

Pooled Analysis of Admission Patterns and Outcomes in Paediatric Intensive Care Units in Pakistan

Sir,

Paediatric intensive care units (PICUs) have grown exponentially since the COVID pandemic era, contributing to a notable decrease in mortality rate globally. In developed countries, PICU mortality ranges from 1.85–5.8%, compared with 6.7–51.1% in low-income countries.¹ Pakistan continues to face a substantial burden of acute, yet potentially reversible, illnesses; however, there is a lack of resources and a scarcity of qualified intensivists and nursing staff.² We conducted a pooled analysis of 13 studies on the epidemiological profile of paediatric intensive care units (PICUs) in Pakistan from 2009 to 2024 to provide a snapshot of demographic, clinical, and outcome data from both private and public sector PICUs across the country.^{3,4}

A total of 5,756 critically ill children were included in these studies. Their ages ranged from 8 months to 6.72 years, and

nearly 50% of them were younger than 12 months. More than 50% were male. Respiratory (10–44%), neurological (10–35%), and cardiac (7–42%) conditions were the leading causes of admission. Sepsis accounted for up to 30.7% of cases in some studies. The length of stay (LOS) in PICUs ranged from 1 to 10.5 days (Table I).

Mortality rates varied widely (12.9–37.4%), reflecting disparities in resource allocation and care protocols. A high mortality rate was observed in ventilated patients with septic shock, calling for targeted interventions, including improved infection control and ventilation strategies. This pooled analysis underscores the urgent need for a structured system and collaborative efforts to reduce PICU mortality in Pakistan and helps in achieving Sustainable Development Goal 2030 (SDG) 3.2.1.

It is recommended to establish a unified database to track admissions, interventions, and outcomes across PICUs; to develop evidence-based guidelines for sepsis management and mechanical ventilation; to prioritise training and equipment allocation, particularly in small cities with a high disease burden; and to implement the System, Space, Staff, and Stuff (4S) framework for establishing PICUs.⁵

We urge policymakers and clinicians to leverage these findings for targeted improvements in paediatric critical care.

Table I: Descriptive characteristics of PICUs studies from Pakistan.

Variables	Study 1	Study 2	Study 3	Study 4	Study 5	Study 6	Study 7	Study 8	Study 9	Study 10	Study 11	Study 12	Study 13
Title	Improving outcomes in PICU in the Academic Hospital in Pakistan	Clinical profile and outcome in a PICU in Pakistan	The profile and outcomes of children admitted to the PICU of a public hospital in Karachi	Clinical spectrum and outcomes of patients admitted to the PICU of a tertiary hospital	Evaluating outcomes in mechanically ventilated young patients in a PICU	Clinical profile and outcome in a PICU in Pakistan	Clinical profile and outcome of the patients admitted to PICU in tertiary hospital.	Mortality patterns among critically ill children in the PICU of a developing country	Clinical profile and outcome in the PICU of a tertiary care hospital in Pakistan	Survival among patients admitted to the PICU of a tertiary childcare hospital.	Disease spectrum and outcome of patients in the PICU of the Federal Govt. Polyclinic Hospital (FGPC) Islamabad	Accuracy of pediatric risk of mortality (PRISM) Ill score in predicting mortality outcomes in a PICU in Karachi	Outcome among mechanically ventilated children in a tertiary care hospital.
Publication year	2009	2009	2016	2024	2023	2015	2021	2015	2020	2021	2024	2020	2022
Centre	AKUH	AKUH	Civil Hospital Karachi	Children's Hospital Lahore	Shahida Islam Hospital, Lodhran	Children's Hospital, Multan	Nishtar Hospital, Multan	AKUH	Military Hospital, Rawalpindi	Children's Hospital, Multan	Polyclinic Hospital, Islamabad	Abbasi Shaheed Hospital, Karachi 2017-2019	National Institute of Child Health, Karachi 2019
Year of study	2005-2007	2007	2013-2014	2023	2022-2023	2011-2014	2018	2006-2012	2017-2018	2019-2020	2018-2020	2017-2019	2019
Duration (months)	24	12	12	12	6	42	12	72	6	7	24	19	12
No of admissions	413	314	243	884	154	1573	150	248	531	205	424	407	210
Age in months	1-168	1-168	1-120	1 - 60	1- 120	1-168	1-144	4-96	1-156	1-144	1-144	1-144	1-168
Male	63%	66%	52%	59%	65%	63%	55%	60.5%	58%	60.5%	56.4%	54.5%	55.7%
Female	37%	34%	48%	41%	35%	37%	45%	39.5%	42%	39.5%	33.6%	45.5%	44.3%
Respiratory	10%	10%	28%	22.3%	35.1%	18%	26.7%	13.3%	39.90%	N/A	37.3%	44%	N/A
cardiac	42%	42%	9%	0%	14.9%	7%	6.7%	13.3%	12.1%	N/A	2.4%	-	N/A
neurologic	10%	10%	18%	22.5%	29.2%	23.5%	12%	14.9%	17.5%	N/A	15.5%	35.5%	N/A
sepsis	7%	0%	14.4%	2.9%	9.1%	-	30.7%	17.3%	0%	N/A	14.6%	14.9%	N/A
others	31%	38%	30%	52%	-	11%	25%	38%	30.5%	N/A	13.9%	5.6%	N/A
Mechanical ventilation	90%	90%	34%	54%	100%	27.8%	41%	100%	23%	N/A	27.4%	35.2%	100%
LOS (days)	5.3	3.2	1	10.5	7.08	4.5	N/A	N/A	4.11	4.52	3.1	3.3	6.73
Mortality	24.5%	14%	24.4%	14%	33.8%	19%	18%	12.2%	26.6%	15%	25%	37.4%	37%

PICU: Paediatric intensive care unit.

COMPETING INTEREST:

The authors declared no conflict of interest.

AUTHORS' CONTRIBUTION:

UF: Study design, data analysis, and wrote the manuscript.

AH: Concept, critical review, and final guarantor of the manuscript

AS: Data collection.

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