

## Original research article

**Assessment Of The Clinical Profile And Outcome Of Children Admitted In PICU At Tertiary Care Hospital****Dr. Dheeraj Kumar<sup>1</sup>, Dr. Bankey Behari Singh<sup>2</sup>****<sup>1</sup> Senior Resident, Department of Pediatrics, Anugrah Narayan Magadh Medical College and Hospital, Gaya, Bihar, India.****<sup>2</sup> Associate Professor, HOD, Department of Pediatrics, Anugrah Narayan Magadh Medical College and Hospital, Gaya, Bihar, India****Corresponding Author: Dr. Dheeraj Kumar****Abstract**

**Aim:** The aim of the present study was to identify the clinical profile and outcome of children admitted in PICU.

**Materials and methods:** A retrospective, descriptive study was conducted in the Department of Pediatrics, Anugrah Narayan Magadh Medical College and Hospital, Gaya, Bihar, India for 1 year. 200 children less than 14 years admitted to PICU with complete patient information along with the investigation reports in the medical records were included in the study. Outcome was noted as discharge/against medical advice/referred. History, examination details, investigations done was noted.

**Results:** Total of 200 patients were admitted in PICU. Out of these 200 patients, 150 (75%) were males and remaining 50 (25%) were females. Male to female ratio was 3:1. Maximum numbers of patients were in the age group of more than 28 days to 1 year which constituted 111 (55.5%) cases. This was followed by 1 year to less than 5 years age group which constituted 49. (i.e. 24.5%) cases. Under 5 years aged children constituted 160 (80%) cases. Next most common age group admitted was 5 years to 10 years with 29 (i.e. 14.5%) cases and 10 to 14 years age group constituted 11 (5.5%) cases. Table 2 shows the system wise cause of admission of patients to PICU. Central nervous system was the commonest system involved (n=67, 33.5%). Next system commonly involved was respiratory system (n=39, 19.5%). Other common causes were infections (n=32, 16%), cardiovascular (n= 22, 11%), gastro intestinal (n=9, 4.5%), haematological (n=11,5.5%) and renal (n=8,4%) system causes. This was followed by metabolic causes (n=6, 3%), Down syndrome (n = 3, 1.5%) and poisoning in 3 (1.5%) cases. Out of the 200 patients admitted to PICU, 53 (26.5%) patients' died. 111(55.5%) cases improved and were shifted to general ward and later discharged. 36 (18%) cases constituted of those who were shifted to higher centre or another department or were taken against medical advice.

**Conclusion:** We concluded that children below 5 years constituted the major load of the patients in our PICU.

**Keywords:** Cardiovascular, Metabolic, PICU, Respiratory

**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.<sup>1</sup> Care of critically ill children remains one of the most demanding and challenging aspects in the field of pediatrics.<sup>2</sup> 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.<sup>3</sup> 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.<sup>4</sup> 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 accessed on the basis of outcome such as mortality rate or survival.<sup>5</sup> In PICU it becomes important to audit admissions and their outcome, which may help to modify practices if necessary following thorough introspection, leading to better patient outcomes.<sup>6</sup> 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.<sup>7</sup> 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.<sup>8</sup> The aim of the present study was to identify the clinical profile and outcome of children admitted in PICU.

### Materials and methods

A retrospective, descriptive study was conducted in the Department of Pediatric, Anugrah Narayan Magadh Medical College and Hospital, Gaya, Bihar, India for one year, after taking the approval of the protocol review committee and institutional ethics committee.

### Methodology

Children less than 14 years admitted to PICU with complete patient information along with the investigation reports in the medical records were included in the study. Children with medical records with incomplete information were excluded. The patients needed for this study were identified by reviewing our PICU nominal register. 200 patients were include in this study. 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. 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

Total of 200 patients were admitted in PICU. Out of these 200 patients, 150 (75%) were males and remaining 50 (25%) were females. Male to female ratio was 3:1.

**Table 1: Age distribution of children admitted in PICU**

Age	Number of cases)	(Percentage
>28 days-1 year	111	55.5
1-5 years	49	24.5
5-10 years	29	14.5
10-14 years	11	5.5
Total	200	100

Table 1 shows maximum numbers of patients were in the age group of more than 28 days to 1 year which constituted 111 (55.5%) cases. This was followed by 1 year to less than 5 years age group which constituted 49. (i.e. 24.5%) cases. Under 5 years aged children constituted

160 (80%) cases. Next most common age group admitted was 5 years to 10 years with 29 (i.e. 14.5%) cases and 10 to 14 years age group constituted 11 (5.5%) cases.

**Table 2: Distribution in relation to the system involved.**

System involved/causes	Number of cases	(Percentage)
Central nervous system	67	33.5
Respiratory system	39	19.5
Infection/sepsis	32	16
Cardio vascular system	22	11
Gastro intestinal system	9	4.5
Haematological system	11	5.5
Renal system	8	4
Metabolic	6	3
Down syndrome	3	1.5
Poisoning	3	1.5

Table 2 shows the system wise cause of admission of patients to PICU. Central nervous system was the commonest system involved (n=67,33.5%). Next system commonly involved was respiratory system (n=39, 19.5%). Other common causes were infections (n=32, 16%), cardiovascular (n= 22, 11%), gastro intestinal (n=9, 4.5%), haematological (n=11,5.5%) and renal (n=8,4%) system causes. This was followed by metabolic causes (n=6, 3%), Down syndrome (n = 3, 1.5%) and poisoning in 3 (1.5%) cases.

