that only (52.5%) improved and (19.5%) of patients were referred/went against medical advice [9]. Sepsis(29.62%) were the highest cause of mortality,followed by Neurological 28.43%, then miscellaneous cause 27.27%, and then Respiratory 25.27%.Children less than one year of age were the most vulnerable group in our PICU. Mortalitywas highest 203(29.33%). This was comparable to studies in**Egypt by Rady HI[10]**and in India by **Mukhija G et al.[7]**

In present study overall mortality was 25.78%.**Jyothi AK et al.[9]** in a study from India, reported a mortality rate of 28% which was higher than in present study .Overall mortality in a study done by**Sarbani Misra Roy et**al[3] was 24.32%.Study done by **Saleem M et al [2]**the mortality was 18.1 %. Some other studies have also shown mortality comparable to present study. Another study from Pakistan by **Haque A et al and Bano S et al[5]**, reported a mortality of 35% in their institute. The high mortality in our study may be contributed by several factors. Important contributory factor might be that, central nervous system was responsible for 394(29.36%) of admissions in our PICU and many of these cases were Acute Encephalitic Syndrome including viral meningo encephalitis and Japanese B Encephalitis which may not have good prognosis. Another cause of high mortality is that, lot of patients requiring PICU admissions have to be managed in the ward due to paucity of beds in PICU and thereafter shifted to PICU in the late stage of the disease process and also most of the patients were critical at admission. In preset study mortality was highest due to sepsis.A small prospective study performed in India revealed a mortality rate of 58% due to sepsis [11].In present study 14.97% required Mechanical ventilation. A study was done by **de Silva et al.[12]** in Brazil showed 20.3%.and**Khurshid A etal**[13] in their study 27.8% patients required Mechanical ventilation. Average length of stay was 3-12 days in present study which is similar to the study done by **Khurshid A et al[13]** and **Qureshi AU et al[14]**. Use of inotropes, need

for mechanical ventilation, and presence of co morbid illness and low level of Glasgow coma scale less than eight were independent predictors of mortality.

Limitation of this study:

It is a retrospective study hence it lacks follow up in patients admitted PICU .we were unable to have a proper assessment of the severity scoring using tools like "Pediatric Risk of Mortality (PRISM)" and "Pediatric Index of Mortality (PIM)" among study cases. Being a single center study meant that the results of this study cannot be generalized.

V. Conclusion:

Respiratory illness, neurological problems and Sepsis are the most common causes for PICU admissions. Better manpower and infrastructure improve the outcome. Patients that were critical at presentation their outcome were bad.The need for ventilation and inotropes indicates that these patients were in an advanced stage of disease. This is a retrospective study with small sample size, it is recommended for further detailed prospective studies in future, with emphasis on the awareness of the most common and emerging rare etiology of patients admitted to PICU.

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