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Assessing Antenatal and Clinical Profile in Late Preterm and Term Neonate

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ABSTRACT

Background: Late preterm neonates (34⁰/₇–36⁶/₇ weeks) are often presumed to be as healthy as term neonates (≥37⁰/₇ weeks), but they face increased risks due to physiological immaturity. Maternal and antenatal factors significantly influence neonatal outcomes, especially in resource-limited settings. We aimed to assess and compare the clinical and antenatal profiles of late preterm and term neonates.
Methods: A hospital-based prospective observational study was conducted over 12 months at Rohilkhand Medical College, Bareilly. Seventy-six neonates were enrolled—38 in each group. Maternal and neonatal data were recorded and statistically analyzed.
Results: Late preterm neonates had significantly lower birth weight, APGAR scores, and a higher NICU admission rate. Maternal risk factors like PROM and infection were more common among them. Neonatal complications such as jaundice and respiratory issues were notably higher.
Conclusion: Late preterm neonates exhibit increased morbidity linked to identifiable antenatal risk factors, emphasizing the need for enhanced perinatal monitoring.

Keywords: Late Preterm Infant; Term Neonate; Neonatal Intensive Care; Pregnancy Complications; Perinatal Outcome

INTRODUCTION

Late preterm neonates, defined as those born between 34^0/7 and 36^6/7 weeks of gestation, constitute a significant subset of preterm births and are often misjudged as developmentally equivalent to term neonates.[1] Term neonates, delivered at or beyond 37 weeks of gestation, are generally perceived as low-risk.[2] However, both groups may experience adverse outcomes influenced by varying clinical conditions and antenatal risk factors. Despite their apparent maturity, late preterm neonates are more vulnerable to complications such as respiratory distress, feeding difficulties, hypoglycemia, and prolonged hospitalization compared to their term counterparts.[3]

In resource-limited settings like India, where disparities in maternal health care are prevalent, the impact of antenatal factors—such as maternal age, parity, nutritional status, infections, hypertensive disorders, diabetes, and quality of antenatal care—on neonatal outcomes remains an area of growing concern.[4] Recognizing the distinct clinical presentations and associated antenatal backgrounds of late preterm and

term neonates is crucial for early identification of risk and timely intervention.[5]

This cross-sectional study is designed to evaluate and compare the clinical and antenatal profiles of late preterm and term neonates. By systematically assessing maternal factors and neonatal outcomes, the study aims to identify differences that can inform targeted neonatal care strategies and strengthen antenatal practices, ultimately contributing to reduced neonatal morbidity and improved care delivery in similar healthcare settings.

MATERIAL AND METHODS

This hospital-based prospective observational study was conducted over 12 months at Rohilkhand Medical College, Bareilly. The study included 76 neonates—38 late preterm (34^0/7 to 36^6/7 weeks) and 38 term (37^0/7 to 41^6/7 weeks) neonates. Informed consent was obtained from the parents or guardians of all participants. Gestational age was determined using the last menstrual period (LMP), obstetric ultrasonography, or the Expanded New Ballard Score when necessary.

The inclusion criteria consisted of late preterm neonates admitted to the Neonatal Intensive Care Unit (NICU) or Postnatal Ward (PNC) during the study period and term neonates born or admitted during the same period. Exclusion criteria included neonates born before 34^0/7 weeks, those with congenital anomalies, or those whose parents did not provide informed consent.

Neonates were assessed daily, and maternal and neonatal data were recorded on a structured proforma. Maternal data included age, parity, medical conditions (hypertension, diabetes), prenatal factors (e.g., infections, premature rupture of membranes), and delivery details. Neonatal parameters recorded included birth weight, gender, gestational age, Apgar scores at 1 and 5 minutes, complications (e.g., respiratory distress, hypoglycemia, jaundice, sepsis), and the need for NICU care, ventilation, or medications. Follow-up was done on days 7 and 28 through outpatient visits and telephonic checks.

Data were analyzed using SPSS version 23.0, with quantitative variables presented as means and standard deviations and qualitative data as frequencies and percentages. The Student's t-test and Chi-square test were used to compare the groups, with a p-value of <0.05 considered statistically significant.

RESULTS

Table 1 compares demographic and clinical characteristics between Late Preterm (Case) and Term (Control) neonates. Significant differences were noted in NICU admissions, with higher rates in the Case group, mainly due to jaundice and respiratory complications.

