

## **Clinico-Demographic Profile and Outcome Assessment in a Paediatric Intensive Care Unit: A Retrospective Observational Study**

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### **Abstract**

**Aim:** The aim of the present study was to analyze demographic profile and outcome in a tertiary care hospital Pediatric Intensive care (PICU) in Bihar region.

**Methods:** This was a hospital based retrospective study, done on patients admitted to Paediatric ICU of Nalanda medical College and Hospital, Patna, Bihar, India for the period of one year. Total 200 patients were included in the study.

**Results:** According to the socio demographic pattern, age distribution of patients showed that < 1year were 50 (25%), 1-5 years were 90 (45%), > 5yrs of age were 60 (30%). There was a male preponderance 140 (70%), males were 60 (30%). The mean age was 5.25±6.4 years. Out of the total cases 200, 150 (75%) were medical cases and 50 (25%) were surgical cases. The mean PRISM III score was 15.5 (4-36). The average length of PICU stay was 8.40 ±5.5. The major diagnostic categories of medical patients were neurological 40 (20%), respiratory 36 (18%) and cardiac 12 (6%), renal 30 (15%), infectious 20 (10%), hematological 12 (6%), gastrointestinal 26 (13%), others including surgical and trauma cases 24 (12%). The outcome noted was, out 200 patients admitted to paediatric ICU, 176 (88%) were discharged. About 20 (10%) patients went against medical advice. About 4 (2%) patients were referred at parent's request.

**Conclusion:** Respiratory illness, infectious diseases, neurological problems and poisoning are the most common cause for PICU admissions. But seronegative dengue cases, electric shock, reemergence of scrub typhus, are being increasingly diagnosed. So, emphasis is therefore placed on high index of suspicion for this type of conditions. We also recommend better manpower and infrastructure to improve the outcome of patients admitted to PICU.

**Keywords:** Clinical profile, Outcome, Paediatric intensive care unit

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### **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. [1] The goal of PICU is the surveillance and support of vital organ function in critically-ill or injured children who are at risk for organ dysfunction. [2] Care of critically ill children remains one of the most demanding and challenging aspects in the field of pediatrics. [3] 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 a minimum pain anxiety and complications and to provide comfort and guidance to the child's family. [4] 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. [5] But despite all the measures, ICU is one of the sites where medical errors are most likely to occur because of the complexity of the diseases, and multiple interventions. With advancement in intensive care facilities, there is a dramatic increase in survival of critically ill children. In critical care medicine, intensive care unit (ICU) results can be assessed on the basis of outcome such as mortality rate or survival. [6]

Advances in knowledge and technology of medical science have dramatically improved the prognosis for the critically-ill children. Pollack et al showed a better outcome of PICU patients in units where there was a pediatric intensivist and/or a pediatric intensive care fellowship programme. [7] Numerous conditions that were previously fatal are now treatable. Moreover, there are references that support better outcome of PICU patients in tertiary centers, which led to the development of a centralized system of PICUs worldwide. [8-10] The primary focus of critical care has evolved from saving lives by monitoring and maintaining physiological status to placing greater emphasis on the prevention of secondary injuries and preservation of function. [11] Collection,

analysis, and interpretation of relevant objective data on the utilization of ICU beds will help plan for reducing the length of ICU stay and facilitate covering more patients who require this care. [8]

The aim of the present study was to analyze demographic profile and outcome in a tertiary care hospital Pediatric Intensive care (PICU) in Bihar region.

### **Materials and Methods**

This was a hospital based, retrospective, descriptive study conducted at department of pediatrics, Nalanda medical College and Hospital, Patna, Bihar, India for the duration of one year.

### **Inclusion criteria**

Children less than 13 years admitted to PICU with complete patient information along with the investigation reports in the medical records were included in the study.

### **Exclusion criteria**

Children with medical records with incomplete information were excluded.

### **Methodology**

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 384 patients admitted to PICU, 184 were excluded. The remaining 200 patients were analysed.

Quantitative variable was clinical profile and outcome pattern. Statistical analysis used was simple proportion test. The following data was collected from the medical records department (MRD) about the patients included in this study-gender, age, address, provisional and final diagnosis of the patient, date of admission.

Outcome was noted as discharge/against medical advice/referred classified by system and etiology of the disease, elective

or emergency status, admission source (same hospital, referral hospital, home), critical care management during the PICU stay, average length of the PICU stay, and duration of mechanical ventilation, as applicable. All patients underwent PRISM-III scoring. History, examination details, investigations done were noted (CBC,

CRP, serum bilirubin, chest x ray, USG abdomen, neuroimaging, EEG, ABG, CSF analysis, urine routine, microscopy, stool for occult blood, LFT, RFT), course in the hospital and treatment given were recorded.