**Table 3: Outcome of patients in PICU**

Outcome	No of cases	(Percentage)
Expired	53	26.5
Survived	111	55.5
Others	36	18

Out of the 200 patients admitted to PICU, 53 (26.5%) patients died. 111(55.5%) cases improved and were shifted to general ward and later discharged. 36 (18%) cases constituted of those who were shifted to higher centre or another department or were taken against medical advice.

### Discussion

In this study, authors found that total of 200 children in the age group of more than 28 days to 14 years were admitted in the Pediatric Intensive care unit of anugrah narayan magadh medical college and hospital, gaya, bihar, India from march 2018 to april 2020. Maximum numbers of patients were in the age group of more than 28 days to 1 year which constituted 111 (55.5%) cases. This was followed by 1 year to less than 5 years age group which constituted 49. (i.e. 24.5%) cases. Under 5 years aged children constituted 160 (80%) cases. This is comparable to a study published by El Halal MG et al, from Brazil where it was reported that majority of patients (78.3%) was under 5 years of age.<sup>9</sup> A study conducted by Abhulimhen-Iyoha BI et al,<sup>10</sup> revealed that 72.4% patients were aged less than 5 years. In the same study, 50.7% constituted infants which are comparable to this study where 52.53% constituted children aged between 29 days to 1 year. In a study published in journal of college of physicians and surgeons Pakistan by Haque A et al, most children (62.5%) were under 5 years of age.<sup>11</sup>

Out of these 200 patients, 150 (75%) were males and remaining 50 (25%) were females. Male to female ratio was 3:1. Abhulimhen-Iyoha BI et al, found male: female ratio of

1.49:1.<sup>10</sup> Haque A et al, also found that majority (60.9%) of patients were male.<sup>11</sup> Another study from Nepal by Shah GS et al, found the male to female ratio to be 1.7:1.<sup>12</sup> In this study, most of the cases admitted in PICU belonged to Central nervous system (n=67,33.5%). Next system commonly involved was respiratory system (n=39, 19.5%). Other common causes were infections (n=32, 16%), cardiovascular (n= 22, 11%), gastro intestinal (n=9, 4.5%), haematological (n=11,5.5%) and renal (n=8,4%) system causes. This was comparable to a study carried out by Haque A et al, which showed that the most common cause was neurological (28%) followed by respiratory in 24.4%, sepsis in 13.7% and cardiovascular in 10.9% cases.<sup>11</sup> This was in contrast to a study published in British journal of medical research by Shah GS et al, which found that respiratory diseases contributed to the maximum number of cases i.e. 33%, followed central nervous system diseases (18.6%), infectious diseases (11.3%), surgical causes (7.8%), gastrointestinal diseases (7.4%), cardiovascular diseases (6.5%) and poisoning (4.8%).<sup>12</sup> A study done in south india by Earan SK et al, found that respiratory system was the commonest system (40.2%) affected in their study.<sup>13</sup> A study by I. Abhulimhen-Iyoha BI et al, found that in their centre, the commonest cause was cardiovascular (41.1%) followed by neurological (12%), respiratory (10%), infectious (8.5%) and hematological causes (5-6%).<sup>10</sup>

In our study, out of 200 patients admitted in PICU, 53 patients died bringing the mortality to 26.5%. In a study from Brazil, El Halal MG et al, found the mortality in their centre to be 10.3%.<sup>9</sup> Abhulimhen-Iyoha BI et al, found that mortality in their centre was as low as 2.1%.<sup>10</sup> In a study from Pakistan by Haque A et al, it was found that the mortality of their PICU cases was 11.9%.<sup>11</sup> Shah GS et al, found that in their centre the mortality was 12.6%.<sup>12</sup> Some other studies have reported mortality similar to our study. Kapil D et al and Bagga A et al, found a mortality of 23.5% in their centre in 1993.<sup>14</sup> Another study from Pakistan by Haque A et al and Bano S et al, reported a mortality of 35% in their institute.<sup>15</sup> A study from Africa by Jeena PM et al reported an overall mortality of 35.44%.<sup>16-19</sup> The high mortality in our PICU may be contributed by several factors. Firstly, it is the only government run PICU in the tribal areas of Bihar. Another contributory factor might be that in our study central nervous system was responsible for 33.5% of admissions in PICU and many of these cases were cases of acute encephalitic syndrome. Again, viral Meningo encephalitis constituted most of the AES cases which included Japanese encephalitis. Japanese encephalitis is common in this part of the country which has high mortality. Another cause of high mortality is that lot of patients requiring PICU admissions have to be treated in the ward due to paucity of beds in PICU.<sup>20,21</sup> Our PICU caters to seriously ill pediatric patients from other departments also, including paediatric surgery, hematology, neurology, neurosurgery etc.

The mortality rate compared to developing countries somewhat less, thanks to the advanced ventilators and protocols available here. People working in PICU in developing countries face many problems like lack of resources, knowledge and the support system. A trained pediatric intensivist may help by working closely with general pediatricians, training residents and nurses in advanced procedures, developing and updating unit protocols taking into consideration the existing human, logistic and financial resources. The intensivist may also be helpful for training peripheral units on stabilization and transportation of sick children. Nightingale provided the definition of nursing as “helping the patient to live” and thus the role of Nurses in PICU cannot be overemphasized.

### Conclusion

We concluded that the children below 5 years constituted the major load of the patients in our PICU. There was male preponderance of PICU admission. Central nervous system disorders were the commonest cause of admission in the PICU, followed by respiratory, infectious and

cardiovascular causes. Our mortality stood at 26.5%. There were many cases of meningoencephalities which were admitted, and they have high mortality.

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