Retrospective Study to Identify the Common Signs and Symptoms, Morbidity and Mortality Pattern in Neonates Attending Pediatric Emergency Services, CMC, Vellore, South India

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ABSTRACT

Children are not miniature adults but individuals with uniqueness and specific needs. They have a lot of challenges due to their various stages of growth and development process and particularly their organ systems are very immature and easily will be insulted their pediatric nurses as well the health care team members need to be vigilant in preventing illnesses and managing their illnesses so that they will not develop complications. This article explains the need for early intervention in the management of newborns, identifying their signs and symptoms at an early stage and preventing impending complications.

Keywords: Complications, Neonate, Signs, Symptoms, Treatment**.**

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Introduction

The main aim of newborn care is not only to reduce neonatal mortality but more importantly to ensure their intact survival past this period. Neonates are prone to develop health problems due to the transition from dependent fetal to independent neonatal physiology. According to WHO[2], the proportion of neonatal mortality to infant mortality is increasing in India with 1.2 million deaths. India contributes nearly 30% of deaths to the global burden. Neonatal mortality rates (NMR) are uniformly high in all states except the states of Kerala and Tamil Nadu.[3] There are no published studies done in Tamil Nadu about the emergency visits of newborns.[8]

Pediatric Emergency Services (PES), Christian Medical College caters to all children from birth to 0-16 years. to analyze the causes of newborns visiting the emergency department in the first month of life. This study aimed to look at the incidence of neonatal emergency cases and what brought the neonate to PES.

The study was designed to analyze morbidity patterns like Hypothermia, Sepsis, Jaundice, Hypoglycemia, Intra intra-cranial bleeding which are peculiar only in neonates for a period of one year. We analyzed the co-morbidity factors which are leading to this morbidity like non-institutional birth, preterm delivery, antenatal factors, education, or profession of the mothers in mothers.[9-16] All the demographic data of the babies and the premorbid conditions and parity influence were studied as cofactors of neonatal survival.

Need for the study

Any intervention on the part of the care of the newborn like a separate care area or any skills teaching for nurses is the need of the hour as the infrastructure for NICU primary is available in

every Government Hospital. We intended with this study, to know the incidence of Emergencies in neonates and to address any need for separate care areas for neonates or any expertise on the part of the health care personnel the nurses. The skills in the care of Newborn babies at presentation have not been quantified in any previous study. We wanted to know the incidence of any adverse events leading to mortality during the stay of the neonate which also has not been recorded either too.

This study was done to quantify the spectrum of illness related to neonates by defining the common signs and symptoms, morbidity, and mortality pattern. In this process, we intended to increase the sensitivity of the triage nurses/system to pick up the signs and symptoms in the newborn, so that it equips us to treat in a better way.

Primary Objectives

1. To identify the general symptoms and manifestations with which the neonates are brought to the Pediatric Emergency Service in a period of one year.
2. To assess the incidence of adverse events leading to mortality (e.g. respiratory failure, shock, hypoglycemia status epilepticus, etc.).
3. To study morbidity patterns in Newborns attending Pediatric Emergency Service.

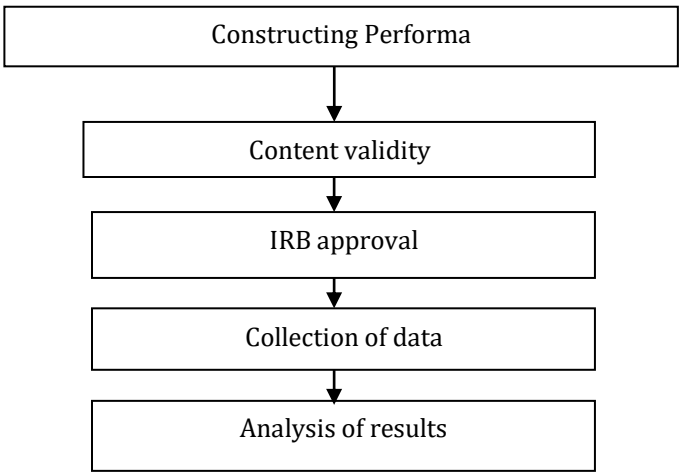
Methodology

This retrospective, observational study was conducted in a tertiary care, 2400-bed teaching hospital in Southern India, with the approval of the Institutional Review Board (IRB) and Ethics Committee (IRB no10712, dated 21-06-2017). For the development of a reliable validated performance, a systematic approach was laid down which was made in consultation with Senior Consultants, Senior Nurses, and Nurse Manager After the satisfaction that the Performa was a true picture of the day-to-day work at our institution, we started the data collection from the chart review retrospectively from January 2016 to December 2016.

