Clinical profile and outcome of PICU in a tertiary care hospital in south India

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Abstract:

Context (Background): This study is done at PICU of Coimbatore Medical College, studied clinical profile and outcome of PICU candidates.

AIM: To study the clinical profile and outcome of children admitted in PICU. Secondary objective is to correlate age, sex, disease with poor outcome.

Settings and design: descriptive study, conducted in PICU of Coimbatore medical college.

Methods: It is a descriptive study, conducted over a period of 3 months from October 2015 to December 2015. Studied all children admitted with PICU admission criteria from 2 months to 12 years of age group. None excluded. All cases admitted in paediatric department are scrutinized and according to the institutional PICU admission criteria, the candidates for PICU are selected. All cases admitted in PICU and treated as per the protocol. The clinical profile such as age, sex, history, co morbid conditions, condition on arrival, provisional diagnosis at arrival is noted. The duration of hospitalization and outcome is recorded with final diagnosis. The results are tabulated in SPSS software and analysed using chi square test for variables.

Results: Total cases admitted during study period were 1372. Among which 793 were boys and remaining girls. Out of which 396 (boys girls221, girls 175) who fulfilled the inclusion criteria were admitted in PICU and treated. There were a total of 396 admissions to the PICU Mean age was 48.35 months. Male to female ratio was 1.26:1. Diagnoses included Respiratory (25.25%), Cardiac (03.78%), Neurological (16.16%), Infectious (26.26%), Toxin/ Envenomation (07.82%), Renal (02.27%), Haematology (08.83%), GIT (06.06%), Hepatology (01.51%), Nutritional (01.26%), Metabolic (00.25%), Multiple Congenital Anomalies (00.25%), Allergic (00.25%). 82 children (20.68%) required mechanical ventilation. Average duration of ventilation was 5.24 days. 22.5% of non survivors had multi organ failure. Average length of PICU stay was 4.52 +/- 2.6 days. Complications commonly encountered were IV site thrombo phlebitis (12%), atelectasis (2.25%), accidental extubation (4%), and pneumothorax (0.8%). Incidence of nosocomial infections was 12.24%. 27 died (boys 13, girls 14) with a mortality rate of 07.07%. The mean age of deaths was 1.76 years (boys 2.63years, girls 0.96 years) with 70.3% of deaths occurring under one years of age (excluding neonates) and 85.18% of deaths occurring in under five years. 25.92% of deaths occurred within 24 hours of admission and 11.11% deaths had prolonged stay (>12days).

Conclusion: Respiratory illnesses were common cause of PICU admissions. As expected, Dengue like illnesses was also common. Maximum deaths were due to CNS infections. 2 deaths attributed to VHF with DIVC. Incidence of nosocomial infections was somewhat high. Interestingly, more boys got admitted to the PICU as compared to girls. More studies are required to assess the overall outcomes of critically ill children in India.

Keywords: PICU, Outcome, Clinical profile

INTRODUCTION:

