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Maternal and Perinatal Outcome in Post Dated Pregnancy - A Prospective Observational Study

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Abstract: ***Background: Post - dated pregnancies, defined as pregnancies extending beyond 40 weeks, are associated with increased maternal and perinatal risks. Understanding the demographic distribution, delivery outcomes, and neonatal health of these pregnancies is crucial for managing potential complications and improving outcomes. Objective: The aim of this prospective observational study was to examine maternal and perinatal outcomes in post - dated pregnancies, focusing on age distribution, parity, mode of delivery, indications for lower segment cesarean section (LSCS), birth weights, APGAR scores, and neonatal intensive care unit (NICU) admissions. Methods: A total of 44 post - dated pregnant women were recruited for the study, with data collected on their age, parity, mode of delivery, and neonatal outcomes. Demographic details and clinical parameters, including birth weight, APGAR scores at 1 and 5 minutes, and NICU admissions, were analyzed. Statistical associations were assessed using Pearson chi - square tests, with significance determined at a p - value < 0.05. Results: The majority of post - dated pregnancies were observed in women aged 21 - 25 years (61.4%), with nearly half being first - time mothers (47.7%). LSCS was the predominant mode of delivery (61.4%), with fetal distress being the leading indication (29.5%). There was no significant association between gestational age range and mode of delivery (p = 0.789). Birth weights ranged between 2 to 4 kg in most cases, with no significant association found between the baby's sex and birth weight (p = 0.278). APGAR scores indicated favorable neonatal outcomes, with 95.5% of newborns scoring 6/10 at 1 minute and 97.7% improving to 8/10 by 5 minutes. A total of 22.7% of newborns required NICU admission, primarily due to meconium aspiration syndrome (MAS) and respiratory distress syndrome (RDS). Conclusion: Post - dated pregnancies are more prevalent in younger, primigravidas and are associated with a high rate of LSCS deliveries. While most newborns show favorable outcomes based on APGAR scores, there is a notable incidence of NICU admissions due to respiratory complications. These findings emphasize the need for close monitoring and timely interventions in managing post - dated pregnancies.***

Keywords: Post - dated pregnancy, lower segment cesarean section (LSCS), APGAR score, neonatal outcomes, NICU admissions

1. Introduction

Pregnancy that extends beyond 40 weeks of gestation, commonly referred to as post - dated pregnancy or prolonged pregnancy, has been a subject of considerable clinical concern due to its association with increased risks for both maternal and perinatal morbidity and mortality. The normal duration of human pregnancy is about 40 weeks from the last menstrual period, with post - dated pregnancy being classified when gestation extends beyond 42 weeks (280 days) [1]. This phenomenon has varied implications for both maternal and fetal health, requiring careful consideration in obstetric management.

The incidence of post - dated pregnancy varies globally, with an estimated 5 - 10% of all pregnancies extending beyond 40 weeks [2]. However, with improved prenatal care and the widespread use of early ultrasound for dating, the accurate assessment of gestational age has become more reliable, reducing the likelihood of misclassifying normal - term pregnancies as post - dated. Despite these advancements, post - dated pregnancy remains a significant clinical challenge because of the associated risks and complications for both mother and baby.

Maternal complications in post - dated pregnancies are primarily due to prolonged labor and increased risk of interventions. Women experiencing post - term pregnancies are more likely to undergo labor induction, which in turn may result in prolonged labor and increased chances of cesarean sections [3]. The likelihood of a cesarean delivery increases as the pregnancy extends beyond term, with a higher incidence observed in nulliparous women [4]. Induction of labor is a commonly recommended intervention in post - dated pregnancies to prevent complications; however, it has its own set of risks, including uterine hyperstimulation, failure of induction, and increased need for instrumental deliveries [5].

Prolonged pregnancies are also associated with an increased risk of maternal morbidities, including postpartum hemorrhage, genital tract trauma, and infection [6]. The psychological impact of prolonged pregnancy, particularly anxiety and distress due to the uncertainty of delivery and concerns for fetal well - being, is another dimension of maternal health that warrants consideration. Additionally, post - term pregnancies are associated with a higher likelihood of delivering a large - for - gestational - age (LGA) infant, which can lead to complications such as shoulder dystocia and perineal trauma during delivery [7].

The risks to the fetus and neonate in post - dated pregnancies are multifaceted. Fetal macrosomia, defined as a birth weight greater than 4, 000 grams, is a common finding in post - term pregnancies and is associated with birth injuries such as brachial plexus injury, clavicle fracture, and cephalhematoma [8]. The risk of stillbirth increases significantly in post - dated pregnancies, particularly beyond 41 weeks, due to placental insufficiency, oligohydramnios (reduced amniotic fluid), and fetal distress [9]. The decline in placental function with advancing gestation can lead to compromised fetal oxygenation and nutrient supply, posing serious threats to fetal well - being.