Table 1: Distribution of Demographic and Clinical Parameters in Case and Control Groups

	Category	Case Group	Control Group	P value	χ^2
Age (years)	20-30	28(73.7%)	23 (60.5%)	0.384	3.05
	30-40	10 (26.3%)	15 (39.5%)		
Gravida	Multigravida	13 (34.2%)	14 (36.8%)	0.811	0.0574
	Primigravida	25 (65.8%)	24 (63.2%)		
Mode of Delivery	NVD	22 (57.9%)	22 (57.9%)	1.00	0.00
	LSCS	16 (42.1%)	16 (42.1%)		
Gender	Male	16 (42.1%)	21 (55.3%)	0.251	1.32
	Female	22 (57.9%)	17 (44.7%)		
NICU Admission	No	10 (26.31%)	20 (52.63%)	0.019	5.51
	Yes	28 (73.68%)	18 (47.37%)		
Causes of NICU Admission	Sepsis	5 (13.2%)	4 (10.5%)	0.305	7.17
	Jaundice	13 (34.2%)	10 (26.3%)		
	Feeding Problem	3 (7.9%)	2 (5.3%)		

	Perinatal Asphyxia	2 (5.3%)	1 (2.6%)		
	Respiratory Morbidities	4 (10.5%)	1 (2.6%)		
	Hypothermia + Hypoglycemia	1 (2.6%)	0 (0.0%)		

Table 2 compares maternal risk factors between Case and Control groups. Infection, PROM, and previous preterm delivery were significantly higher in the Case group, indicating their association with adverse neonatal outcomes.

Table 2: Distribution of Maternal Risk Factors in Case and Control Groups

Maternal Risk Factor	Case Group (n=38)	Control Group (n=38)	Total (n=76)	χ^2 Value	P-Value
Infection	12 (31.6%)	2 (5.3%)	14 (18.4%)	8.76	0.003
PROM	19 (50.0%)	1 (2.6%)	20 (26.3%)	22	<0.001
GDM (Gestational Diabetes)	7 (18.4%)	6 (15.8%)	13 (17.1%)	0.093	0.761
Hypertension	13 (34.2%)	10 (26.3%)	23 (30.3%)	0.561	0.454
Poly/Oligohydramnios	6 (15.8%)	2 (5.3%)	8 (10.5%)	2.24	0.135
Previous Preterm Delivery	17 (44.7%)	3 (7.9%)	20 (26.3%)	13.3	<0.001

Table 3: Distribution of Neonatal Complications in Case and Control Groups

Neonatal Complications	Case Group (n=38)	Control Group (n=38)	Total (n=76)	χ^2 Value	P-Value
Feeding Problems	3 (7.9%)	2 (5.3%)	5 (6.6%)	0.214	0.644
Hypoglycemia	1 (5.3%)	0 (2.6%)	3 (3.9%)	0.347	0.556
Hyperbilirubinemia	13(5.3%)	10 (0.0%)	2 (2.6%)	2.05	0.152
Perinatal Asphyxia	2 (5.3%)	1 (2.6%)	3 (3.9%)	0.347	0.556
Respiratory Morbidities	4 (10.5%)	1 (2.6%)	5 (6.6%)	1.93	0.165
Sepsis	5 (13.2%)	4 (10.5%)	9 (11.8%)	0.126	0.723
Need for IV Medication	5 (5.3%)	4 (0.0%)	2 (2.6%)	2.05	0.152
Hypothermia	1 (2.6%)	0 (0.0%)	1 (1.3%)	1.01	0.314

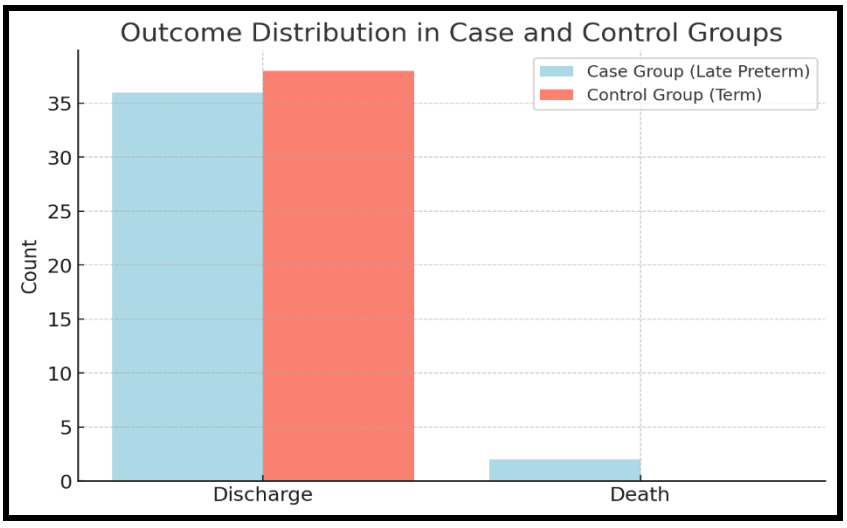

Figure 1 illustrates the outcome distribution of Discharge and Death in both the Case (Late Preterm) and Control (Term) groups.

