

ORIGINAL ARTICLE

Clinico-demographic profile of patients admitted in PICU at tertiary care centre in Ahmedabad.

Dr. Purvi R. Patel* Dr. Halak J. Vasavada** Dr. Snehal V. Patel *** Dr. Rohan Mehta**** Dr. Nirav Rathod****

*Assistant Professor **Associate Professor ***Professor & Head of Unit ****Resident Doctor Department of Pediatrics, N.H.L. Medical college Shardaben Municipal General Hospital, Ahmedabad

KEY WORDS : P.I.C.U., Clinical profile, Demography, Respiratory system, Outcome.

ABSTRACT

Introduction : Advances in paediatrics especially in the field of intensive care have dramatically improved the prognosis for the critically ill children. Numerous conditions that were previously fatal are now treatable, and many children who previously would have sustained a permanent disability now recover completely.

Aims & objectives: is to study the demographic, clinical profile, morbidity, mortality & outcome of the patients admitted in P.I.C.U.

Materials & Method: It is a prospective observational study conducted at a Paediatric I.C.U of tertiary care centre (Shardaben general hospital) affiliated with medical college during September 2017 to June 2018.

Result: Out of 242 Children admitted to PICU 48.13% of the patients were infants, 53.30% were male & 46.70% female. 74.80 % of the patients were directly admitted in PICU while rest were shifted from ward when the patient deteriorated. Out of total patients, 53.31% patients had respiratory system involvement, 19.84% CNS, 18.5% multi system, 5.79% GIT, 0.83% renal, 0.83% CVS and 0.83% endocrine system involvement. .As per outcome status, 80.16% were discharged & 19.84% were expired. Among the expiries, Respiratory involvement (37.50%) was most common as primary system involvement on presentation.

Conclusion:In children who required admission in PICU maximum were male infants. The occurrence of disease critical enough to warrant PICU admission, were maximum involving respiratory system.

INTRODUCTION

Advances in paediatrics especially in the field of intensive care have dramatically improved the prognosis for the critically ill children. Numerous conditions that were previously fatal are now treatable, and many children who previously would have sustained a permanent disability now recover completely. The current evidence suggests that the sickest subgroup of critically ill children are less likely to die if treated in paediatric intensive care unit (PICU) in a tertiary care hospital.

Advances in the care of the critically ill child have not come cheaply, and there are problems in terms of costs, resources, technical problems, and stress on staff, family and child. To some, intensive care appears over-invasive, unreasonably expensive, frequently ineffective, and a drain on the limited health service resources. So, for the optimal management of the critically ill children, the paediatrician dealing with the children should be familiar with critical complications of all childhood diseases, and be aware how invasive intensive care can significantly improve the prognosis.

MATERIALS & METHOD

STUDY TYPE

- It is a prospective observational study.

STUDY SITE

- Paediatric I.C.U of Shardaben Municipal General Hospital , affiliated to N.H.L. Medical College, Ahmedabad.

STUDY PERIOD

- September 2017 to June 2018

INCLUSION CRITERIA

- All the patients from the age of 1 month to 18 years who were admitted in the paediatric I.C.U. fulfilling admission criteria as per department protocol.
- All children 1 month to 18 years of age admitted to paediatric ward and shifted to PICU.

EXCLUSION CRITERIA

- All DAMA patients.

Correspondence Address : Dr. Purvi R. Patel
95, Madhavbag Tenements, Nirnaynagar, Ahmedabad-382481
E mail: evergreen.purvi@yahoo.in

Table I : Age wise distribution

Age of child	Number of patients	Percentage of total	Number of patients	Percentage of total
<1 year	117	48.34%	128	44.8%
1-5 year	76	31.41%	111	38.8%
5-12 year	47	19.42%	35	12.2%
12-18 year	02	0.83%	12	4.2%
Total	242		286	

- Patients expired within 2 hours.
- All surgical cases.

Out of 60 bedded ward, the PICU in the institute is a 3 bedded with 3 ventilators. It was a Well-equipped PICU with adequate Nursing staff and round-the clock pediatrician.