The paediatric critical and emergency medicine has been evolved as a sub speciality in paediatrics over the years and the care and researches in this field dramatically reduced the mortality in so many diseases like dengue. Admission criteria for PICU admissions are institution dependent, based on the available facilities, bed strength. The trend is continuously changing from period to period. Infectious diseases contributing majority admissions in the past especially in developing countries like India. But now non communicable diseases are also in rise. Mortality is proportional to the underlying nature of the disease, physiological status n arrival and the quality of care of course. In this study, we aimed to identify the indication for PICU admission and outcome and to correlate the cause for poor outcome. Immediate outcome like death and intact neurological survival are measured. If the pattern of PICU cases and outcome is known, it will be easy for us to strengthen the facilities to manage those type of patients. In future we can reduce the mortality and improve the quality of care rendered to the public.
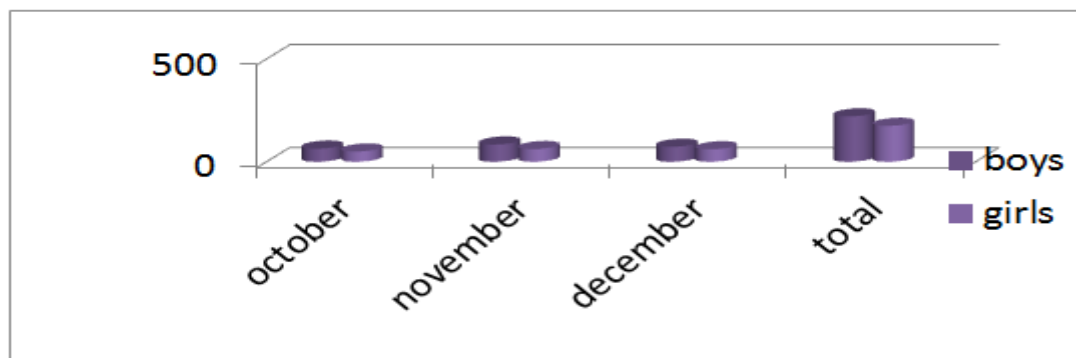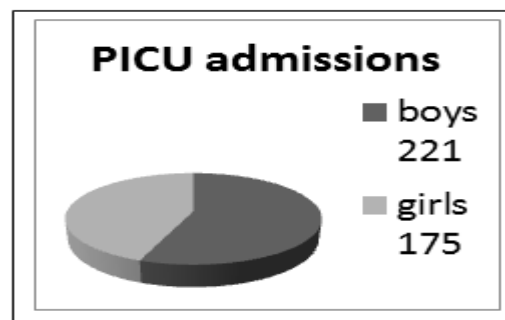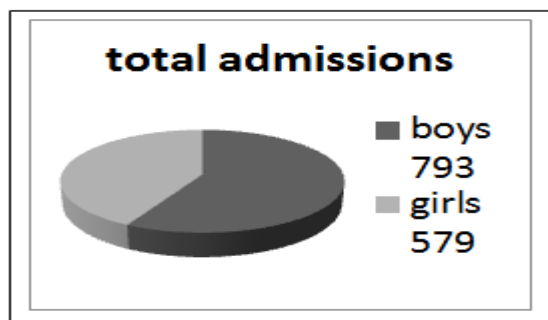
MATERIALS AND METHODS:

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RESULTS:

Total cases admitted during study period were 1372. Among which 793 were boys and remaining girls. Out of which 396 (boys girls221, girls 175) who fulfilled the inclusion criteria were admitted in PICU and treated. There were a total of 396 admissions to the PICU Mean age was 48.35 months. Male to female ratio was 1.26:1.

Diagnoses included Respiratory (25.25%), Cardiac (03.78%), Neurological (16.16%), Infectious (26.26%), Toxin/ Envenomation (07.82%), Renal (02.27%), Haematology (08.83%), GIT (06.06%), Hepatology (01.51%), Nutritional (01.26%), Metabolic (00.25%), Multiple Congenital Anomalies (00.25%), Allergic (00.25%). 82 children (20.68%) required mechanical ventilation. Average duration of ventilation was 5.24 days. 22.5% of non survivors had multi organ failure. Average length of PICU stay was 4.52 +/- 2.6 days. Complications commonly encountered were IV site thrombo phlebitis (12%), atelectasis (2.25%), accidental extubation (4%), and pneumothorax (0.8%). Incidence of nosocomial infections was 12.24%.

Table 3: Diagnosis

S. No	System	October	November	December	Total
1	RS	32	39	29	100(25.25%)
2	Infection	25	41	38	104(26.26%)
3	CNS	18	22	24	64(16.16%)
4	Hematology	8	11	16	35(08.83%)
5	CVS	7	5	3	15(03.78%)
6	Renal	7	1	1	9(02.27%)
7	Toxin/Env	8	10	13	31(07.82%)
8	GIT	2	12	10	24(06.06%)
9	Hepato	4	2	0	6(01.51%)
10	Nutri	1	3	1	5(01.26%)
11	Metabolic	0	0	1	1(00.25%)
12	conj	1	0	0	1(00.25%)
13	allergic	0	1	0	1(00.25%)
Total		113	147	136	396(100.00%)

