

Frequency of Neonatal Sepsis in Babies Born to Mothers with Prom More Than 18 Hours

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ABSTRACT

PROM has a major impact on neonatal difficulties and sequelae in neonates who survive, in addition to perinatal morbidity and mortality. The purpose of this study was to ascertain how frequently babies born to moms who had PROM for longer than 18 hours experienced neonatal sepsis. The study was designed as a cross section. The study was carried out at the NICU, OPD, and Well Baby Nursery at the Shifa International Hospital in Islamabad. Assuming verbal consent, data was prospectively collected from patients. The study comprised 260 newborns in total who met the inclusion and exclusion standards. In our study, the mean gestational age, PROM duration, and weight were 38.723.24 weeks, 19.963.24 hours, and 2.861.12 kg, respectively. Of the 260 patients, 38 (14.6%) and 222 (85.4%) developed neonatal sepsis, respectively. Our findings imply that an identified risk factor for culture-proven newborn sepsis is premature membrane rupture > 18 hours. Such methods would be a safe and effective plan, especially in undeveloped countries.

Keywords: Premature rupture of membrane, neonatal sepsis, morbidity and mortality.

INTRODUCTION

Approximately 40% of under five years mortality is neonatal mortality and among them 98% occurs in first 7 days in developing countries. Despite advances in the medical care sepsis remains the main reason for neonatal mortality and morbidity. 1.6 million deaths occur due to neonatal infections annually and this is 40 to 50 % of overall mortality in developing countries[1]. PROM is defined as premature rupture of membranes 18 hours before delivery[2, 3].

Neonates are at increased risk of sepsis born to the mother with PROM especially EONS which is sepsis within 72 hours. Some babies exhibit signs of sepsis immediately after birth and some after 48 to 72 hours[4-7].

The use of intrapartum antibiotics to mothers with PROM significantly reduced the incidence of newborn sepsis. The evidence for using antibiotics to treat babies born to moms with PROMs longer than 18 hours is poor[3]. Neonatal sepsis was reported in 14.5% of cases in a research by Chakravarthi et al. on the frequency of neonatal sepsis in mothers with prolonged premature rupture of membranes[8].Whereas Rathore et al study .s revealed that 5.6% of PROM cases had neonatal sepsis[1].

The purpose of this study is to ascertain how frequently babies born to moms who have PROM for longer than 18 hours experience neonatal sepsis. Because neonatal sepsis is linked to greater rates of morbidity and mortality, this study is crucial. Empirical antibiotics will be advised for these newborn kids to lower the incidence of sepsis if a greater rate of sepsis is discovered in babies of moms presenting with PROM. We will keep the no-antibiotic-use protocol in place for these infants if a lower incidence is discovered.

METHODOLOGY

Study location, size and duration: Study locations included the NICU, OPD, and Well Baby Nursery at Shifa International Hospital in Islamabad. From 30-09-21 to 30-03-22, six months after the synopsis's approval was the study duration. 260 patients were determined to be the necessary sample size. The following assumptions are made while calculating the sample size using the WHO software: Level of confidence: 95% Ratio of the population: 5.6% & Absolute accuracy is 2.8%

Sampling Technique: Non-probability consecutive sampling was adopted.

Sample Selection: Inclusion criteria

- All babies with gestational age 35 to 42 weeks .

- Both male and female babies
- Babies of birth weight more than 2 kg

Exclusion criteria

- Babies born less than 34 weeks of gestation.
- Babies born with APGARs less than 6 at 5 minute of life
- The mentioned factors are confounders and, if present, will distort the study's findings.

Data Collection: Research was carried out following hospital research and ethical committee approval. For each neonate, information such as name, age, gestational age at birth, baby's gender, and birth weight will be gathered. Neonatal sepsis was identified in accordance with operational definition. On a pre-made Proforma, all the information pertinent to this study was recorded (Annexure-I)

Data Analysis: SPSS 23 was employed to analyse the data. Sepsis and other qualitative factors were expressed as frequency and percentages. Quantitative factors such the mother's age, the baby's gestational age at birth, the length of the PROM, and the birth weight were expressed as mean +/- standard deviation. By stratification, effect moderators such mother's age, baby's birth weight, gestational age at birth, and gender were managed. The Chi-square post-stratification test was used. P value under 0.05 was regarded as significant.

RESULTS

The study comprised 260 newborns who met the inclusion and exclusion criteria and were admitted to the Well Baby nursery, NICU, and OPD at Shifa International Hospital, Islamabad.

