

# Assessment of Neonatal Sepsis Prevalence and Risk Factors in a Tertiary Hospital: A Retrospective Analysis

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**Abstract:** ***Background:** Neonatal sepsis is an important cause of morbidity and mortality among neonates in developing countries accounting for 30 - 50% of total deaths each year. Childhood mortality is often used as broad indicator of the social development or a specific indicator of health conditions of a country. **Method:** Institution based retrospective descriptive survey with the review of documents was conducted in the NICU of Apollo Hospital Noida. Sample size was calculated by using single population proportion sample formula and the final sample size was 40. The study subject was selected by using systematic random sampling method, and adopted data collection tool was used. The overall prevalence of neonatal sepsis in this study was 15%. All neonates developed early onset neonatal sepsis. This study found out that age of neonates, birth asphyxia, prolong PROM and meconium aspiration. **Conclusion and Recommendation:** The most risk factors of neonatal sepsis were identified age of neonates, birth asphyxia, prolong PROM and meconium aspiration. It has been identified that high risk mothers to be identified and prophylactic care should be given to the newborn. Strict infection control practices should be followed. The study can be done for larger samples for longer duration to generalize the results. Based on this results we recommend the concerned body to continue with best practice on infection control.*

**Keywords:** Sepsis, neonates, PROM, meconium aspiration

## 1. Introduction

Newborn or neonatal period include the time from birth to 28 days of life. This is the crucial period in laying the foundation of good health. At this time specific biological and psychological needs must be met to ensure the survival and health development of the child into a future adult. The major causes of neonatal deaths globally were estimated to be due to complications of pre - maturity (28%) sepsis, pneumonia (26%), birth asphyxia, injuries (23%), tetanus (7%), congenital anomalies (7%) and diarrhea (3%). A study done by Baqui, et. al., (2006) in rural Uttar Pradesh showed that out of 618 neonatal deaths, 32% deaths were on the day of birth, 50% occurred during the first 3 days of life and 71% were during the first week of life. Care practices immediately after delivery play a major role in causing neonatal morbidities and mortalities. Essential newborn care practices were outlined to decrease the neonatal morbidity and mortalities. These practices include clean cord care, thermal care, and initiating breast feeding immediately after birth. WHO reported that each year about 4 million newborns die before they are four weeks of life. Ninety - eight percent of these deaths occurring in developing countries. Mortality rates are high in Sub - Saharan Africa and Asia. Two thirds of newborn deaths occur in the WHO regions of Africa (28%) and East Asia.

Globally four million deaths occur every year in the first month of life. Almost all (99%) neonatal deaths arise in low - income and middle - income countries. In India alone, around one million babies die each year before they complete their first month of life, contributing to one -

fourth of the global burden. The neonatal mortality rate in India was 32 per 1000 live births in the year 2010, a high rate that has not declined much in the last decade. India's neonatal mortality rate dropped significantly, that is, by 25%, from 69 per 1,000 live births in 1980 to 53 per 1,000 live births in 1990 followed by a 15% decline from 51 to 44 per 1,000 live births between 1991 and 2000. In recent years the NMR has dropped by 15% that is, from 40 per 1000 live births in 2001 to 34 per 1000 live births in 2009. Urban - rural differences in neonatal mortality exist with the mortality rates higher by 50% in rural (42.5/1000 live births) compared to urban (28.5/1000 live births) areas, as per the National Family Health Survey (NFHS - 3). The common causes of neonatal deaths in India include infections, birth asphyxia, and prematurity which contribute to 32.8%, 22.3%, and 16.8% of the total neonatal deaths, respectively. Therefore, this research was conducted to find out the prevalence of neonatal sepsis and associated factors in Apollo Hospital Noida. In addition, it will provide opportunity for stake holders to reduce the problem by working on identified factors. (1)

## Objectives

The objective of this study is to assess the prevalence of neonatal sepsis in preterm Neonates and associated factors among neonates admitted in neonatal intensive care unit at Apollo Hospital Noida.

## 2. Methods and Materials

- **Research approach** - Quantitative Research Approach

Volume 12 Issue 8, August 2023

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- **Research design** - Retrospective exploratory research design
- **Study setting** - Apollo hospital, Noida
- **Target population** - 0 - 28 days preterm babies who has neonatal infection.
- **Sample** - New born babies preterm those who fulfilling inclusion criteria

**Inclusion –**

- Preterm newborn babies
- Preterm newborn babies with meconium aspiration
- Preterm babies with abnormal laboratory findings (high CRP / high WBC/ Positive blood culture).

**Exclusion Criteria** - Term born Babies

- **Sample size** - 40
- **Sampling techniques** - Purposive sampling technique
- **Data collection method** - Patient’s file & data collection base
- **Study duration** - 8 months
- **Ethical clearance** - The ethical committee reviewed the article & approved the study.
- **Data collection tool** - A structured check list was used for Neonatal Variables

S. No	Baby's Noida in Patient Number	Gestational Age	Birth Weight	Meconium Aspirated	Resuscitated at Birth	Cry at Birth	Pre Natal Asphyxia	Feeding (Breast/ Tubefeeding)	Apgar Score (<7/>7)	Neonatal Age	Onset Of Sepsis (<72 Hours/>72 Hours)	D. O. A	D. O. D	Days	Crp

**3. Results**

The data was analyzed using descriptive statistics as per the objectives.