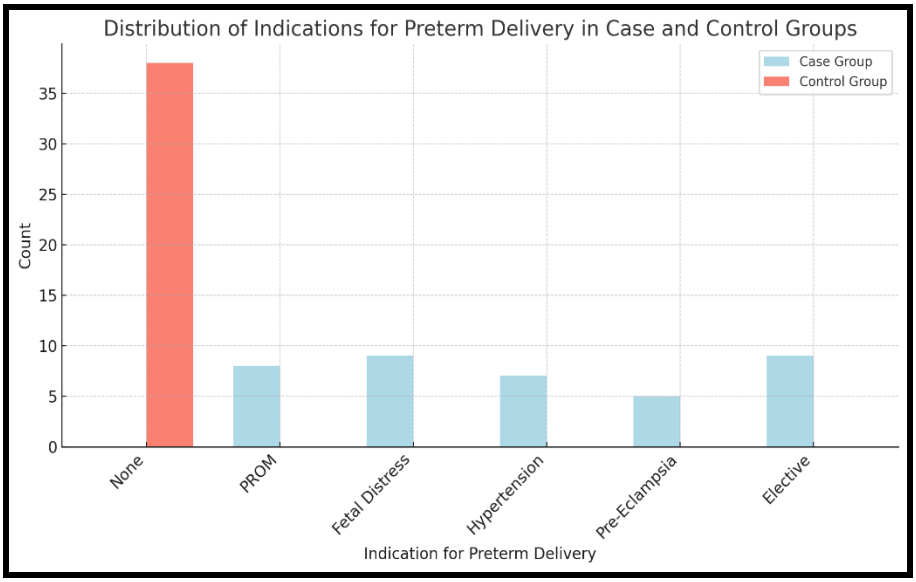

Figure 2 shows the distribution of indications for Preterm Delivery in case and control groups

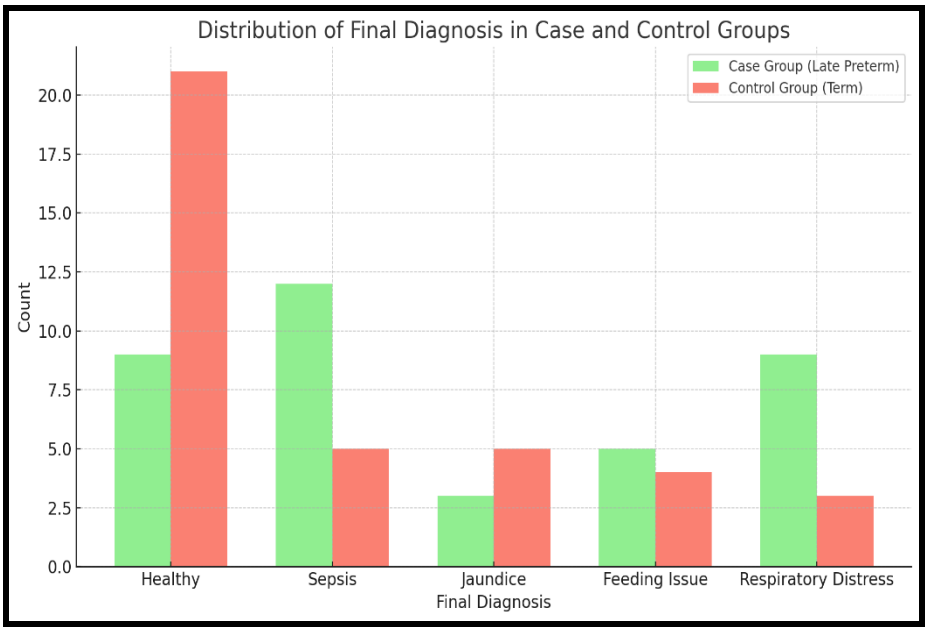

Figure 3 shows the distribution of final diagnosis in case and control groups

Table 4 compares the APGAR scores at 1 minute and 5 minutes between the Case (Late Preterm) and Control (Term) groups. Statistically significant differences were observed at both time points, with the Case group having a lower mean APGAR score at 1 minute, while the Control group showed predominantly higher scores at both time points.

Table 4: Distribution of APGAR Scores at 1 Minute and 5 Minutes in Case and Control Groups

APGAR Score	Group	Case	Control	Total	χ^2 and p
		n (%)	n (%)	n (%)	
1 Min	4	1 (2.6%)	0 (0.0%)	1 (1.3%)	χ^2=74.0, p=<0.001
	5	1 (2.6%)	1 (2.6%)	2 (2.6%)	
	6	36 (94.7%)	0 (0.0%)	36 (47.4%)	
	8	0 (0.0%)	37 (97.4%)	37 (48.7%)	
Mean ± SD		6.87 ± 0.578	7.92 ± 0.487		
5 Min	6	2 (5.3%)	0 (0.0%)	2 (2.6%)	χ^2=76.0, p=<0.001
	7	0 (0.0%)	1 (2.6%)	1 (1.3%)	

	8	36 (94.7%)	0 (0.0%)	36 (47.4%)	
	9	0 (0.0%)	37 (97.4%)	37 (48.7%)	
Mean ± SD		7.89 ± 0.453	8.95 ± 0.324		

Table 5 compares key neonatal parameters such as length at birth, head circumference, ponderal index, and duration of hospital stay between the Case (Late Preterm) and Control (Term) groups. Statistically significant differences were found in length at birth, ponderal index, duration of rupture of membranes, and duration of hospital stay, highlighting the developmental differences between the groups.

