

# Mortality pattern in pediatric intensive care unit patients of a tertiary care teaching hospital: a retrospective analysis

Kalraiya A<sup>1</sup>, Kapoor A<sup>2</sup>, Singh R<sup>3</sup>

<sup>1</sup>Dr. Ashish Kalraiya, Assistant Professor, <sup>2</sup>Dr. Anju Kapoor, Professor, <sup>3</sup>Dr. Richa Singh, Residents; all authors are attached with Department of Pediatrics, People's College of Medical Sciences & Research Centre, Bhopal, Madhya Pradesh, India.

**Address for Correspondence:** Dr. Ashish Kalraiya, Jawaharlal Nehru Cancer Hospital Campus, H.N.08, Idgah Hills, Bhopal, MP, Email: akalraiya@yahoo.com

## Abstract

**Background:** A well functioning Pediatric Intensive Care Unit (PICU) contributes significantly in improving survival of critically sick children. **Method:** We retrospectively studied medical record of all children aged 1 month to 12 years old admitted in our PICU over a five years period. Data was collected in a predefined proforma that included age, gender, co-morbidities and final diagnosis at the time of death. Patients who left the hospital against medical advice (LAMA) were also noted. **Result:** Out of 1767 admissions, 87 patients died with mortality rate of 4.92%; male: female ratio of 2:1. 55.1% deaths belonged to 1month to 5 years age group and 41(47.13%) cases died within 24 hours of admission. Central Nervous System diseases were the commonest cause of mortality (35%) followed by Respiratory system diseases (28.73%). Many critically sick patients (14.8%) left the hospital against medical advice (LAMA). **Conclusion:** Mortality rate is quite low in our PICU; although high LAMA rate may be causing some bias in the result.

**Keywords:** Mortality; Pediatric Intensive Care Unit; PICU

## Introduction

Intensive care unit has got a very important role in management of critically ill children. These patients who require continuous monitoring, hemodynamic support, respiratory support, advanced airway management are admitted in Pediatric Intensive Care Unit (PICU) to achieve better outcome [1].

Child mortality is a sensitive indicator of a country's development and evidence of its priorities and values. According to NFHS-4 (2015), under five mortality rate in India is 47/1000 live birth; in Madhya Pradesh it is higher [52 (urban) and 69(rural) per 1000 live birth [2]. Under nutrition is a very important contributor to under-five mortality.

Present study was conducted to review the mortality pattern over the last 5 year period in our PICU and to compare the results with published national and international data. This assessment can provide valuable

inputs in finding local disease pattern as well as cases requiring more intensive management with the aim to predict and reduce the mortality. The information thus obtained can also be used to assess the existing services and further improving the facilities for optimum patient care.

## Material and Methods

We reviewed the medical records of all children aged 1 month to 12 years old who were admitted in PICU and died from July 2010 to June 2015. Ours' is a 5 bedded well equipped PICU unit in a teaching hospital (People's Hospital) attached to a medical college in central India.

Postgraduate pediatric residents do round the clock floor duty which is supervised and guided by senior residents and consultants in the department.

Data was collected from medical records in a predefined proforma that included age, gender, co morbidities and diagnosis at the time of death. Patient

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who left the hospital against medical advice (LAMA) was also noted.

Institutional Ethics Committee of People's College of Medical Sciences and Research Centre, Bhopal.

The cause of death was classified (ICD-10 coding system) on basis of primary system involved along with associated co-morbidities. Study was approved by

Data collected was entered into Excel sheet and analyzed by SPSS version 19 software. The results were shown as median, Inter Quartile Range (IQR), frequency and percentage.

## Result

During five years of study period, there were 1767 PICU admissions and 87 deaths (mortality rate of 4.92%). Out of 87 patients who died, male were 58 (66.6%) as compared to 29 (33.3%) females (M: F; 2:1).

Median age was 4 years with IQR of 6.6 years (25<sup>th</sup> percentile 1.4 year; 75<sup>th</sup> percentile 8.0 year; range 1 month-12 years).

Table 1 shows distribution of deaths in different age group.

**Table-1: Age wise distribution of deaths**

Age	Number of death
1 Month to 1 year	20 (22.9%)
1 year to 5 years	28 (32.2%)
Above 5 years	39 (44.8%)

Out of 87 deaths, approximately half of them (n = 41; 47.13%) died within 24 hours of admission in PICU.

Twenty-four (27.59%) cases succumbed to death between 24-48 hours and remaining 22 deaths (25.29%) occurred after 48 hours (Table-2).