Defining the variables

1. **General symptoms:** Common complaints of the attending caregiver of the neonates to the Triage Nurse/Doctors at Pediatric Emergency services
2. **Adverse events**- Any event that requires acute support in the physiological parameters of A, B, C, or D (Airway, Breathing, Circulation, Disability, etc.), which may lead to increased severity of the disease /mortality during the stay of the neonate.
3. **Morbidity Pattern:** It refers to the diagnosis of the neonate and the prevalence of the condition in newborn babies presenting to the Pediatric Emergency Service.

Detailed diagrammatic Algorithm of the study



Inclusion Criteria: All neonates from birth to 28 days of life attending Pediatric Emergency Service for acute illness.

Exclusion Criteria: When required details are not available in the chart or in the case of an Adopted child.

Sample size: All the babies presented to Pediatric Emergency Services during the period were included in the study. The total neonates included in the study was 436.

Statistical Analysis

Data was summarized as Mean and Standard Deviation (SD) for continuous variables and categorical variables were reported by using numbers and percentages. To find out an association between two categorical variables, the Chi-square test was used. All the analyses were done by using STATA version 15.

Results

The demographic data of the present study found that out of 436 newborns majority were male (65.6%), and 44.3 % belonged to age more than 216 hours of life. Among the recruited sample, the majority were term babies (91.7%) and the majority were having normal birth weight (87%).

Figure 1 Bar Diagram shows that the majority of the neonates 85(19.49) percent presented with fever and the least 3 (0.68) of them with decreased passing urine and discharge from the umbilicus.