CRITERIA FOR P.I.C.U.ADMISSIONS

- Mechanical ventilation
- Impending respiratory failure
- Stridor
- Oxygen requirement to maintain spo2 >94
- Severe respiratory distress
- Respiratory rate >70 per min
- Chest indrawing- use of accessory muscles of respiration
- Prolonged episodes of apnoea
- Comatose patients – GCS <11, altered sensorium
- Prolonged or Multiple convulsions
- All type of poisonings
- Shock / circulatory failure
- Systemic bleeding
- Recovery from critical illness requiring monitoring
- All ward patients with potential unstable conditions requiring close monitoring.

Shock⁽¹⁾ is an acute process characterized by the body's inability to deliver adequate oxygen to meet the metabolic demands of vital organs and tissues.

M.O.D.S.⁽²⁾: Multiple organ dysfunction syndrome was defined as progressive dysfunction of two or more major organ systems in a critically ill patient that makes it impossible to maintain homeostasis without medical intervention.

OBSERVATION AND DISCUSSION

In present study, out of total 242 patients, maximum patients are infants (48.3%). This is comparable to a study conducted in southern India by Sujay kumar Earan et al(4) which shows 53.4% of the total to be infants. This was similar to that reported by Rady(5), Einloft et al(6)(40%), and Lanetzki et al(7). In the age group of 1-5 year, there were 31.41% patients, which was 27.7% in the study by Sujay Kumar Earan et al(4).

The higher percentage of PICU admissions in infants can be attributed to a number of factors.

- Low immunity
- Malnutrition more in infants
- Higher rates of infectious diseases in infants as compared to other group.
- Over crowding

The lower percentage of PICU admissions in age group >12 years attributed to following factors.

- Lower incidence of infectious diseases in adolescence.
- More adolescence attending medical OPD than paediatrics OPD in most set up.

Table II. : Source of admission

	Number of patients	Percentage of total
From ward	61	25.20%
Direct PICU	181	74.80%
Total	242	

Table III. : Number of patients transferred from other hospital Which were admitted directly into P.I.C.U.

Duration of stay at previous hospital	Number of patients
< 24hrs	16
1-3 days	45
3-4 days	12
>= 5 days	09

Table IV: Primary system involved on presentation

	Number of patients	Percentage of total	Sujay kumar Earan et al(4)	Rukamani et al(10)	Ali Mohammed et al(3)
Respiratory System	129	53.31%	40.2%	25.5%	43%
C.V.S	2	0.83%		3.78%	20.9%
C.N.S	48	19.84%	16%	16.16%	12.2%
G.I.T	14	5.79%	9.9%	6.06%	1%
Renal	2	0.83%			
Multi system	45	18.5%			
Endocrine	2	0.83%			
Total	242				

In the present study, out of 242 patients, almost 75% were directly admitted in PICU and the rest were shifted from pediatric ward when they deteriorated and fulfilled criteria for PICU admission. This is comparable to study by Asim Khurshid et al(8) showed that, total admissions from emergency were 70%, from the ward were 20% and from operation theatre 10%.

Monitoring is an essential component of pediatric care and it is important to react at first sign of worsening and shift such patients to PICU so that overall survival can be improved. This shows the lack of awareness and literacy regarding early consultation to general practitioner, at PICU or referral doctor.

In the present study out of 181 patients admitted in P.I.C.U. , 82 were referred from other hospital . Out of 82 patients ,16 patients (19.5%) came within 24 hours of outside admission. 45 patients (54.8%) came within 1-3 days of outside admission. 12 patients (14.6%) came within 3-4th day of outside admission. Whereas 09 patients (10.9%) came on or after 5th day of outside admission. Rest of the 99 patients out of 181 admitted directly in P.I.C.U. came directly from home. Out of these 99 patients which were directly admitted to P.I.C.U. , 67 patients were seeking consultation on O.P.D. basis at different clinics

Out of 242 patients admitted in P.I.C.U 129 (53.3%) were primarily due to respiratory cause of which 85 (65.89%) were due to pneumonia, 44 (34.1%) patients presented with bronchiolitis were as 2 (0.01%) patients were found to have congenital lung anomalies.