Out of 260 patients, the lowest mother age of the patient was 20, and the highest patient age was 40. In our study, the mean age was 29.14 years, with a standard deviation of 8.49 years. However, in our study, the mean gestational age, PROM duration, and weight were 38.723.24 weeks, 19.963.24 hours, and 2.861.12 kg, respectively [Table 1].

Out of 260 patients, 38 (14.6%) and 222 (85.4%) had and did not have neonatal sepsis[Figure 01]. Out of 260 patients, 125 (48.1%) and 135 (51.9%) were male and female [Figure 02].

Frequency distribution of maternal age showed that out of 260 patients, 73 (28.1%) and 187 (71.9%) mothers were in age group 20-30 years and 31-40 years respectively[Figure 3].Frequency distribution of gestational age showed that out of 260 patients, 147 (56.5%) and 113 (43.5%) neonates had gestational age ≤ 38 weeks and > 38 weeks respectively [Figure 4].Frequency distribution of duration of PROM showed that out of 260 patients,

210 (80.8%) and 50 (19.2%) had duration of PROM \leq 24 hours and $>$ 24 hours respectively [Figure 5]. Frequency distribution of birth weight showed that out of 260 patients, 94 (36.2%) and 166 (63.8%) neonates had birth weight \leq 2.5 kg and $>$ 2.5 kg respectively [Figure 6].

Stratification for maternal age with respect to neonatal sepsis showed that 21 (28.8%) and 17 (9.1%) mothers who were in age group 20-30 years and 31-40 years had neonatal sepsis respectively. Whereas 52 (71.2%) and 170 (90.9%) mothers who were in age group 20-30 years and 31-40 years did not have neonatal sepsis respectively. P-value was 0.00 [Table 2]. Stratification for gestational age with respect to neonatal sepsis showed that patients who had gestational age \leq 38 weeks, 19 (12.9%) and 128 (87.1%) had and did not have neonatal sepsis respectively. Whereas patients who had gestational age $>$ 38 weeks, 19 (16.8%) and 94 (83.2%) had and did not have neonatal sepsis respectively. P-value was 0.37 [Table 3].

Table 1: Descriptive Statistics n=260

Variable	Mean \pm sd	Standard deviation	Min- max
Maternal age (years)	29.14	\pm 8.49	20-40
Gestational age (weeks)	38.72	\pm 3.24	36-42
Duration of prom (hours)	19.96	\pm 3.24	18-29
Weight (kg)	2.86	\pm 1.12	2-4

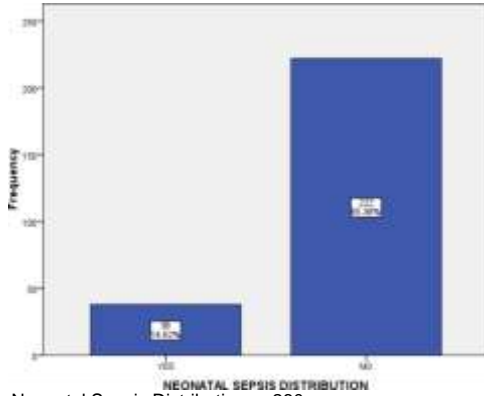


Figure-1: Neonatal Sepsis Distribution n=260

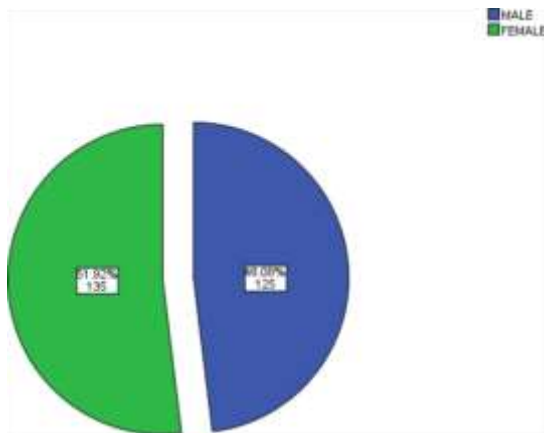


Figure-2: Gender Distribution n=260

Stratification for gender with respect to neonatal sepsis showed that 21 (16.8%) and 104 (83.2%) who were in male group had and did not have neonatal sepsis respectively. Whereas 17 (12.6%) and 118 (87.4%) who were in female group had and did not have neonatal sepsis respectively. P-value was 0.33 [Table 4].

Stratification for duration of PROM with respect to neonatal sepsis showed that patients who had duration \leq 24 hours, 24 (11.4%) and 186 (88.6%) had and did not have neonatal sepsis

respectively. Whereas patients who had duration $>$ 24 hours, 14 (28%) and 36 (72%) had and did not have neonatal sepsis respectively. P-value was 0.00 [Table 5].

