

Original research article

A retrospective study on clinico-demographic and outcome profile of patients admitted in PICU

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Abstract

Aim: To evaluate the clinical profile and outcome of children admitted in PICU.

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 from April 2019 to March 2020. 180 children of age 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, discharge against medical advice, referred or death. History, examination details and investigations done was noted.

Results: Out of these 180 patients, 132 (73.33%) were males and remaining 48 (26.67%) were females. Male to female ratio was 2.75:1. Maximum numbers of patients were in the age group of more than 28 days to 1 year which constituted 99 (55%) cases. Central nervous system involvement was the commonest (34.44%) cause for PICU admission followed by sepsis/infections (19.44%). Down's syndrome was present in 1.11% case. Out of the 180 patients admitted to PICU, 40 (22.22%) patients died.

Conclusion: Children under 5 years of age constituted the major load of the patients in our PICU. Neurological problems, infectious diseases, respiratory illness and poisoning were the most common cause for PICU admissions.

Keywords: Neurological, Sepsis, Respiratory, PICU

Introduction

Paediatric intensive care unit (PICU) has got an important role in management of critically ill infants and children. The management is aimed at providing vital organ function support and intensive monitoring in critically ill children at risk of organ dysfunction.¹ Advancements in knowledge and practices of medical sciences have improved the outcomes of critically ill children, up to five times, and various conditions are now treatable which were fatal previously.² The quality of paediatric medical care is reflected by the presence of functioning Paediatric Intensive Care Units in a country.² 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.³ 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.⁴ 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.⁵ 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.⁶ 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.⁷ 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 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 from April 2019 to March 2020, 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. 180 patients were included 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/ discharge against medical advice/ referred/ death. History, examination details, investigations done (CBC, CRP, serum bilirubin, chest x ray, USG abdomen, neuroimaging, EEG, ABG, CSF analysis, urine routine, microscopy, stool for occult blood, LFT, RFT) were noted, course in the hospital and treatment given were recorded.

Data Analysis

Statistical analysis was done, using the statistical package for social science (SPSS 20) for Windows Software. Continuous data were presented as mean \pm standard deviation (SD), if normally distributed and median [interquartile range (IQR), if data were non-normal. Categorical variables were presented as frequency and percentages (n; %). Comparability of groups was analyzed by Chi-square test, Student's t test or Mann-Whitney test as appropriate. P value of < 0.05 was considered significant.

Results

Total of 180 patients were admitted in PICU. Out of these 180 patients, 132 (73.33%) were males and remaining 48 (26.67%) were females. Male to female ratio was 2.75:1.

Table 1 shows maximum numbers of patients were in the age group of more than 28 days to 1 year which constituted 99 (55%) cases. This was followed by 1 year to less than 5 years age group which constituted 45 (25%) cases. Under 5 years aged children constituted 144 (80%) cases. Next most common age group admitted was 5 years to 10 years with 26 (14.44%) cases and 10 to 14 years age group constituted 10 (5.56%) cases.

Table 1: Sex and Age distribution of children admitted in PICU

Sex	Number of cases	Percentage
Male	132	73.33
Female	48	26.67
Age		
>28 days-1 year	99	55
1-5 years	45	25
5-10 years	26	14.44
10-14 years	10	5.56

Table 2 shows the system wise cause of admission of patients to PICU. Central nervous system was the commonest system involved (n=62, 34.44%). Next sepsis/infections was 2nd most common (n=35, 19.44%) cause for PICU admission. Other common causes were respiratory system (n=30, 16.67%), cardiovascular (n= 19, 10.56%), gastro intestinal (n=8, 4.44%), haematological (n=9.5%) and renal (n=7, 3.89%) system causes. This was followed by metabolic causes (n=5, 2.78%), Down syndrome (n = 2, 1.11%) and poisoning in 3 (1.67%) cases.

Table 2: Distribution in relation to the system involved.