## Results

**Table 1: Patient characteristics**

Variables	Numbers
Admissions	200
Mean age (years)	5.25±6.4
<b>Age</b>	
< 1 year	50 (25)
1-5 years	90 (45)
>5 years	60 (30)
<b>Gender</b>	
Males (%)	140 (70%)
Females (%)	60 (30%)
<b>Type of admission</b>	
Medical admissions	150 (75)
Surgical admissions	50 (25)
<b>Mean PRISM III Score</b>	15.5
<b>PICU length of stay (days) average</b>	8.40±5.5

According to the socio demographic pattern, age distribution of patients showed that < 1 year were 50 (25%), 1-5 years were 90 (45%), > 5yrs of age were 60 (30%). There was a male preponderance 140 (70%), males were 60 (30%). The

mean age was 5.25±6.4 years. Out of the total cases 200, 150 (75%) were medical cases and 50 (25%) were surgical cases. The mean PRISM III score was 15.5 (4-36). The average length of PICU stay was 8.40 ±5.5.

**Table 2: Disease categories requiring PICU admission**

Disease Categories	Number of Patients
Neurological	40 (20%)
Respiratory	36 (18%)
Renal	30 (15%)
Gastrointestinal	26 (13%)
Infectious	20 (10%)
Haematological	12 (6%)
Cardiac	12 (6%)
Others (surgical, trauma)	24 (12%)

The major diagnostic categories of medical patients were neurological 40 (20%), respiratory 36 (18%) and cardiac 12 (6%), renal 30 (15%), infectious 20 (10%), hematological 12 (6%), gastrointestinal 26 (13%), others including surgical and trauma cases 24 (12%).

**Table 3: Distribution of PICU patients according to outcome pattern**

Outcome	N%
Discharged	176 (88)
Referred	4 (2)
Against medical advice	20 (10)

The outcome noted was, out 200 patients admitted to paediatric ICU, 176 (88%) were discharged. About 20 (10%) patients went against medical advice. About 4 (2%) patients were referred at parent's request.

### Discussion

A pediatric intensive care unit (also paediatric), usually abbreviated to PICU, is an area within a hospital specializing in the care of critically ill infants, children, and teenagers. [12] There are studies documenting outcomes of Pediatric intensive care units (PICU) from other state of India [13] but no such studies are available from the Bihar. Parikh et al outlined significant issues in quality, cost and outcomes from an adult Intensive care unit (ICU) in India. [14] Pollack et al showed a better outcome of PICU patients in units where there was a pediatric intensivist and/or a pediatric intensive care fellowship programme. [15] Advances in knowledge and technology of medical science have dramatically improved the prognosis for the critically-ill children.

According to the socio demographic pattern, age distribution of patients showed that < 1year were 50 (25%), 1-5 years were 90 (45%), > 5yrs of age were 60 (30%). There was a male preponderance 140 (70%) males were 60 (30%) which was correlated with the study conducted by Praveen et al, and in African studies. [16,17] The mean age was 5.25±6.4 years. Out of the total cases 200, 150 (75%) were medical cases and 50 (25%) were surgical cases. The mean PRISM III score was 15.5 (4-36). The average length of PICU stay was 8.40 ±5.5. The major diagnostic categories of medical patients were neurological 40 (20%), respiratory 36 (18%) and cardiac 12 (6%), renal 30 (15%), infectious 20 (10%), hematological 12 (6%), gastrointestinal 26 (13%), others

including surgical and trauma cases 24 (12%). Similar findings was observed in a study done in Coimbatore in which respiratory illness was the most common reason for PICU admission. [18] But study conducted in Bihar showed that neurological diseases followed by respiratory illness was the most common reason for admission. [19] The outcome noted was, out 200 patients admitted to paediatric ICU, 176 (88%) were discharged. About 20 (10%) patients went against medical advice. About 4 (2%) patients were referred at parent's request. But a study conducted in Andhra Pradesh showed that only (52.5%) improved and (19.5%) of patients were referred/went against medical advice. [20]

### Conclusion

Respiratory illness, infectious diseases, neurological problems and poisoning are the most common cause for PICU admissions. But seronegative dengue cases, electric shock, reemergence of scrub typhus, are being increasingly diagnosed. So, emphasis is therefore placed on high index of suspicion for these types of conditions. Authors also recommend better manpower and infrastructure to improve the outcome. But since this is a retrospective study with small sample size, the authors would like to recommend 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.