Oligohydramnios is a prominent concern in post - dated pregnancies as it can lead to umbilical cord compression, causing fetal distress and potential meconium aspiration syndrome [10]. Meconium aspiration syndrome is a severe respiratory condition in neonates resulting from the inhalation of meconium - stained amniotic fluid and can lead to pneumonia, respiratory distress, and in severe cases, death [11]. Neonates born to mothers with prolonged pregnancies are also at a higher risk of neonatal encephalopathy, seizures, and admission to neonatal intensive care units (NICUs) [12].

Furthermore, studies have shown that post - dated pregnancies are associated with an increased risk of perinatal morbidity, including low Apgar scores at birth, respiratory complications, and metabolic issues such as hypoglycemia and polycythemia [13]. As the fetus remains in utero beyond the expected time, the likelihood of adverse outcomes increases, necessitating vigilant monitoring and timely intervention to prevent potential complications.

The management of post - dated pregnancies often revolves around two primary approaches: expectant management with close monitoring or elective induction of labor. The decision - making process involves weighing the risks of prolonging the pregnancy against the risks associated with induction and delivery. Expectant management includes regular antenatal surveillance, such as non - stress tests, biophysical profiles, and amniotic fluid index assessments, to monitor fetal well - being [14]. This approach allows for the natural onset of labor but requires vigilant monitoring to detect any signs of fetal compromise.
Induction of labor is a common strategy employed to mitigate the risks associated with post - dated pregnancies. The timing of induction, typically between 41 and 42 weeks of gestation, aims to balance the reduction in perinatal morbidity and mortality with the risks associated with medical interventions. Studies have shown that elective induction of labor at 41 weeks can reduce the incidence of cesarean sections and improve perinatal outcomes compared to expectant management [15]. However, the success of induction largely depends on the cervical status at the time of induction, as measured by the Bishop score, and the overall health of the mother and fetus.

Clinical guidelines on managing post - dated pregnancies vary across different organizations and regions. The American College of Obstetricians and Gynecologists (ACOG) recommends induction of labor at 41 weeks of gestation, while the National Institute for Health and Care Excellence (NICE) in the UK advises induction between 41 and 42 weeks [16, 17]. These guidelines reflect a growing consensus that proactive management of post - dated pregnancies can lead to improved maternal and perinatal outcomes.

Several factors have been identified as predictors for the development of post - dated pregnancy. These include maternal age, parity, previous history of post - term pregnancies, obesity, and certain genetic factors [18]. Nulliparous women, in particular, are at a higher risk of experiencing prolonged pregnancies compared to multiparous women. Additionally, factors such as a high pre - pregnancy body mass index (BMI), male fetal gender, and certain ethnic backgrounds have been associated with an increased risk of post - dated pregnancy [19].

The accurate assessment of gestational age is critical in identifying and managing post - dated pregnancies. The use of early pregnancy ultrasounds for dating has greatly improved the accuracy of gestational age estimation and has reduced the incidence of falsely labeling pregnancies as post - term [20]. In cases where the last menstrual period is uncertain or not well documented, early ultrasound dating is particularly valuable in guiding clinical decision - making. The aim of this prospective observational study was to examine maternal and perinatal outcomes in post - dated pregnancies, focusing on age distribution, parity, mode of delivery, indications for lower segment cesarean section (LSCS), birth weights, APGAR scores, and neonatal intensive care unit (NICU) admissions.

2. Methodology

1) Study Design

The study was conducted as a prospective observational study, which involved collecting and analyzing data from pregnant women with post - dated pregnancies over a period of 6 months (august 1st 2023 to jan 31st 2024). The aim was to observe maternal and perinatal outcomes without any intervention, allowing for a natural course of pregnancy progression to be studied.

2) Study Setting

The study was carried out at the Department of Obstetrics and Gynecology in BMC& RC Ballari. This setting enabled access to a diverse patient population and a range of post - dated pregnancies, ensuring that the study could collect comprehensive data on maternal and fetal outcomes.

3) Study Duration

The research was conducted over a period of 6 months (august 1st 2023 to jan 31st 2024). During this time, eligible participants were recruited, and data were collected to allow for an adequate sample size and comprehensive results.

4) Participants – Inclusion and Exclusion Criteria

Inclusion Criteria:

- Pregnant women who were more than 40 weeks of gestation as per their last menstrual period (LMP) and had reliable dating confirmed by a first - trimester scan were included.
- Singleton pregnancies were considered to ensure consistent data.

- Cephalic presentation was a prerequisite for inclusion to reduce confounding outcomes related to different presentations.

Exclusion Criteria:

- Women with uncertain LMP or unreliable dating were excluded.
- Pregnancies with known fetal congenital anomalies, multiple pregnancies, or complications like fetal growth restriction were excluded.

5) Study Sampling

A convenience sampling technique was employed, where eligible women meeting the inclusion criteria were consecutively recruited for the study. All participants were evaluated to confirm their gestational age, pregnancy status, and overall health before inclusion.

