

“NEONATAL OUTCOME IN EARLY TERM VERSUS FULL TERM PREGNANCY”

- 1) **Dr. Swati Lal;** Resident doctor , Department of OBGY, Dr D Y Patil Medical College, Hospital and Research Centre, D. Y. Patil Vidyapeeth, Pune, India
- 2) **Dr. Akanksha verma (corresponding author);** Resident doctor , Department of OBGY, Dr D Y Patil Medical College, Hospital and Research Centre, D. Y. Patil Vidyapeeth, Pune, India
- 3) **Dr. Nikita bhattacharjee;** Resident doctor , Department of OBGY, Dr D Y Patil Medical College, Hospital and Research Centre, D. Y. Patil Vidyapeeth, Pune, India
- 4) **Dr. Samar Rudra;** Professor Department of OBGY, Dr D Y Patil Medical College, Hospital and Research Centre, D. Y. Patil Vidyapeeth, Pune, India

ABSTRACT:

Objective: To compare the neonatal morbidity rates in early term versus full term born neonates.

Study design: This was a prospective study of 220 deliveries from 37 0/7 to 40 6/7 weeks of gestation from September 2020 to September 2022. After excluding anomalies, twin gestation, malpresentation, and stillbirth in parturating women in the study. Labour was monitored and newborns were assessed at birth. Neonatal morbidities of babies compared for each week of delivery.

Results: Neonatal morbidity, in the early term babies when compared with full term babies was 24.5% and 6.3% respectively. Neonatal intensive care unit admission and respiratory morbidity were lowest at or beyond 39 weeks of gestation when compared with the early term babies. Statistically significant differences in morbidity were noted between 37 and 39 weeks of gestation. Respiratory morbidity was higher at 37 than 39 weeks regardless of the route of delivery.

Conclusion: This was a prospective comparative study between early and full-term babies. We observed that the neonatal outcome was poorer in the early term group in terms of birth weight, neonatal morbidity, NICU admission rate, and respiratory distress with a statistically significant difference in comparison to full term babies.

Keywords: early term birth; neonatal morbidity; NICU.

INTRODUCTION

Gestation is the period between conception and birth, which lasts on an average of forty weeks (280 days) from the first day of the last menstrual period (LMP) to the expected delivery date.

The period of gestation from 3 weeks before till 2 weeks after the estimated date of delivery was considered term in the past, with the expectation that neonatal outcomes from deliveries in this period were uniform and good. Recent research has shown that increased risk for neonatal morbidity and mortality associated with late preterm birth (34–36 weeks) continue to exist though to a lesser extent in early-term babies (37–38 weeks).^[1]

In 2010 Fleischman et al^[2] noticed a small but measurable increase in neonatal morbidity for infants born at 37 weeks and 38 weeks compared to 39 weeks of gestation and suggested an early-term group of categories. Since the publication of Fleischman's paper, many research papers were published showing increased morbidity between the 37 and 38 completed weeks in comparison to 39 weeks.

In 2013, the AMERICAN COLLEGE OF OBSTETRIC AND GYNAECOLOGY SOCIETY (ACOG)^[3] for maternal and fetal medicine recommended the classification of term deliveries into:

Early term: is defined as 37 weeks to 38 weeks and 6 days from the first day of the last menstrual period.

Full term: defined as 39 weeks to 40 weeks and 6 days from the first day of the last menstrual period.

Late term: defined as 41 weeks to 41 weeks and 6 days from the first day of the last menstrual period.

Post-term: defined as the period of gestation 42 weeks and beyond.

It is observed that the best neonatal outcome is at 39 weeks to 40 weeks and 6 days. Neonatal morbidity is increased both before as well after this gestational period. Previously, it was believed that pregnancy can be terminated at any time after 37 weeks of gestational age. Medical indications to terminate pregnancies of 37 weeks and some other factors like the convenience of obstetrician, patient's preference, repeat cesarean section, etc are the reasons to deliver the patient at this gestational age.

It is pertinent to note that repeat elective cesarean section, a very common indication to terminate the pregnancy as soon as pregnancy reaches 37 weeks, has resulted in increased neonatal morbidity and mortality when compared to neonates born at 39 weeks of gestation. It has been observed that the frequency of poor neonatal outcomes and associated complications is decreased in pregnancies between the gestational age of 39 weeks and 40 weeks and 6 days.^[4]

Therefore, our objectives were to determine if morbidity differed in neonates born during the early and full term period. Hence this study is proposed to be carried out to find the neonatal

outcome and compare them between early term and full-term pregnancies as per the new definition.

METHODOLOGY

This comparative study was done at a tertiary care teaching hospital- Dr. D. Y. Patil medical college and hospital, Pune, over a period of two years (September 2020 to September 2022). The sample size was 220 patients. The sample size was calculated using Winpepi software

220 patients in labour were selected and alternately allocated by simple randomization into two groups (Group A- Early term, Group B- Full term).