Stratification for birth weight with respect to neonatal sepsis showed that patients who had birth weight \leq 2.5 kg, 11 (11.7%) and 83 (88.3%) had and did not have neonatal sepsis respectively. Whereas patients who had birth weight $>$ 2.5 kg, 27 (16.3%) and 139 (83.7%) had and did not have neonatal sepsis respectively. P-value was 0.31 [Table 6].

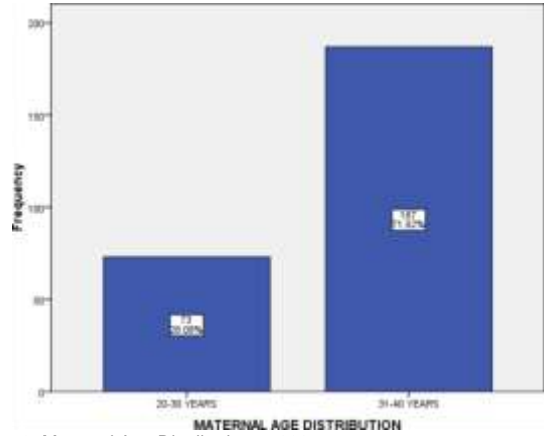


Figure-3: Maternal Age Distribution n=260

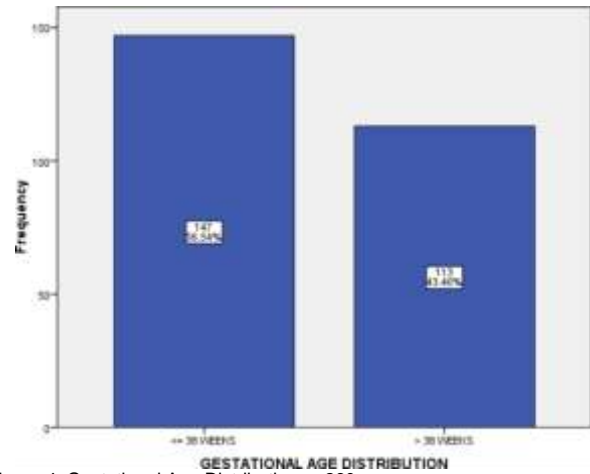


Figure-4: Gestational Age Distribution n=260

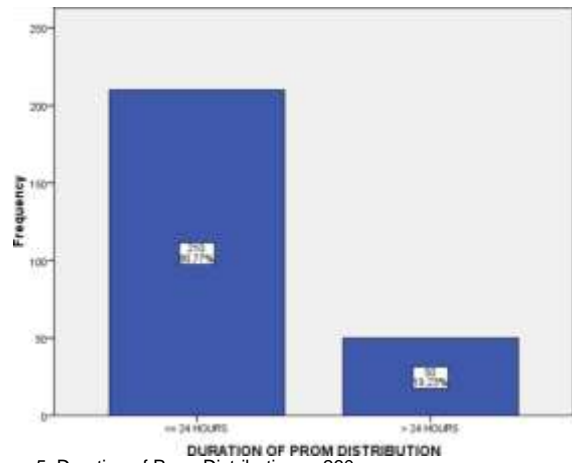


Figure-5: Duration of Prom Distribution n=260

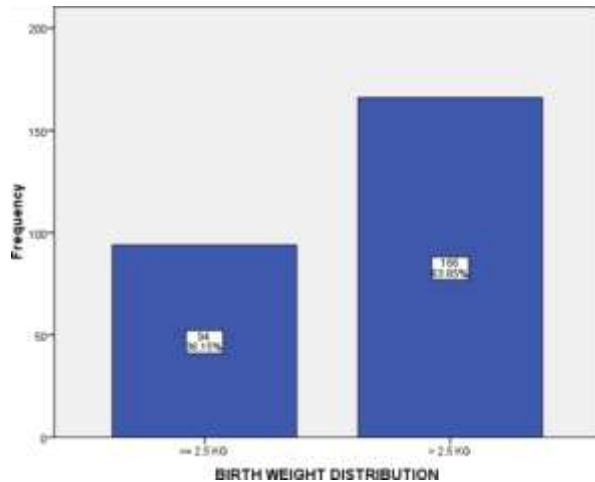


Figure-6: Birth Weight Distribution n=260

Table-2: Neonatal Sepsis According To Maternal Age n=260

Age (years)	Neonatal sepsis		Total
	Yes	No	
20-30	21 (28.8%)	52 (71.2%)	73 (100%)
31-40	17 (9.1%)	170 (90.9%)	187 (100%)
Total	38 (14.6%)	222 (85.4%)	260 (100%)
P-value	0.00		