System involved/causes	Number of cases	Percentage
Central nervous system	62	34.44
Sepsis/Infection	35	19.44
Respiratory system	30	16.67
Cardio vascular system	19	10.56
Gastro intestinal system	8	4.44
Haematological system	9	5
Renal system	7	3.89
Metabolic	5	2.78
Down syndrome	2	1.11
Poisoning	3	1.67

Out of the 180 patients admitted to PICU, 40 (22.22%) patients' died. 105(58.33%) cases improved and were shifted to general ward and later discharged. 35(19.44%) cases constituted of those who were shifted to higher centre or another department or were taken against medical advice. (Table 3)

Table 3: Outcome of patients in PICU

Outcome	No of cases	(Percentage
Expired	40	22.22
Survived	105	58.33
Others	35	19.44

Discussion

The PICU is a special unit of health care delivery service for patients who are critical with potentially recoverable diseases. 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, and early referral to PICU is to be implemented to have a low mortality.

Maximum numbers of patients were in the age group of more than 28 days to 1 year which constituted 99 (55%) cases. This was followed by 1 year to less than 5 years age group which constituted 45 (25%) cases. Under 5 years aged children constituted 144 (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.⁹ A study conducted by Abhulimhen-Iyoha BI et al,¹⁰ 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.¹¹ Out of these 180 patients, 132 (73.33%) were males and remaining 48 (26.67%) were females. Male to female ratio was 2.75:1. Abhulimhen-Iyoha BI et al, found male: female ratio of 1.49:1.¹⁰ Haque A et al, also found that majority (60.9%) of patients were male.¹¹ Another study from Nepal by Shah GS et al, found the male to female ratio to be 1.7:1.¹²

In this study, most of the cases admitted in PICU belonged to diseases of central nervous system, which was the commonest (n=62, 34.44%) system involved. Second most common (n=35, 19.44%) cause was sepsis/infections. Other common causes were respiratory system (n=30, 16.67%), cardiovascular (n= 19, 10.56%), gastro intestinal (n=8, 4.44%), haematological (n=9.5%) and renal (n=7, 3.89%) system causes. This was followed by metabolic causes (n=5, 2.78%), Down syndrome (n = 2, 1.11%) and poisoning in 3 (1.67%) cases. 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.¹¹ 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%).¹² 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.¹³ 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%).¹⁰

In our study, out of 180 patients admitted in PICU, 40 patients died bringing the mortality to 22.22%. In a study from Brazil, El Halal MG et al, found the mortality in their centre to be 10.3%.¹⁰ Abhulimhen-Iyoha BI et al, found that mortality in their centre was as low as 2.1%.¹¹ In a study from Pakistan by Haque A et al, it was found that the mortality of their PICU cases was 11.9%.¹¹ Shah GS et al, found that in their centre the mortality was 12.6%.¹² 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 1993.¹⁴ Another study from Pakistan by Haque A et al and Bano S et al, reported a mortality of 35% in their institute.¹⁵ A study from Africa by Jeena PM et al reported an overall mortality of 35.44%.¹⁶⁻¹⁹ The high mortality in our PICU may be contributed by several factors. Firstly, ours is the government run PICU which mostly caters to the tribal areas of Bihar, where patients often present late in their course of illness. Another contributory factor might be that in our study central nervous system was responsible for 34.44% 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.^{20,21} Our PICU caters

to seriously ill pediatric patients from other departments also, including paediatric surgery, haematology, neurology, neurosurgery etc.

The mortality rate as compared to developing countries is 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 paediatricians, training residents and nurses in advanced procedures, developing and updating unit protocols taking into consideration the existing human, logistic and financial resources. The pediatric intensivist may also be helpful for training peripheral units on stabilization and transportation of sick children.

Conclusion

The present study concluded that children < 5 years of age constituted the major load of the patients in our PICU. Neurological problems, infectious diseases, respiratory illness, and poisoning are the most common cause for PICU admissions.

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