DIAGNOSIS OF PICU ADMISSIONS SYSTEM WISE

System	Total	Deseases
RS	100 (25.25%)	ARI-5 BP-15 WALTRI-24 Asthma Exacerbation-8 ACUTE BRONCHIOLITIS-14
Infection	104 (26.26%)	VIRAL FEVER-77 DENGUE FEVER-16 ENTERIC FEVER-4 TB-2 PYODERMA-1 VHF/SEPTICAEMIA-4
CNS	64(16.16%)	FEBRILE SEIZURES-8 GDD-9 SD-16 SE/SD- 15 Shizencephaly-1 AES-2 Meningitis-5 GBS-1 PES/HIE sq-3 RHEUMATIC CHOREA-1 CP-1 SOL-1 TBM-1
Hematology	35(08.83%)	Thalassemia-14 Haemophilia-12 HDN-2 Hemophagocytosis-1 TRANSIENT ERYTHROBLASTOMAOF CHILD-2 ITP-4
CVS	15(03.78%)	VSD-4 ACHD-4 CCHD-7
Renal	9(02.27%)	AKI/SEPTICAEMIA-2 UTI-3 UTI/sepsis-1 MULTICYSTIC DYSPLASTIC KIDNEY-1 Nephrotic syndrome-1 ANS-IRGN-1
Toxin/ Envenomation	31(07.82%)	SNAKE BITE-11 SCORPIAN STING-5 RAT KILLER POWDER INGESTION-8 YELLOWPOWDER(AURAMINE O) POISONING4 OPC poisoning -1 UNKNOWN BITE -1 DOG BITE III -1
GIT	24(06.06%)	ADD 22 ACUTE GASTIRTIS 1 MECONIUM ILEUS-COLOSTOMY 1
Hepatology	6(01.51%)	AVH 5 MASSIVE HEPATOSPLENOMEGALY 1
Nutritional	5(01.26%)	NUTRITIONAL ANEMIA
Metabolic	1(00.25%)	IEM- ACYL COA DEF
Congenital	1(00.25%)	MCA
Allergic	1(00.25%)	ACUTE URTICARIA
Total	396 (100.00%)	

There were a total of 396 admissions to the PICU of which 27 died (boys 13, girls 14) with a mortality rate of 07.07%. The mean age of deaths was 1.76 years (boys 2.63years, girls 0.96 years) with 70.3% of deaths occurring under one years of age (excluding neonates) and 85.18% of deaths occurring in under five years. 25.92% of deaths occurred within 24 hours of admission and 11.11% deaths had prolonged stay (>12days).

Demographic characteristics (Gender, age) in died patients in PICU

gender	Oct		Nov		Dec		Total N (%)
Male	0		8		5		13(48.15)
Female	4		4		6		14(51.85)
Total	4		12		11		27(100)
Age	male	Female	male	Female	Male	Female	Total
1-6 m	0	3	2	3	4	4	16
7-12 m	0	1	1	0	0	1	3
>1-5 years	0	0	3	0	0	1	4
>5	0	0	2	1	1	0	4
Total	0	4	8	4	5	6	27

Characteristics of children who died in Paediatric ICU

Age	No=27
<1	19
1-5	4
>5	4
gender	
Male	13
Female	14
stay	
<1	7
1-6	11
5-12	7
>12	2
Comorbid	
MCA	1
GDD	3
HIE sequele	1
CNS malformation	1
Meconium ileus	1
SAM	3
CLE	1
System:	
RS	4 Bronchopneumonia/Sepsis2 Bronchopneumonia/myocarditis1 Bronchopneumonia/CLE 1
CNS	9 GBS/RF1, AES/SE/RF1,SE/SD/shock3, meningitis3, schizencephaly/cyst/RF1
CVS	4 ACHD/VSD/CCF1, CCHD/tricuspidatresia/shock1 TOF/PA/shock1, VSD/aspiration pneumonia1
Infection	4 VHF/DIVC/septicaemia2, SAM/sepsis1,disseminated TB1
GIT	1meconium ileus colostomy/sepsis
renal	1UTI/LOS
MCA	1
Toxin env	1 snake bite /envenomation
Hematology	1Late HDN/IC bleed/ ICP
IEM	1acyl COA deficiency