**Demographic Characteristics**

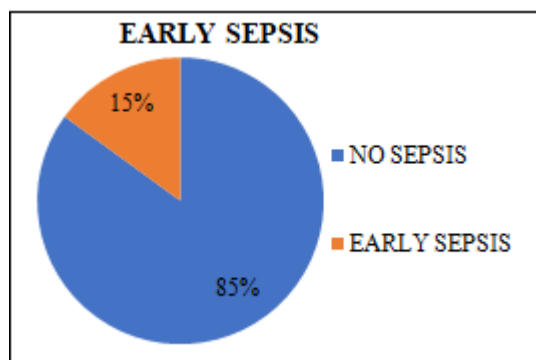
Among 40 reviewed cards of preterm neonates, 27 (68%) of them were aged between 0 and 7 days while 8 (20%) of neonates were aged between 8 and 28days. More than 28days (preterm) 5 (12.50) among neonates who enrolled in this study more than half of them were male 24 (60%) and the rest are females. Majority (59.37%) of the mothers were aged between 30 and 35 years (Table 1).

**Table 1:** Demographic characteristics of the preterm new born neonates

Factors	Frequency	Early onset of sepsis
<b>Age of neonates</b>		
0 - 7days	27 68%	7.50%
8 - 28days	8 20%	7.50%
>28days	5 12.50%	12.50%
<b>Sex of neonates</b>		
Male	24 60%	25%
Female	16 40%	0

**Table 2:** Prevalence of Sepsis

Bivariate and multivariate analysis showing the association between neonatal sepsis and others different variables in neonates				
Factors	Frequency	Early onset of sepsis		
Age of neonates	0 - 7 days	27 68% 7.50%		
	8 - 28 days	8 20% 7.50%		
	>28days	5 12.50%		
Meconium aspiration	YES	2 5% 5%		
	NO	38 95% 0		
Birth Weight	Low birth weight	32 80% 7.50%		
	Normal Weight	8 20%		
	Preterm	32 80% 7.50%		
	Term	8 20%		
Birth Asphyxia	Yes	3 7.50%		
	No	37 92.50%		



**Figure 1:** Prevalence of Neonatal sepsis among the preterm new born

3.4. Medical Risk Factors of Neonatal Sepsis. From the total 40 study units 3 (5%) neonates were reported to have mechanical ventilation; out of this 2 (2.50%) of them had neonatal sepsis.

**Medical risk factors for neonatal sepsis among neonates admitted**

**Table 3:** Factor associated with neonatal sepsis

Factors	Frequency	Percentage
<b>1. Age</b>		
0 - 7 days	68	7.50%
8 - 28 days	20	7.50%
>28days	12.50	
<b>2. Mechanical ventilation</b>		
Yes	5%	2.50%
No	93%	10%
<b>Oxygen via nasal catheter</b>		
Yes	93%	10%
No	5%	
<b>Meconium aspiration</b>		
Yes	5%	5%
No	95%	0
<b>Birth Weight</b>		
Low birth weight	80%	7.50%
Normal Weight	20%	
Preterm	80%	

Term	8	
<b>Birth Asphyxia</b>		
Yes	3	
No	37	
Meconium		

#### Factors Associated with Neonatal Sepsis

On this study, bivariate logistic regression analysis revealed that age of neonates, meconium aspiration, birth asphyxia, low birth weight, and gestational age less than 37 weeks shows significant association with neonatal sepsis. Multivariate logistic regression neonates whose age were less than seven days were 3 times more likely to develop neonatal sepsis compared with the age of neonates greater than eight days of age.

Distribution maternal risk factors for neonatal sepsis among neonates		
		Frequency
Meconium stained amniotic fluid		
YES	4	12.50%
No	28	87.50%
History of premature rupture of membrane		
Yes	20	62.50%
No	12	37.50%
<b>Duration of PROM &lt;18 hrs</b>	17	85.00%
>18 hrs	3	15.00%
Parity Primi	9	28.12%
Multipara	23	71.87%
<b>Mode of delivery</b>		
ND	17	53.12%
C/S	15	46.87%
Vacuum (I)	0	
<b>Duration of labor</b>		
<6 hrs	15	46.85%
6 - 12 hrs	14	43.75%
12 - 24 hrs	2	6.25%
>24 hrs	1	3.13%
CRP>10	6	15%
CRP<10	13	32.50%

#### Maternal age:

20 - 24	2	6.25%
25 - 29	5	15.62%
30 - 35	19	59.37%
>35	6	18.75%

## 4. Discussion

This study was conducted to trace out the neonatal health statistics for determining the frequency of neonatal sepsis in preterm neonates and its contributing factors. The results show a major frequency of sepsis cases among neonates ranging from 0 - 7 days (68%) due to varied factors. However, a positive side of the study was 'no death' cases were registered during the study duration among 40 birth cases in 8 months. Early sepsis could be observed for only 15% among all the cases.

## 5. Conclusion

The study concludes that health professionals have to follow stringent infection control practices to prevent neonatal

sepsis among newborns. Some measures are mentioned below: -

#### a) Infection Control Measures

- Maintaining strict aseptic technique while handling the patient and its surrounding
- Strict aseptic technique while handling all kind of invasive lines
- Maintaining all bundles (VAP, CAUTI, CLABSI)
- Education to the family members to maintain personal as well as environmental hygiene.

#### b) Personal Hygiene

- Ensuring regular hygiene and cleaning
- Changing of diaper every 2nd hourly

#### c) Nutritional Requirement

- Maintaining adequate nutrition, safe ryles tube feeding to prevent risk of aspiration.

## References

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