Study by Bandyasahoo et al(11) revealed that infectious diseases (20.7%), respiratory diseases (19.1%) and central nervous system diseases (14.3%) were the Major Primary Causes of admission into PICU and Study by Batista et al.(9) showed that most hospitalizations were primarily due to clinical conditions involving respiratory illnesses such as pneumonia, bronchiolitis, and asthma.

This means that overall incidence of respiratory system infections like pneumonia, bronchiolitis and ALTB, HRAD is higher and these patients are more vulnerable to get PICU admissions as compared to GI system disorders.

In the study done by Suresh Goyal et al(12) 20% were of respiratory system. In the same study CNS, GI, Infectious disease, CVS, hematological were respectively 19.2%, 18.9%, 18.9%, 8.9%, 3.9%. This may be due to different spectrum of illness prevalent in that locality and differing criteria for PICU admission and the level of PICU setting..

Table V : Morbidity Profile:

	Number of patients	percentage of total
Shock	78	32.23%
Mechanical ventilation	60	24.79%
M.O.D.S	33	13.64%
Local complication of Intravenous access	11	16.41%
Bed sores	0	0%

Table VI : Outcome

Present study			Ali mohammed et al(3)	
	Number of patients	Percentage of total	Number of patients	Percentage of total
Discharged	194	80.16%	249	87.1%
Expiry	48	19.84%	37	12.9%
Total	242		286	

In present study, 78(32.23%) were in shock, 60(24.79%) needed mechanical ventilation, 33(13.64%) had M.O.D.S, 11(16.41%) had local complication of Intravenous access.

In a study done by Paridon B et al(13) showed that, out of 79 children admitted to PICU 44 (56%) children were with septic shock.

This is comparable to study by Bandy Sahoo et al(11) which showed 25% and by Villeneuve A(14) showed 21.4% had MODS during PICU stay.

This is comparable to the study done by Rukmani et al(10) showed 20.68% patients required mechanical ventilation.

In present study, out of 242 patients admitted in PICU, 194 (80.16%) were discharged and 48(19.84%) were expired. This is comparable to study done by Asim Khurshid et al(8) which shows 19.07% mortality, Rukmani et al(10) showed out of 396 PICU admissions, 27(7.07%) died, mortality of 6.7% and 16.7% recorded in India by Khilnani et al(15) and Bellad et al(16) respectively. Study by Batista et al(9) showed 514 (84.4%) patients were discharged from the unit and 95 (15.6%) died.

CONCLUSION

The occurrence of disease critical enough to warrant PICU admission, was maximum in infancy and involving respiratory system. Most of patients who need PICU care

were directly admitted in PICU. Most of patients who expired were of respiratory system involvement.

Important factors that may have contributed to survival in these patients include adequate manpower and equipment and provision of continuous medical education on pediatric critical care from time to time for staff by the institution.

The reasons behind the association between admission source and fatal outcome are still unclear. In the present study, we found that mortality was higher among patients with comorbidities, regardless of source of admission. Prevalence of comorbidities was similar among patients originating from wards when compared with those transferred from OR; however, mortality was significantly higher among the former. The underlying hypothesis is that, unlike OR patients, certain patients transferred from wards would also have severe comorbidities refractory to treatment and/or acute diseases with poor response to routine treatment. Furthermore, these patients are also more likely to have had prior prolonged stays, favouring colonization and infection by resistant microorganisms, which, in patients weakened by comorbidities and prolonged hospital admission, could result in unfavourable progression.

In addition, indication for PICU admission depends on the clinical judgment of the hospital team. It is possible that the team responsible for the patients in the wards may eventually delay shifting them to the PICU while they are

clinically deteriorating. This potential delay in transferring a patient to intensive care in more severe scenarios may be related to worse prognosis. On the other hand, we cannot exclude the hypothesis that patients admitted to the wards with complex diseases and poor prognosis may have been admitted to the PICU, where they subsequently died. Compared with all other patients, those admitted from wards had more oncologic/hematologic, neurologic, multiple, gastroenterological/hepatic and genetic comorbidities. Another factor that may be associated with PICU admission of patients with poor prognosis is the difficulty medical teams may have in adopting only palliative, rather than curative, therapy.

