

Disease spectrum of PICU admissions in a Tertiary Care Center

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Abstract

Background: Child mortality rate is labeled as a sensitive indicator of a country's development and evidence of the nation's priorities and values. Advanced technologies, effective monitoring, and high-intensity staffing and specialized training have been reported to drastically improve the outcomes of critically ill infants and children who are admitted to the Pediatric Intensive Care Unit (PICU). **Methods:** 434 patients each in age group 1-14 years were included as cases. The study was carried out in the Departments of Pediatrics in a tertiary care centre. **Results:** The total admissions during this study were 434 children. These 434 cases were used for the analysis. The age of the children was from >1 year to 14 years old. Males accounted for 57.4 % of the sample and females were 42.6%. It was found that the most common age group of admitted children is 1- 5 year, followed by above 5years age group. The most common diagnosis at the time of admission overall was Seizures (31.7%), Pneumonia (29%), Bronchiolitis (16.5%), Fever (22.5%). **Conclusion:** Children are the most vulnerable and valuable demographic group for any community and country. They need special care and protection, especially when admitted to intensive care units. Thus a general understanding in the management of these patients is crucial for all emergency medicine clinicians

Keywords: PICU, Seizures, Pneumonia, Bronchiolitis, Fever

INTRODUCTION

Prompt identification, quick referral, and emergency management are essential for critically ill or injured children. This is one of the most demanding, testing and challenging situations for pediatricians. It has been reported that mortality rate is extremely high in critically ill children in first 24 hours of admission.^[1] Child mortality rate is labeled as a sensitive indicator of a country's development and evidence of the nation's priorities and values. Advanced technologies, effective monitoring, and high-intensity staffing and specialized training have been reported to drastically improve the outcomes of critically ill infants and children who are admitted to the Pediatric Intensive Care Unit (PICU).^[2,3] A well-functioning PICU has got a significant role in management and improving survival of critically sick children.^[4-6] Studies all over the world, have revealed that critically ill children admitted in PICU have some common disease such as fever, pneumonia/respiratory tract infections, acute gastroenteritis(diarrhea, dysentery with or without vomiting), and seizures. Fever is one of the most common complaints (around 20%) for which children are presented to the pediatric emergency department (PED).^[7] According to a WHO,^[8] pneumonia is the most common infectious cause of worldwide mortality in children. It is responsible for 16% deaths of children under five years old especially in South Asia and sub-Saharan Africa. Kiranmai et al,^[9] reported that ARI is responsible for about 30-50 % visits to health facilities and for about 20- 40 % admissions in the hospitals. Farooqui et al,^[10] suggested that 3.6 million episodes of severe

pneumonia and 0.35 million all-cause pneumonia deaths occurred in children below 5 years of age, in India. One of the most common causes of pneumonia is Streptococcus pneumoniae and others include Hemophilus influenzae, Respiratory syncytical virus and Influenza. Due to lack of diagnostic support and surveillance systems the identification of etiological agent is difficult in developing nations.⁸ However, after universal immunization of children with Hib and Pneumococcal vaccines, the incidence of pneumonia has decreased in developed countries. These conjugated vaccines are indicated for the prevention of pneumonia morbidity and mortality in children younger than 5 years.

Diarrheal diseases have been reported by WHO as the second most leading cause of worldwide mortality in children under five,^[11] killing around 525,000 children. Around 1.7 billion cases of childhood diarrheal disease are reported every year all over the world. These diseases are attributed as a major reason for development of malnutrition in children under five. Studies have revealed that diarrhea is the third leading cause of childhood death in India, and is responsible for 13% of all deaths/year in children (Laxminarayana,^[12] 2015). Management of acute dehydration in PICU is a demanding task for physicians (Sutariya,^[13] 2011). The integrated Global action plan for pneumonia and diarrhea (GAPPD) of WHO and UNICEF aims to accelerate pneumonia control with a combination of interventions to protect,^[14] prevent, and treat pneumonia/diarrhea in children with actions to: a) protect children by promoting exclusive breastfeeding and adequate complementary feeding; b) prevent pneumonia with hand washing with soap, reducing household air pollution, vaccinations, HIV prevention and Cotrimoxazole prophylaxis for HIV-infected and exposed children. Preventive interventions for diarrhea include sanitation, source water improvements, household water treatment, and safe storage; c) treat focusing on making sure that every sick child has access to the right kind of care – either from a community-based health worker or in a health facility if the disease is severe – and can get the necessary antibiotics and oxygen needed.

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Seizures and epilepsy is a common cause for periodic visits to the PED in India (Saravanan,^[15] 2013). Results have shown that about 5% children would have at least one episode of seizure by the time they reach 16 years of age (Udani,^[16] 2005). Most of the seizures in children are provoked by somatic disorders, originating outside the brain, such as high grade fever, infection, syncope, hypoxia, toxins, head trauma or cardiac arrhythmias; while epilepsy is responsible for less than one third cases of seizures. Though, the prognosis is generally good, yet 10- 20% cases are persistent and refractory to drugs. These cases present a diagnostic and management challenge in PICU.