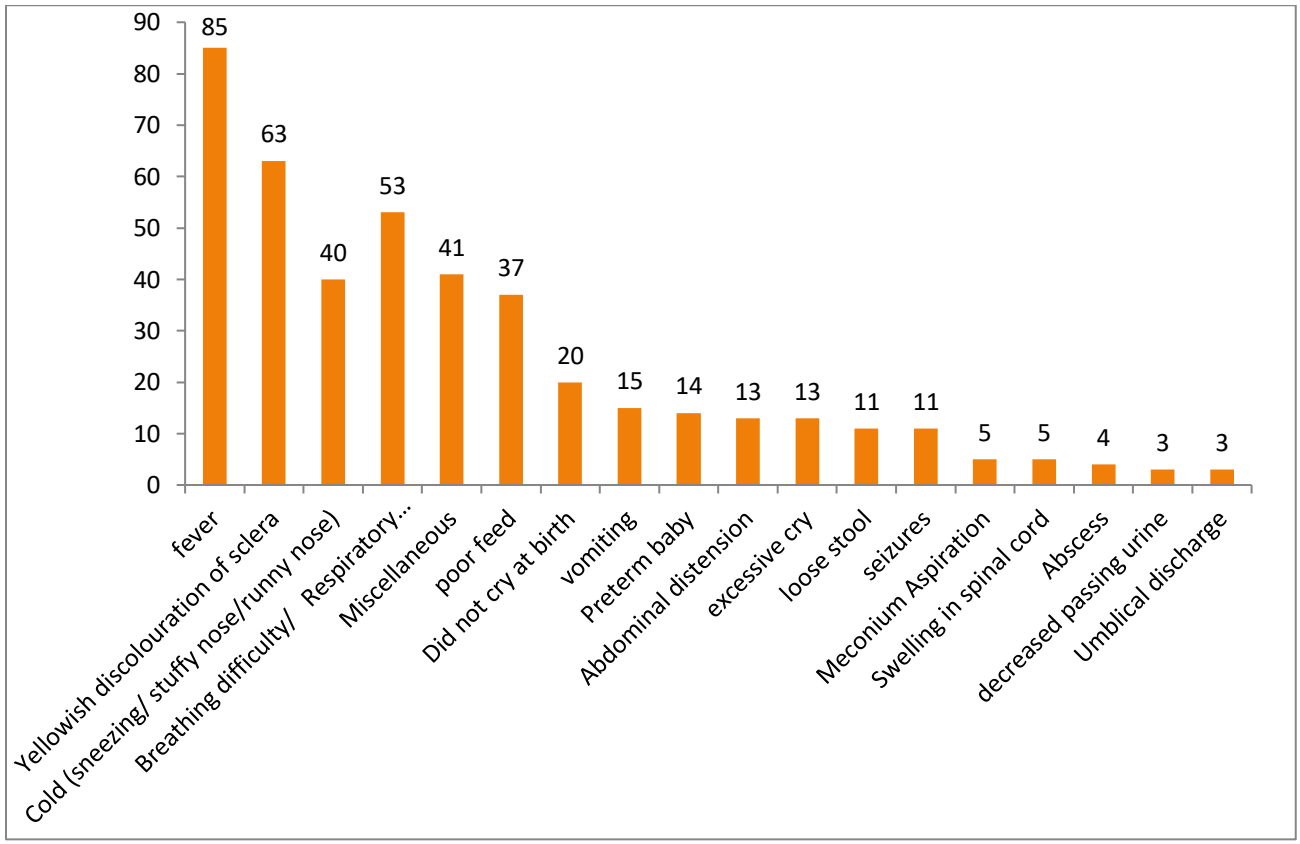
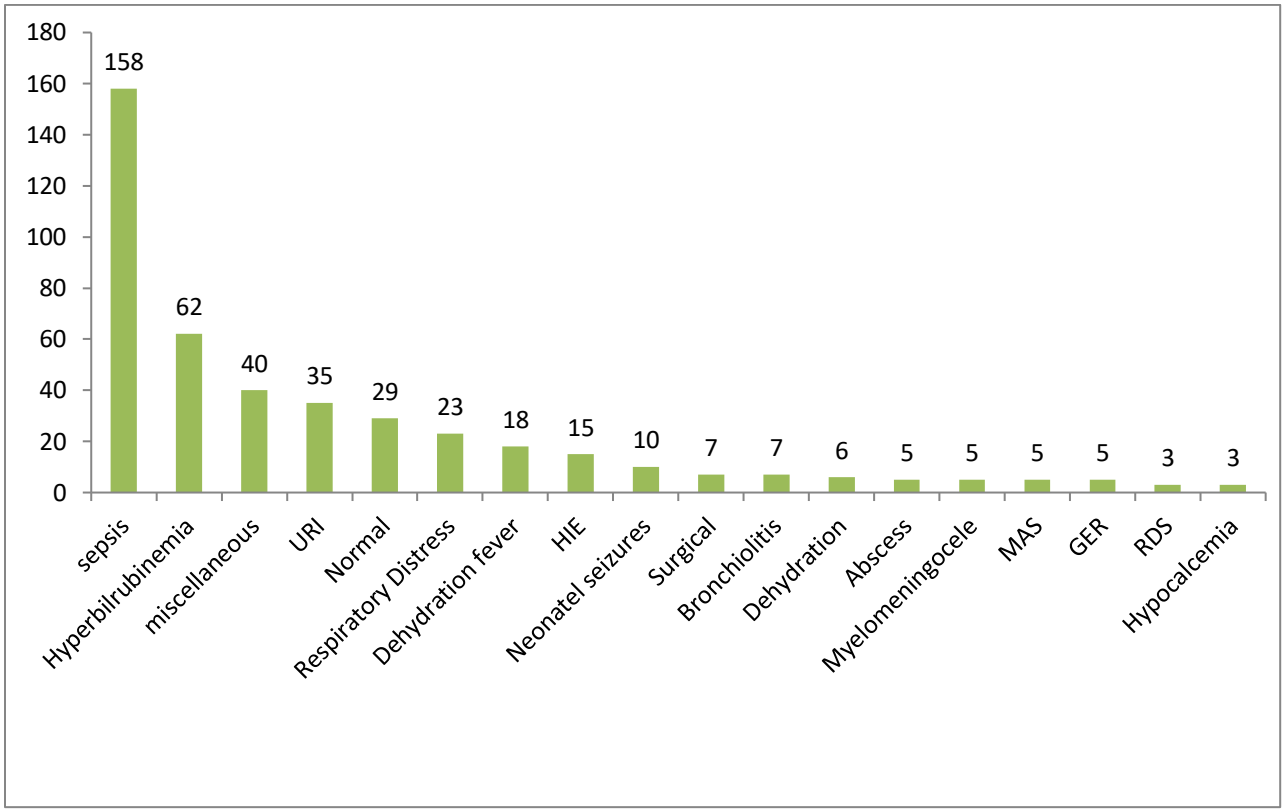


Figure 1: Frequency Distribution of signs and symptoms of neonates on arrival at Paediatric Emergency unit.