**Table-2: Time interval from admission in PICU to death**

Interval from admission to death	Number (%)
Less than 24 hrs	41 (47.13%)
24 hrs to 48 hrs	24 (27.59%)
More than 48 hrs	22 (25.29%)

Most common primary system involved leading to mortality was Central Nervous System (n =31; 35%) followed by Respiratory system (n =25; 28.73%) and Gastro-Intestinal system (n = 15; 17.1%) (Table-3).

**Table-3: System wise distribution of mortality**

Primary system involved	ICD coding of system (Blocks)	Frequency (%)
Central Nervous System	G00-G98	31(35%)
Cardiovascular system	I00-I99	10 (11.49%)
Respiratory system	J00-J99	25 (28.73%)
Gastrointestinal system	K00-K93	15 (17.1%)
Renal	N00-N99	3 (3.44%)
Poisoning	X40-X49	3 (3.44%)

Different causes of mortality and co-morbid conditions are tabulated in table 4.

Common co-morbidities found were anemia in 35 (40.23%) and sepsis in 36 (41.38%) patients.

Large number of critically sick patients (14.8%) left the hospital against medical advice (LAMA).

**Table-4: Causes of mortality and co-morbid conditions**

Causes	Frequency (%)
Pyogenic meningitis	7 (8.05)
Tuberculous Meningitis	3 (3.45)
Cerebral malaria	8 (9.19)
Acute Febrile Encephalopathy	8 (9.19)
Refractory status epilepticus	5 (5.75)
Congenital Heart Disease	6 (6.89)
Rheumatic Heart Disease	1 (1.15)
Congestive Cardiac Failure with anemia	2 (2.29)
Tubercular pericarditis	1 (1.15)
Bacterial pneumonia	22 (25.29)
Pulmonary Tuberculosis	3 (3.45)
Acute Diarrhoea	14 (16.09)
Abdominal tuberculosis	1(1.15)
Renal diseases	3 (3.45)
Poisoning	3 (3.45)
Failure To Thrive (up-to 5 years age)	10/48 (21)
Anemia	35 (40.23)
Sepsis	36 (41.38)

## Discussion

We have 1767 admissions in PICU over 5 year period with 87 deaths ( mortality rate of 4.92%) which is in accordance with various published studies (range; 2.1% - 7.1% )[3-6]. Much higher rate of mortality (16.7% - 23.5%) has been reported by other authors [7, 8, 9].

We postulate that one probable reason of low mortality rate observed by us could be due to high LAMA (Left Against Medical Advice) rate of critically sick children from our PICU. Most of these patients leave the hospital either due to financial constraint or parents' perception that the child won't survive from current illness.

In present study, we observed that 55.1% deaths belonged to patients 1 month to 5 years age group, which is lower than reported by other studies (72% - 80%) [10,11]. Higher proportion of male (66.6%) dying in present observation is in accordance with the study done by Siddiqui et al (60.5%)[1].

We observed that out of total 87 deaths, 47.13% cases died within 24 hours of admission in PICU which is in contrary with study done by Shashikala et al. They reported 16% deaths occurring within 24 hours of admission [10]. This reflects either a poor health seeking behavior of parents or very late referral from peripheral health centres.

We observed that neurological diseases were most common causes of mortality (35%) followed by respiratory diseases (28.73%). This observation is consistent with the study by Volakli et al [12] but contrary to other studies which reported either sepsis or pneumonia as most common causes of death [7, 13]. Singhal and colleagues in their study found respiratory condition (40%) as most common cause of death in their PICU followed by neurological diseases (27%) [14].

Apart from being a retrospective study, other limitations of present study include a high LAMA rate of critically sick patients from PICU (as we don't know the outcome of these sick children) and non-inclusion of pediatric surgical cases (they are admitted in surgical ICU after initial stabilization in PICU) . A well functioning PICU reduces morbidity and mortality in critically sick children. Low mortality rate observed in present study shows quality management of our PICU patients; although high LAMA rate may be causing some bias in the result.

### Details of contributions:

**Dr Ashish Kalraiya:** data collection, data analysis, literature search, drafted initial manuscript and approved the final manuscript before submission.

**Dr Anju Kapoor:** Conceptualized the study, develop the study design, did literature search, data analysis, revised the manuscript and approved the final manuscript before submission.

**Dr Richa Singh:** Did data collection, literature search, reviewed the manuscript and approved the final manuscript before submission.

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