The predominant morbidity pattern of children in the community can be provided by analysis of the disease spectrum of children admitted to the PICU. This information is used in preparing public health action plans and strategies both at the macro (state and country) as well as micro (hospital) level.

Objective

The objective of this study was to examine the Disease spectrum of PICU admissions in a tertiary care center in Hyderabad, Telangana. The study has used statistical analysis. The study identified the major diagnosis of admissions in three age groups, as well as analysis on gender differences, if any.

MATERIAL AND METHODS

Study population

434 patients each of in age group 1-14 years were included as cases.

Study Area

The study was carried out in the Departments of Pediatrics of in a tertiary care centre.

Study duration

Duration of this study was six month.

Sampling technique & Data collection

All cases are triaged by the duty physician and moderately sick and severely ill patients are directly admitted to the PICU. Once stabilized, they are shifted to a step-down unit. Data on age, sex and diagnosis spectrum details were retrieved from the medical records and admission registers and tabulated into an Excel sheet.

Data Analysis

The results were analyzed using MS Excel software Data was then stratified into male and female in three age groups—less than one year, one to five years and above five years. The data was analyzed using MS Excel software.

RESULTS

The total admissions during this study were 434 children. These 434 cases were used for the analysis. The age of the children was from >1 year to 14 years old. Males accounted for 57.4 % of the sample and females were 42.6%. It was found that the most common age group of admitted children is 1- 5 year, followed by above 5years age group.

The most common diagnosis at the time of admission overall was Seizures (31.7%), Pneumonia (29%), Bronchiolitis (16.5%), Fever (22.5%).

Table 1: Gender wise distribution of patients

Gender	Number Of Patients	Percentage
Male	249	57.4%
Female	185	42.6%
Total	434	100%

Table 2: Diagnostic Spectrum of total number of patients

Symptoms	Total no. of patients	Percentage
Bronchiolitis	72	16.5%
Fever	98	22.5%
Pneumonia	126	29%
Seizures	138	31.7%
Total Sample	434	100%

Table 3: Bronchiolitis in less than 1 year, 1-5 year, more than 1 year according to male and female

Age	Bronchiolitis		Total
	Male	Female	
< 1 year	39 (73.5)	13 (68.4)	52 (72.3)
1-5 year	14 (26.4)	6 (31.5)	20 (27.7)
>5 year	-	-	-
	53 (73.6%)	19 (26.3%)	72

Table 4: Fever in less than 1 year, 1-5 year, more than 1 year according to male and female

Age	Fever		Total
	Male	Female	
< 1 year	19(35.1%)	9(20.4%)	28(28.5%)
1-5 year	14(25.9%)	11(25%)	25(25.5%)
>5 year	21(38.9%)	24(54.5%)	45(45.9%)
	54(55.1%)	44 (44.8%)	98(100%)

Table 5: Pneumonia in less than 1 year, 1-5 year, more than 1 year according to male and female

Age	Pneumonia		Total
	Male	Female	
< 1 year	36(58%)	23(35.9%)	59(46.8%)
1-5 year	26(42%)	41(64%)	67(53.1%)
>5 year	-	-	-
	62(49.2%)	64(50.7%)	126(100%)

Table 6: Seizures in less than 1 year, 1-5 year, more than 1 year according to male and female

Age	Seizures		Total
	Male	Female	
< 1 year	8 (11.5%)	19(27.5%)	27(19.5%)
1-5 year	29(42%)	23(33.4%)	52(37.6%)
>5 year	32(46.3%)	27(39.1%)	59(42.7%)
	69(50%)	69(50%)	138(100%)

DISCUSSION

The most common diagnosis at the time of admission in PICU was seizures (31.7%), pneumonia (29%), fever (22.5%). The gender differences have not been taken in consideration in the main diagnosis. The results of this study are correlated with the results of other Indian studies. The Government of India introduced the Hib-containing pentavalent vaccine in a phased manner and also started rotavirus vaccinations in a few States,^[17] in 2011. This year, the pneumococcal vaccination is planned to be introduced by Government of India. These interventions will surely decrease the morbidity and mortality rates. GAPPD has been aimed to accelerate pneumonia control with a combination of interventions to protect,^[14] prevent, and treat pneumonia/ diarrhea. Implementation of these measures will definitely prevent children admission to PICU. Thus, it will reduce the overall morbidity and mortality. The present study was carried out in 434 cases were admitted in six month. A severe strain was caused on the medical and human resources of the pediatric unit in this hospital as there was no pediatric emergency care unit and all cases were directly admitted to the PICU. It is suggested that a PED to be started so that only the serious cases are admitted in PICU and others to be sent directly to the ward after triage. Outcomes of researches related to Intensive Care Unit (ICU) are valuable tools for policy makers and hospital administrators. Strategies, for developing models for patient-centered outcomes and for better resource uses, can be drawn from findings of researches.^[18,19] Study of Khilnani et al,^[20] supported the present work as they suggested that more researches are required to be done to assess the overall outcome of critically ill children in India and the strategies for managing PICU admissions.

CONCLUSION

Children are the most vulnerable and valuable demographic group for any community and country. They need special care and protection, especially when admitted to intensive care units. Thus a general understanding in the management of these patients is crucial for all emergency medicine clinicians.

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