Table-3: Neonatal Sepsis According to Gestational Age n=260

	Neonatal sepsis		Total
	Yes	No	
≤ 38 WEEKS	19 (12.9%)	128 (87.1%)	147 (100%)
> 38 WEEKS	19 (16.8%)	94 (83.2%)	113 (100%)
TOTAL	38 (14.6%)	222 (85.4%)	260 (100%)
P-VALUE	0.37		

Table-4: Neonatal Sepsis According to Gender of Baby n=260

Gender of baby	Neonatal sepsis		Total
	Yes	No	
Male	21 (16.8%)	104 (83.2%)	125 (100%)
Female	17 (12.6%)	118 (87.4%)	135 (100%)
Total	38 (14.6%)	222 (85.4%)	260 (100%)
P-value	0.33		

Table-5: Neonatal Sepsis According to Duration of Prom n=260

Duration of prom	Neonatal sepsis		Total
	Yes	No	
≤ 24 hours	24 (11.4%)	186 (88.6%)	210 (100%)
> 24 hours	14 (28%)	36 (72%)	50 (100%)
total	38 (14.6%)	222 (85.4%)	260 (100%)
p-value	0.00		

Table-6: Neonatal Sepsis According to Birth Weight n=260

Birth weight	Neonatal sepsis		Total
	Yes	No	
≤ 2.5 kg	11 (11.7%)	83 (88.3%)	94 (100%)
> 2.5 kg	19 (16.8%)	94 (83.2%)	166 (100%)
total	38 (14.6%)	222 (85.4%)	260 (100%)
p-value	0.31		

DISCUSSION

Approximately 8%–10% of pregnancies experience prolonged rupture of membranes (PROM), which is defined as membrane rupture lasting more than 18 hours prior to delivery[9]. PROM is a major risk factor for both early onset neonatal sepsis (EONS) and premature births [8]. Several studies have found that, in addition to being the most frequent issue, preterm, infection was the most significant occurrence and possible consequence following PROM [9-11]. If they were combined, this got even more problematic. PROM is important for prenatal morbidity and mortality as well as long-term problems and sequelae in neonates who survive. In

conjunction with early detection of sepsis and its aggressive management in newborns, increased prenatal care and antenatal antimicrobial treatment of mothers with a history of PROM had a considerably better neonatal outcome[12]. Our study included a total of 260 neonates who met the inclusion and exclusion criteria. Mean gestational age, duration of PROM and weight in our study was 38.72±3.24 weeks, 19.96±3.24 hours and 2.86±1.12 kg. Out of 260 patients, 38 (14.6%) and 222 (85.4%) had and did not have neonatal sepsis.

In a developing country's tertiary care institution, a cross-sectional study including 124 patients was carried out. Four neonates (3.2%) with a maternal history of PROM showed positive cultures, while seven neonates (5.6%) with EONS developed them. Pathogenic species in EONS caused by extended PROM were the microorganisms found in cultures.[1].

In a different study, 133 of 170 neonates whose mothers experienced PROM were evaluated at 7 days, and 10 of them (or 7.5%; 95% CI, 4.4% to 13.2%) had indications of sepsis. Four people experienced cutaneous pustules, five people had isolated fevers, and one person had fever with periumbilical erythema. Between 8 and 28 days, four more people (3%) displayed any sepsis-related symptoms. There was only one bacteremia case and no fatalities. Hospital records did not show any later enteries for infection, despite the fact that 37 were lost to follow-up. Sepsis rates were reported that were equivalent to those in other studies conducted in low-income nations[3].

A total of 405 pregnant women with PROM were enrolled in a different research. Neonatal sepsis affected 21 people (5.2%), on average. The research revealed that the risk of newborn sepsis was extended in pregnant women with protracted membrane rupture for at least 18 hours before to hospital admission (OR 3.08), for at least 15 hours during hospitalisation (OR 7.32), and for at least 48 hours following delivery (OR 3.08). (OR 5.77). With a gestational age of under 37 weeks, preterm pregnancy carried an increased risk of newborn sepsis (OR 18.59). When the membrane rupture is continued for a longer period of time and the pregnancy is preterm, the risk of newborn sepsis is increased[13]. Another study determined the incidence of EONS in the current sample to be 14.5%. In this study, *Staphylococcus aureus* (45.45%) and *CONS* (27.27%) were the two most typical isolates.[8].

CONCLUSION

Our findings imply that an identified risk factor for culture-proven newborn sepsis is premature membrane rupture > 18 hours. Early risk factor identification, quick laboratory testing for infection upon clinical symptom diagnosis, and early use of empirical antibiotic therapy are all examples of effective preventative strategies. An effective and safe strategy would be to use such techniques, particularly in developing countries.

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