Group A- Early term patient (37-38.6weeks)

Group B- Full term patient (39-40.6weeks)

Inclusion Criteria

- 1) Patients delivering between 37 0/7 weeks to 40 6/7 weeks were included in our study.
- 2) Post-caesarean pregnancies were included.
- 3) All deliveries during this period of gestation were considered irrespective of route and mode of delivery.
- 4) All deliveries were considered irrespective of mortality.

Exclusion Criteria

- 1) Twin pregnancies
- 2) Malpresentations
- 3) Congenital malformations in the babies
- 4) Stillbirth

After getting their informed consent detailed evaluation including a thorough history, general physical examination, and detailed obstetrics examination was done. All data were noted and entered in a data sheet. Mode of delivery like normal or cesarean with its indication was noted. Assessment of the neonates is done by the pediatrician immediately after the birth. Neonate without any complication sent to the mother's side. Those neonates having some complications like low Apgar score, meconium-stained liquor, respiratory distress, and perinatal asphyxia were shifted to NICU. Neonatal outcomes of all the patients were noted.

RESULTS**Table 1: Distribution of cases based on the period of gestation:**

| Period of gestation | | Frequency (n) | Percent (%) |
|---------------------------------------|---------------|---------------|--------------|
| Early term | 37-37.6 weeks | 52 | 23.7 |
| | 38-38.6 weeks | 58 | 26.3 |
| Total Early term | | 110 | 50.0 |
| Full term | 39-39.6 weeks | 81 | 36.8 |
| | 40-40.6 weeks | 29 | 13.2 |
| Total full term | | 110 | 50.0 |
| Total (Early term + Full term) | | 220 | 100.0 |

Table no.1 shows distribution of cases based on period of gestation.

Table 2:-On the basis of demographic and clinical data:

| Age | Period of gestation | p-value | |
|----------------------|---------------------|-----------|--------|
| | Early term | Full term | |
| Less than 19 years | 3 | 1 | 0.457* |
| | 2.72% | 0.90% | |
| 20 to 30 years | 85 | 82 | |
| | 77.27% | 74.54% | |
| 31 years and above | 22 | 27 | |
| | 20.0% | 24.54% | |
| Total | 110 | 110 | |
| | 50% | 50% | |
| Socioeconomic status | Period of gestation | p-value | |
| | Early term | Full term | |
| Lower | 35 | 33 | 0.942* |
| | 31.81% | 30% | |
| Middle | 66 | 67 | |
| | 60.0% | 60.90% | |
| Upper | 9 | 10 | |

| | | | |
|----------------------------------|----------------------------|------------------|--------|
| | 8.18% | 9.09% | |
| Total | 110 | 110 | |
| | 50% | 50% | |
| Hemoglobin (g/dL) | Period of gestation | p-value | |
| | Early term | Full term | |
| >11 (Normal) | 62 | 61 | 0.212* |
| | 56.3% | 55.5% | |
| 9.5-10.9 (Mild anemia) | 26 | 35 | |
| | 42.6% | 57.4% | |
| 8.0-9.4 (Moderate anemia) | 22 | 14 | |
| | 61.1% | 38.9% | |
| 6.5-7.9 (Severe anemia) | 0 | 0 | |
| Total | 110 | 110 | |
| | 50% | 50% | |

Table no.2 shows demographic and clinical data, there was no statistically significant difference between the numbers of cases in both the groups.

Table 3: Distribution of cases based on the mode of delivery:

| Mode of delivery | Period of gestation | | p-value |
|-------------------------|----------------------------|------------------|----------------|
| | Early term | Full term | |
| Normal | 54 | 70 | 0.041* |
| | 43.5% | 56.5% | |
| LSCS | 56 | 40 | |
| | 58.3% | 41.7% | |
| Total | 110 | 110 | |
| | 50% | 50% | |

Table no.3 shows, statistically significant difference between the number of cases in early terms and full term, based on the mode of delivery. (P = 0.041)

Table 4: Distribution of cases on the basis of Apgar score:

| APGAR score | Period of gestation | | p-value |
|-----------------------------|----------------------------|------------------|----------------|
| | Early term | Full term | |
| APGAR score at 1 MIN | | | |
| <7 | 47 | 13 | 0.000* |
| | 78.3% | 21.6% | |
| ≥7 | 63 | 97 | |
| | | | |

| | | | |
|-----------------------------|--------|--------|---------------|
| | 39.37% | 60.62% | |
| APGAR score at 5 MIN | | | |
| <7 | 25 | 6 | 0.000* |
| | 80.64% | 19.35% | |
| ≥7 | 62 | 96 | |
| | 39.24% | 60.75% | |

Table no.4 shows, statistically significant difference between the number of cases in early term and full term based on APGAR scores at 1 min and 5 mins. (P = 0.000).