Table 5: Comparison of Neonatal Parameters Between Case and Control Groups

			95% Confidence Interval				
Parameters	**Group**	**Mean**	**Lower**	**Upper**	**SD**	**T-Test**	**P value**
Length at Birth (cm)	Case	46.8	46	47.7	2.51	-5.01	<0.001
	Control	49.4	48.8	50.1	1.98		
Length at Discharge (cm)	Case	48.3	47.5	49	2.31	-5.54	<0.001
	Control	51	50.4	51.7	1.98		
Head Circumference at Birth (cm)	Case	33.8	33.2	34.4	1.79	0.06	0.952
	Control	33.8	33.3	34.3	1.62		
Head Circumference at Discharge (cm)	Case	34.4	33.8	34.9	1.81	0.15	0.879
	Control	34.3	33.8	34.8	1.64		
Ponderal Index	Case	1.68	1.6	1.77	0.259	-11.86	<0.001
	Control	2.78	2.62	2.95	0.509		
Time of True Labour Pain (Hours)	Case	14.7	13.1	16.3	4.93	1.50	0.137
	Control	12.8	10.8	14.8	6.14		
Duration of Rupture of Membranes (Hours)	Case	7.05	6.2	7.91	2.6	2.57	0.012
	Control	5.53	4.68	6.37	2.57		
Duration of Hospital Stay (Days)	Case	10.5	9.47	11.53	3.13	3.99	<0.001
	Control	7.97	7.21	8.74	2.33		

DISCUSSION

Our study found that in the Case group, the majority of mothers were aged 20-30 years, while the Control group had a higher percentage in the 30-40 years range. Bhattacharjee et al. [6] (2024), Vuppu and Iragamreddy [7] (2023), and Goswami et al. [8] (2023) reported similar age distributions but with varying concentrations in different brackets. Our study also showed no significant differences in gravida status across groups, which aligns with Kalita et al. [9] (2023) and Bhattacharjee et al. [6] (2024), although Lorenzo et al. [10] (2021) observed higher multigravida rates.

A significant difference in booking status was noted, with 39.5% booked in the Case group compared to 76.3% in the Control group, indicating disparities in prenatal care, similar to findings by Vuppu and Iragamreddy [7] (2023) and Goswami et al. [8] (2023). In terms of mode of delivery, both groups had a 57.9% NVD and 42.1% LSCS, but Bhattacharjee et al. [6] (2024) and Vuppu and Iragamreddy [7] (2023) reported higher LSCS rates. Gender distribution was similar in both groups, with a higher prevalence of females in the Case group, consistent with Bhattacharjee et al. [6] (2024).

Our study revealed a significant difference in NICU admissions, with 73.68% of Case neonates requiring NICU care compared to 47.37% of the Control group, aligning with Kalita et al. [9] (2023) and Lorenzo et al. [10] (2021). Jaundice and sepsis were the primary causes for NICU admission, similar to findings by Séassau et al. [11] (2023). Additionally, maternal risk factors like PROM and previous preterm delivery were

more prevalent in the Case group, consistent with Bhattacharjee et al. [6] (2024) and Séassau et al. [11] (2023).

Finally, APGAR scores and neonatal outcomes in the Case group were lower at 1 and 5 minutes, aligning with Bhattacharjee et al. [6] (2024) and Kalita et al. [9] (2023). Our study also highlighted significant differences in neonatal length at birth and discharge, with the Case group showing poorer nutritional status, consistent with Goswami et al. [8] (2023). These findings emphasize the need for targeted prenatal care and neonatal management strategies for late preterm neonates.

CONCLUSION

We found significant differences in clinical and antenatal profiles between late preterm and term neonates, emphasizing the impact of maternal factors on neonatal outcomes, particularly in NICU admissions and birth parameters.

Strengths & Limitations

This study offers valuable insights into the clinical and antenatal profiles of late preterm and term neonates, with a well-structured methodology that enables clear comparisons across various parameters, contributing to evidence-based neonatal care. However, its limitations include a small sample size, single-center design, and lack of long-term follow-up data, which may limit the broader applicability and long-term outcome analysis.

Declaration by Authors
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Ethical Approval: *Obtained.*
Consent: *Written consent secured.*

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