ABBREVIATION

PICU	Paediatric intensive care unit
MODS	Multiple Organ Dysfunction Syndrome
IAP	Indian Academy of Paediatrics
ALTB	Acute Laryngotracheobronchitis
CVS	Cardio Vascular System
CNS	Central Nervous System
GIT	Gastro Intestinal System
HRAD	Hyper Reactive Airway Disease
OR	Operation Room

REFERENCES

1. Definition of "Shock". <http://medical-dictionary.thefreedictionary.com/shock>
2. Al-Khafaji A, Sharma S, Eschun G, Pinsky MR. Multiple Organ Dysfunction Syndrome in Sepsis: Medscape. [.http://emedicine.medscape.com/article/169640-overview](http://emedicine.medscape.com/article/169640-overview)
3. Ali mohammed ali Zaakouk, Mohamed abdel malik Hasaan, Mohammed Fathy Hassan et al, Demographic criteria, clinical profile and outcome in PICU of El-Hussein university hospital, Cairo, Egypt. *Al- Azahar journal of ped.*vol.16 no.2 june 2013, 1-17
4. Kumar S, Varadarajan P, Sangareddi S. Study of Vasoactive Infusions through Peripheral Line. *pediatric Oncall online journal.* April-June 2015;12.
5. Rady HI. Profile of patients admitted to pediatric intensive care unit, Cairo University Hospital: 1-year study. *Ain-Shams J Anaesthesiol* 2014;7:500.
6. Einloft PR, Garcia PC, Piva JP, Bruno F, Kipper DJ, Fiori RM. Epidemiological profile of sixteen years in a pediatric intensive care unit. *Rev Public Health* 2002;36:728-33.
7. Lanetzki CS, de Oliveira CA, Bass LM, Abramovici S, Troster EJ. The epidemiological profile of pediatric intensive care center at hospital Israelita Albert Einstein. *Einstein (Sao Paulo)* 2012;10:16-21.
8. Asim Khurshid, Ghazi Khosa, Sara Rubab, Admission Source and Mortality in a Pediatric Intensive Care Unit, *p.j.m.h.s* vol. 9, no. 1, jan – mar 2015
9. Batista NO, de Rezende Coelho MC, Trugilho SM, Pinasco GC, de Sousa Santos EF, Ramos-Silva V. Clinical-epidemiological profile of hospitalised patients in paediatric intensive care unit. *J Hum Growth Dev* 2015;25:187-93.
10. Dr. J. Rukmani, Dr. N. Kumar, Clinical profile and outcome of PICU in a tertiary care hospital in south India, *RAJAR* Volume 3 Issue 5 May 2017, 902-907
11. Sahoo B, Patnaik S, Mishra R, Jain MK. Morbidity pattern and outcome of children admitted to a paediatric intensive care unit of Eastern India. *Int J Contemp Pediatr* 2017;4:486-9.
12. Goyal S, Dhyani A. Epidemiological Profile, Outcome Analysis and PRISM III Score of Patients Admitted in PICU at Bal Chikitsalaya, M.B Hospital, R.N.T. Medical College, Udaipur. *International Journal of medical pediatrics and oncology*, October-December 2015; 1(1); 1-5.
13. Paridon B, Sheppard C, Guerra G, Joff A. Timing of antibiotics, volume, and vasoactive infusions in children with sepsis admitted to intensive care. *Critical care* 2015;19(1):293.
14. Villeneuve A, Joyal J, Proulx F, Ducruet T, Poitras N, Lacroix J. Multiple organ dysfunction syndrome in critically ill children: clinical value of two lists of diagnostic criteria. *Annals of Intensive Care* 2016;6:40.
15. Khilnani P, Sarma D, Singh. Demographic profile and outcome analysis of tertiary level pediatric intensive care unit. *Indian J Paediatr.* 2004;71:587-91.
16. Bellad R, Rao S, Patil VD, Mahantshetti NS. Outcome of intensive care unit patients using pediatric risk of mortality (PRISM) score. *Indian Pediatr.* 2009;46:1091-2.