Table 5: Distribution of cases on the basis of NICU admission:

| NICU admission | Period of gestation | | p-value |
|----------------|---------------------|-----------|---------------|
| | Early term | Full term | |
| Yes | 54 | 14 | 0.000* |
| | 24.5% | 6.3% | |
| No | 56 | 96 | |
| | 25.45% | 43.6% | |
| Total | 110 | 110 | |
| | 50% | 50% | |

Table no.5 shows, statistically significant difference between the number of cases in early term and full term based on NICU admission. (P = 0.000)

Table 6: NICU admission based on weeks of gestation:

| Weeks of gestation | No. of cases | NICU Admission | p-value |
|--------------------|--------------|----------------|---------------|
| 37-37.6 | 52 | 37 | 0.000* |
| | 23.7% | 16% | |
| 38-38.6 | 58 | 17 | |
| | 26.3% | 7.7% | |
| 39-39.6 | 81 | 13 | |
| | 36.8% | 5.9% | |
| 40-40.6 | 29 | 1 | |
| | 13.2% | 0.45% | |

Table no.6 shows, statistically significant difference between the cases based on weeks of gestation and NICU admission. (P = 0.000)

Table 7: Indication of NICU admission:

| Indication of NICU admission | Period of gestation | | Total |
|------------------------------|---------------------|-----------|---------------|
| | Early term | Full term | |
| Asphyxia | 1 | 1 | 0.000* |
| | 0.9% | 0.9% | |
| Hypoxia | 4 | 0 | |
| | 3.63% | 0.0% | |
| LBW | 4 | 0 | |
| | 3.63% | 0.0% | |
| MSL | 0 | 8 | |
| | 0.0% | 7.2% | |
| Respiratory distress | 49 | 5 | |
| | 44.5% | 4.5% | |

Table no.7 shows, statistically significant difference between the number of cases in the early term and full term based on indications for NICU admission. (P = 0.000)

Table no.8: Neonatal outcome:

| Fetal outcome | Period of gestation | | p-value |
|---------------|---------------------|-----------|---------------|
| | Early term | Full term | |
| Morbidity | 54 | 14 | 0.000* |
| | 79.1% | 20.9% | |

Table no.8 shows, statistically significant in neonatal outcome in both the groups.

DISCUSSION:

It is traditionally assumed, Infants born at late preterm are at increased risk of neonatal intensive care admission compared to term infants. Recent research has shown that increased risk for neonatal morbidity and mortality associated with late preterm birth (34-36 weeks) continue to exist, though to a lesser extent in early term babies (37–38 weeks).

Presently there is a tendency to terminate pregnancy as soon as it reaches 37weeks, especially in case of previous cesarean section. This has given rise to increased neonatal morbidity and mortality associated with early term gestation, which has caused a major health issues in majority of countries, especially the developing countries which lacks in adequate neonatal facilities. ^[5]

In our study, demographic parameters were similar in both groups without any statistically significant difference.

Week-wise gestational age as shown in Table no.1, 52(23.7%) patients delivered at 37-37.6 weeks of gestation, and 58(26.3%) delivered at 38-38.6 weeks of gestation among early term group, similarly in the full term group 81(36.8%) patients delivered at 39-39.6 weeks of gestation and 29(13.2%) delivered at 40-40.6 weeks of gestation. A Study done by Ramprakash MA et al^[6] had 51.1% early term and 48.9% full term. However, in a larger study Laura I. Parikh et al.^[7] reported that among term deliveries, 64,476 (34.1%) were early term between 37 0/7 and 38 6/7 weeks gestation and 124,333 (65.9%) were full term between 39 0/7 and 40 6/7 weeks. However, we have taken an equal number of cases in the early term and full term in the design of our study.

In our study, 31.81% of cases were in the early term and 30% of cases in the full term, are from low socioeconomic status, of which 15.4% and 5.4% of babies had NICU admission respectively which is shown in Table no2. Chelsea A. Ruth et al^[8] in their study had 37.3% in early term and 31.7% in the full term from low socioeconomic status and had 7.7% and 2.7% of babies had NICU admissions respectively.

In the present study as shown in table no.4, the APGAR score at 5 min was less than 7 in 80.64% in the early term, and 19.35% in the full-term group. Whereas, completely opposite numbers were found with APGAR score of more than 7 is 39.24% and 60.75% respectively in early term and full term groups. Neda Razaz et al^[9] in a Swedish cohort of women also found similar results.