Figure 2 shows that the most common diagnosis of neonates on admission to the ER was Sepsis (36.2%) followed by Hyperbilirubinemia (14.2%) and the least common diagnosis was Respiratory distress syndrome and Hypocalcaemia (0.7%).



*Lt Inguinal hernia, Swelling lt mandible, Abdominal distension, Urachal cyst, Bledding urethra # Presented with symptoms such as not sucking well, loose stool, excessive cry, hearing defect, vaginal discharge, Nas Regurgitation etc. but no abnormalities detected on examination **$** Eye discharge, Ear discharge, umbilical discharge, Vaginal discharge, Aspiration, Breast redness, occipital swelling etc.

Figure 2: Frequency distribution of diagnosis on admission to paediatric Emergency unit.

Table1. Shows that the overall mortality rate was 2.3% of which the highest death rates were because of MAS (20%) followed by Neonatal seizures (10%). The minimal death rates in neonates were due to Respiratory Distress (4.3%). 174 (39.9%) were treated for minor ailments and sent home from the ER, more than half 232 (53.2%) were transferred from the ER to the ward, 20 (4.6%) were discharged against medical advice and 10 (2.3%) died.

Provisional Diagnosis on admission to ER	Discharged well from ER	%	Transferred from ER to Ward	%	DAMA	%	Death	%
Sepsis (158)	35	22.2	108	68.4	8	5.0	7	4.4
Hyperbilirubinemia(62)	29	46.8	31	5	2	3.2	-	-

URI (35)	31	88.6	4	11.4	-	-	-	-
Normal (29)#	18	62.1	9	31.0	2	6.9	-	-
Respiratory Distress(23)	2	8.7	19	83	1	4.34	1	4.3
Dehydration fever(18)	5	27.8	10	55.6	3	16.7	-	-
HIE(15)	5	33.3	8	53.3	2	13.3	-	
Neonatal seizures(10)	-		9	90	-		1	10
Surgical(7)*	4	57.1	3	42.9	-		-	-
Bronchiolitis (7)	3	42.9	3	42.9	1	14.3	-	-
Dehydration (6)	3	50	3	50	-		-	
Abscess (5)	5	100	-		-		-	
Myelomeningocele (5)	1	20	3	60	1	20	-	
MAS(5)	1	20	3	60	-		1	20
GER(5)	5	100	-		-		-	
RDS(3)	2	66.7	1	33.3	-		-	
Hypocalcaemia (3)	1	33.3	2		-		-	
Miscellaneous(40)**$**	24	60	16	40	-		-	
Total	**174**	**39.9**	**232**	**53.2**	**20**	**4.6**	**10**	**2.3**

*Lt Inguinal hernia, Swelling Lt mandible, abdominal distension, Urachal cyst, bleeding urethra. #Presented with symptoms such as not sucking well, loose stool, excessive crying, hearing defect, vaginal discharge, Nasal Regurgitation, etc. but no abnormalities detected on examination $ Eye discharge, Ear discharge, umbilical discharge, Vaginal discharge, Aspiration, Breast redness, occipital swelling, etc.

Table1: Diagnosis on admission to Emergency room categorized by outcome.

Table2 Association of demographic characteristics of neonates admitted to paediatric emergency services with various outcome categories.

Demographic Characteristics		Discharged well from ER	%	Transferred from ER to Ward	%	DAMA	%	Death	%	p-value
Sex	Male	114	65.5	155	66.8	10	50	7	70	0.49
	Female	60	34.5	77	33.2	10	50	3	30	
Age	0-72hrs	20	11.5	85	36.6	5	25	6	60	**0.0001**
	72-216 hrs	52	29.9	68	29.3	7	35	-	-	

	>216hrs	102	58.6	79	34.1	8	40	4	40	
Gestation	Term	165	92.7	209	85	17	68	9	81.8	0.23
	Preterm	9	5.1	23	9.3	3	12	1	9.1	
Birth weight	VLBW	4	2.2	14	5.7	5	20	1	9.1	**0.004**
	LBW	14	8.2	18	8.3	1	6.7	-		
	Normal Weight	156	91.8	200	91.7	14	93.3	9	100	

Table 2: shows that there was a significant association between age and Outcome Categories (p = 0.0001) and between birth and outcome categories (p = 0.004).