Chart 3: Diagnosis for Deaths which occurred within 24 hours

Acute encephalitis syndrome/SE/shock
Snake bite/envenomation/MODS
Schizencephaly/porencephalic cyst/RF
Multiple congenital anomaly/RF
Meningitis/septicaemia
VSD/CCF
Meconium ileus colostomy/sepsis

Death after prolonged hospital stay >12 days

Congenital lobar emphysema/Bronchopneumonia
Acyl COA deficiency/metabolic acidosis

DISCUSSION:

In the present study the mortality rate of PICU was 07.07% which was less comparing the mortality rates reported in developing countries that varied from 9.8-35%[13-16]. Often these patients arrived late with multiple complications leading to mortality despite the best available therapy. A study conducted by Campos Mino et al. in 2012 showed 13.29 % mean mortality rate in PICU in Latin American countries; 5.2% in Cuba,25% in Honduras, 4% in Spain and 6% in Portugal[17]. A study conducted in Argentina revealed a lower mortality of 2.6%[18].Gemke in a multi centre study showed mean7.1% mortality rate (range1-10%) in PICU patients. One of the reasons of variant rate of mortality related the different severity of disorders[5]. The mean age of deaths was 1.76 years (boys 2.63years, girls 0.96 years) in the present study which was comparable (3 years) in Sands study and it varied between 8 months to 2.6 years in other studies. In the present study, 70.3% of deaths occurring under one years of age (excluding neonates) that too in less than 6 months mostly and 85.18% of deaths occurring in under five years. 25.92% of deaths occurred within 24 hours of admission and 11.11% deaths had prolonged stay (>12days)., 70.3% of total PICU deaths were infants a similar figure (68%) was shown in the study conducted by Ghaffariet al; but infant deaths accounted for only 27.9 % in Sands study. However, it is expected that mortality rate is more common in infant than older children in developing countries.

The commonest condition leading to death was CNS infections (24.59%) which were similar to the study conducted from Greece. In a study conducted Nepal in 2014 revealed pneumonia (29%) and sepsis as major causes of death. In the present study congenital heart disease were seen in 14.81% of cases, similar to the study conducted by Ghaffariet al which revealed 11% of deaths had congenital heart disease. Naghib"sstudy presented that 28% had congenital heart disease. Sands et al. showed infections and trauma, each with 19.6% were common aetiology of death in PICU; however as trauma cases would be shifted to surgical department; the present study did not have any trauma cases enrolled. Duration of stay is important because serious cases succumb early and in the present study, 66% of total deaths occurred in first 5 days which was also revealed in other studies. In the present study, 7.4 % of patients had prolonged stay and a very similar figure (11%) was identified in a prospective study conducted on prolonged study by Yaseen Arabi et al. Prolonged ICU stay can adversely affect the health status by increasing the risk of infection, complications and possibly, mortality. Mechanical ventilation was only 20.68 % which was less than the reference values of 31.5-67%. The mortality rate compared to developing countries 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 paediatric 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 intensivist may also be helpful for training peripheral units on stabilization and transportation of sick children. Nightingale provided the definition of nursing as "helping the patient to live" and thus the role of Nurses in PICU cannot be overemphasized.

CONCLUSION:

Respiratory illnesses were common cause of PICU admissions. As expected, Dengue like illnesses was common. Maximum deaths were due to CNS infections. 2 deaths attributed to VHF with DIVC. Incidence of nosocomial infections was somewhat high. Interestingly, more boys got admitted to the PICU as compared to girls. More studies are required to assess the overall outcomes of critically ill children in India.

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