NICU admission in our study as shown in table no.5&6, 71.12% and 29.3% of babies had morbidity from the early term and full term respectively. Showing a statistically significant rapid decline in NICU admission when the gestation increases in term babies. Ramprakash M.A et al.^[6] also found similar results, 76.92% and 29.41% of babies require NICU in early term and full term gestation. Therefore, reducing the frequency of early term deliveries could considerably reduce the burden of NICU admission among infants.

The most significant findings of our study, shows higher prevalence of neonatal morbidity among the babies born in the early term as compared to the ones born in full term and the difference was statistically significant (table no 8). In fact, out of the 220 deliveries when combined, 68 of them showed some form of neonatal morbidity, with 54 (79.1%) of them falling into the early term gestation and only 14 (20.9%) of them belonging to full term gestation.

Subinay et al^[10] also found 9.8% babies has neonatal morbidity in the early term in compared to 3.2% in full term. Hillary K. Brown et al.^[11] also found a similar result in their study. The above studies as well as our study including various other studies have found higher neonatal morbidity in the early term in comparison to full term babies. Gradual improvement in neonatal outcome as gestation progresses even in a term babies has been shown in table no.6.

However, neonatal morbidity is very high in our study as compared to other studies, it may be due to more number of high risk cases come to our institution being a tertiary care hospital, and also because of a very liberal policy of neonatal admission we follow.

Limitations of the study

- The small sample size. The influence of confounding factors affecting neonatal outcomes could not be studied due to the small number of cases in individual categories of neonatal morbidity.
- This study highlighted only short-term neonatal morbidities.
- Long-term maternal and neonatal morbidities could not be assessed.

Strengths of the study:

- One of the strengths of the study was the exclusion of stillbirths and the babies born with anomalies as it controlled the precursors related to the type of delivery and the timing of it.
- Being a prospective study proper design and planning was possible before undertaking the study.

CONCLUSION

This was a comparative study between early term and full term born babies. We observed that the neonatal outcome was poorer in the early term group in terms of birth weight, neonatal morbidity, NICU admission rate, and respiratory distress with a statistically significant difference in comparison to full term babies. However, the confounding factors like maternal and fetal indication for early delivery attributing to the adverse neonatal outcome could not be ascertained conclusively due to less number of cases in our study. Although our results were in conformity with most of the studies done on this subject internationally and nationally. A larger and multicentric study of our population will be needed to conclusively establish our findings.

REFERENCES

1. Brown HK, Speechley KN, Macnab J, Natale R, Campbell MK. Neonatal morbidity associated with late preterm and early term birth: the roles of gestational age and biological determinants of preterm birth. *Int J Epidemiol.* 2014 Jun;43:802-814. doi: 10.1093/ije/dyt251. Epub 2013 Dec 27. PMID: 24374829; PMCID: PMC4052131.
2. Fleischman AR, Oinuma M, Clark SL. Rethinking the definition of “term pregnancy”. *Obstet Gynecol.* 2010;116:136-9.
3. ACOG/SMFM: Replace Phrase 'Term Pregnancy' With 4 Categories - Medscape - Oct 22, 2013.
4. Laughon SK, Reddy UM, Sun L, Zhang J. Precursors for Late Preterm Birth in Singleton Gestations. *Obstetrics & Gynecol.* 2010; 116:1047–1055.
5. Bulut O, Buyukkayhan D. Early term delivery is associated with increased neonatal respiratory morbidity. *Pediatr Int.* 2021 Jan;63(1):60-64. doi: 10.1111/ped.14437. Epub. 2021 Jan 19. PMID: 32786118.
6. Ramprakash MA, Charanraj H, Manikumar S, Srinivasan K, Giridhar S. Neonatal outcomes in early term neonates versus term neonates in a tertiary care hospital - A cross sectional comparative study. *IAIM.* 2016;3(4):21-26.
7. Parikh LI, Reddy UM, Mendola P, Sjaarda L, Hinkle S et al. Neonatal Outcomes in Early Term Birth. *Am J Obstet Gynecol.* 2014 September;211(3):265.1–265:11.
8. Ruth C, Roos N, Hildes-Ripstein E, Brownell M. ‘The influence of gestational age and socioeconomic status on neonatal outcomes in late preterm and early term gestation: a population based study. *BMC Pregnancy and Childbirth.* 2012;12(1).

9. Razaz N, Cnattingius S, Joseph KS. Association between Apgar scores of 7 to 9 and neonatal mortality and morbidity: population based cohort study of term infants in Sweden. *BMJ*. 2019 May 7;365:11656. doi: 10.1136/bmj.11656. PMID: 31064770; PMCID: PMC6503461
10. Subinay Mandal, Satyaki Dey, Meghdeep Mukhopadhyay : A prospective study on early neonatal morbidities in early term neonates. *New Indian Journal of Pediatric NIJP*. 2018;7(3)