Discussion

The demographic data of the present study found that out of 436 newborns majority were male (65.6%), and 44.3 % belonged to age more than 216 hours of life. Among the recruited sample, the majority were term babies (91.7%) and the majority were having normal birth weight (87%). Similar to this, a study done in Mumbai found that out of a total of 531 neonates, the majority were 292 (54.99%) male babies, 396 babies (74.58%) were term, and more than half 323 (60.82%) belonged to normal birth weight. Most of them (261, 49.15%) were less than 1 day of life (Randad K. et. al., 2020).

The present study found that the majority of the neonates 85(19.5%) presented with fever and at least 3 (0.7%) of them presented with decreased passing urine and discharge from the umbilicus. Comparable studies reveal that the most common presenting complaints were breathing difficulty (18.1%) and vomiting (8.3%) while only 5.9% presented with fever and the least was Jaundice with only 3.7%. (Blakey. S et. al. 2021)Another study revealed that the chief complaints at presentation were jaundice (14.5%) and excessive crying (13.6%) and the least presented were complaints of regurgitation (2.3%) (Calado S. et. al. 2009)

In the present study, the findings reveal that the most common diagnosis of neonates on admission to the ER was Sepsis (36.2%) followed by Hyperbilirubinemia (14.2%) and the least common diagnosis was Respiratory distress syndrome and Hypocalcaemia (0.7%). In comparison, a study done by Blakey S. showed that the most common diagnoses were 'no significant medical problem' (41.9%) and bronchiolitis (10.5%) while only 10% presented with Sepsis and the least common diagnosis was Upper Respiratory Tract Infection with only 4%. Another study also showed that neonatal sepsis was the most common reason (39.3%) for admission to the unit followed by asphyxia (18.2%) and prematurity (16.9%). (Also W. et al., 2020)

In regard to the mortality pattern among neonates, the present study found that the overall mortality rate was 2.3% of which the highest death rates were because of MAS (20%) followed by Neonatal seizures (10%). Although Sepsis was the most common diagnosis, death rates were found only in 4.4% of Sepsis cases in neonates. The minimal death rates in neonates were due to Respiratory Distress (4.3%). A comparable study done by Also W. et. al. showed that the overall mortality rate was 13.2%. Sixty-nine (13.2%) out of 522 babies died on admission. The majority of the babies (44.9%) died <24 hours after admission. Major causes of mortality were prematurity, neonatal sepsis, and severe birth asphyxia. Other causes of mortality were neonatal tetanus, ruptured spina bifida, severe anemia following uvulectomy, and macrocosmic infant of diabetic mother.

The current study showed that majority of admission was due to Sepsis i.e. 158 neonates out of which 22.2% got discharged from ER, 68.4 % was transferred to wards, 5% were discharged

against medical advice and 4.4% died. Out of the 436 babies admitted in ER 174 (39.9%) were treated for minor ailments and sent home from ER, more than half 232 (53.2%) were transferred from ER to ward, 20 (4.6%) were discharged against medical advice and 10 (2.3%) died.

In the present study, it showed that there was a significant association between age and Outcome Categories (p = 0.0001) and between birth and outcome categories (p = 0.004). Another study found that The mortality rate was higher among neonates of extremely low birth weight, gestational age <28 weeks, very low birth weight, and preterm which accounted for 27/29(93%), 23/25(92%), 124/236(52.5%) and 230/864(26.6%) respectively. This indicates that there was an association between gestational age, and birth weight with mortality outcome in neonates. (p = 0.000) (Seid et. al. 2019)

Limitations: We have not assessed the knowledge level of nurses prospectively and hope to have an interventional study soon.

Conclusion

The majority of the neonates 85(19.5%) presented with fever and at least 3 (0.7%) of them presented with decreased passing urine and discharge from the umbilicus. The most common diagnosis of neonates on admission to the ER was Sepsis (36.2%) followed by Hyperbilirubinemia (14.2%). The overall mortality rate was 2.3%, although Sepsis was the most common diagnosis, but death rates were found only in 4.4% of Sepsis cases in neonates. Mortality is low in our setting due to the advanced neonatal care facilities at our center. Nevertheless, interventions to reduce LBW, Preterm deliveries, and Birth Asphyxia coupled with improvements in neonatal care at different levels will definitely reduce neonatal morbidity and mortality.

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