### References

1. Abhulimhen-Iyoha BI, Pooboni SK, Vuppali NK. Morbidity pattern and outcome of patients admitted into a pediatric intensive care unit in India. Indian Journal of Clinical Medicine. 2014 Jan;5:IJCM-S13902.

2. KHAN HI, KHALIQ N, AFZAL MF. Pediatric intensive care unit: Pattern of admissions. *The Professional Medical Journal*. 2006 Jun 25;13(03):358-61.
3. Jain S, Bhalke S, Srivastava A. A study of morbidity pattern in PICU at tertiary care center. *Journal of Pediatric Critical Care*. 2018 Sep 1;5(5):23-6.
4. Das I, Bezboruah G, Pathak K, Rahman M. Clinical profile and Outcome of Patients Admitted in Pediatric Intensive Care Unit of Gauhati Medical College & Hospital. *IOSR J Dental Med Sci*. 2017 Dec; 16(12):27-9
5. Haftu H, Hailu T, Medhaniye A. Assessment of pattern and treatment outcome of patients admitted to pediatric intensive care unit, Ayder Referral Hospital, Tigray, Ethiopia, 2015. *BMC research notes*. 2018 Dec; 11(1):1-6.
6. Sahoo B, Patnaik S, Mishra R, Jain MK. Morbidity pattern and outcome of children admitted to a paediatric intensive care unit of Eastern India. *Int J Contemp Pediatr*. 2017 Mar;4(2): 486-9.
7. Wheeler DS, Wong HR. *Pediatric critical care medicine: basic science and clinical evidence*. Springer Science & Business Media; 2007.
8. Pollack MM, Cuerdon TT, Patel KM, Ruttimann UE, Getson PR, Levetown M. Impact of quality-of-care factors on pediatric intensive care unit mortality. *Jama*. 1994 Sep 28;272(12):941-6.
9. Tilford JM, Simpson PM, Green JW, Lensing S, Fiser DH. Volume–outcome relationships in pediatric intensive care units. *Pediatrics*. 2000 Aug 1;106(2):289-94.
10. Ruttimann UE, Patel KM, Pollack MM. Relevance of diagnostic diversity and patient volumes for quality and length of stay in pediatric intensive care units. *Pediatric Critical Care Medicine*. 2000 Oct 1;1(2):133-9.
11. Heneghan JA, Pollack MM. Morbidity: changing the outcome paradigm for pediatric critical care. *Pediatric Clinics*. 2017 Oct 1;64(5):1147-65.
12. Khilnani P, Sarma D, Singh R, Uttam R, Rajdev S, Makkar A, Kaur J. Demographic profile and outcome analysis of a tertiary level pediatric intensive care unit. *Apollo Medicine*. 2004 Dec 1;1(2):161-6.
13. Parikh CR, Karnad DR. Quality, cost, and outcome of intensive care in a public hospital in Bombay, India. *Critical care medicine*. 1999 Sep 1;27(9):1754-9.
14. H, Shanely T. *Paediatric critical care medicine: basic science and clinical evidence*. London: Springer: 2007:3-32.
15. Pollack MM, Cuerdon TT, Patel KM, Ruttimann UE, Getson PR, Levetown M. Impact of quality-of-care factors on pediatric intensive care unit mortality. *Jama*. 1994 Sep 28;272(12):941-6.
16. Khilnani P, Sarma D, Singh R, Uttam R, Rajdev S, Makkar A. Demographic profile and outcome analysis of a tertiary level pediatric intensive care unit. *Indian J Pediatr*. 2007; 71:587-91.
17. Embu HY, Yiltok SJ, Isamade ES, Nuhu SI, Oyeniran OO, Uba FA. Paediatric admissions and outcome in a general intensive care unit. *Afr J Paediatr Surg*. 2011;8(1):57-61.
18. Rukmani J, Kumar N. Clinical profile and outcome of PICU in a tertiary care hospital in south India. *RA J Applied Resea*. 2017May;3(5):902-7.
19. Kumar R, Kishore S, Kumar R, Prakash J. Clinical profile and outcome in a paediatric intensive care unit in a tertiary level centre of Bihar. *Int J Med Paediatr Oncol*. 2019;5(3):89-92.
20. Jyothi AK, Ankireddy K. A study on clinical profile and outcome of patients in PICU (paediatric intensive care unit) at a tertiary care unit. *Int J Contemp Pediatr*. 2019 Mar; 6(2):757-60.