6) Study Sample Size

The sample size was calculated using the formula:

$$\text{Sample size} = Z^2_{\alpha/2} \cdot \frac{p(1-p)}{d^2}$$

Where:

- Zα/2 is the standard normal variate at a 5% type 1 error (1.96 for a 95% confidence interval).
- ppp is the prevalence, taken as 12%.
- q=1−p
- d is the absolute error or precision, decided as 5%.

Based on the calculations, a sample size of 44 subjects was determined to be adequate for the study.

7) Study Parameters

The study evaluated several parameters, including maternal complications associated with post - dated pregnancies, fetal outcomes like birth weight and Apgar scores, and any neonatal intensive care unit (NICU) admissions. Other factors like mode of delivery, maternal age, and pre - existing health conditions were also recorded.

8) Study Procedure

Participants were recruited when they attended the outpatient department (OPD) for routine pregnancy check - ups or when they were admitted for delivery. The gestational age was confirmed based on LMP and first - trimester scans. Detailed history - taking and clinical examination were performed for each participant. The status of the pregnancy was monitored, and any complications or delivery - related outcomes were recorded.

9) Study Data Collection

Data were collected through structured interviews and medical record reviews. Each participant's obstetric history, examination findings, and delivery outcomes were meticulously documented. Information regarding the neonate, including birth weight, Apgar score, and NICU admissions, was also collected immediately after delivery.

10) Data Analysis

The data collected were analyzed using appropriate statistical tools. Frequencies and proportions were calculated for categorical variables, while means and standard deviations were used for continuous variables. A comparison was made to assess maternal and perinatal outcomes among women with post - dated pregnancies, and significant associations were identified.

11) Ethical Considerations

Ethical approval for the study was obtained from the institutional review board (IRB). Participants were informed about the study objectives and procedures, and written informed consent was obtained from each participant before inclusion in the study. Confidentiality was maintained throughout the study, and data were stored securely to protect participants' privacy.

3. Result and Analysis

3.1 Demographic Profile of the Respondent

a) Age distribution among study participants

The study results suggest that the majority of post - dated pregnancies occur in women aged 21 - 25 years, representing 61.4% of cases, followed by 25% in women aged 18 - 20 years. In terms of gravidity, 47.7% of the women were primigravidas (G1), with a notable proportion (29.5%) of cases involving women with one prior pregnancy (G2). There were also smaller groups of women with more complex obstetric histories. This indicates that both primiparous and multiparous women are affected by post - dated pregnancies, with a larger share being first - time mothers.

Table a: Age distribution among study participants

Age	No. of cases (N) 44	Percent
18 - 20	11	25.0
21 - 25	27	61.4
26 - 30	6	13.6
Gravidity		
G1	21	47.7
G2	13	29.5
G3	7	15.9
G4	2	4.5
>/= G5	1	2.3

b) Mode of delivery among study participants

The study results on the mode of delivery indicate that out of 44 cases of post - dated pregnancies, the majority (61.4%) were delivered via lower segment cesarean section (LSCS), with 23 cases occurring between 40 weeks 1 day and 41 weeks, and 4 cases beyond 41 weeks 1 day. Induced labor was the next most common method, accounting for 11 cases (8 in the earlier gestational period and 3 in the later). Spontaneous deliveries were less frequent, with only 5 cases, while forceps delivery was rare, with just 1 case. The Pearson chi - square test (1.050) and the p - value (0.789) suggest that there is no statistically significant association between the mode of delivery and the gestational age range.

Mode of delivery	Frequency	Percentage %
Vaginal delivery	17	38.7
LSCS	27	61.4
Total	44	100

Table b: Mode of delivery among study participants

Mode of delivery	POG		Total
	40 - week 1 day - 41 weeks	41 - week 1 day - 42 weeks	
Forceps	1	0	1
Induced	8	3	11
LSCS	23	4	27
Spontaneous	4	1	5
Total	36	8	44
Pearson chi - square = 1.050, p - value = 0.789			

c) Indications for lower segment cesarean section (LSCS) in post - dated pregnancies among study participants

The data on indications for lower segment cesarean section (LSCS) in post - dated pregnancies reveals that fetal distress was the most common reason, accounting for 48.1% of cases. This was followed by severe oligohydramnios (22.2%) and cephalopelvic disproportion (CPD) at 11.1%. Other notable indications include failed induction and non - progression of labor, both at 7.4%. less frequent indications were also present but accounted for smaller percentages. This distribution highlights that fetal distress is the primary driver of cesarean deliveries in post - dated pregnancies in this cohort.

Table c: Indications for lower segment cesarean section (LSCS) in post - dated pregnancies among study participants

IF LSCS, Indication	Frequency	Percent
Fetal distress	13	48.1
Severe oligo	6	22.2
CPD	3	11.1
DTA	1	3.7
Failed Induction	2	7.4
Non Progression	2	7.4
Total	27	100.0

d) Birth weight among study participants

The birth weight data indicates that among the 44 babies born in post - dated pregnancies, an equal number of male and female babies (11 each) had a birth weight between 2000 to 2900gms. For the 3000 to 3900gms category, there were more male babies (14) than female babies (7). Only one baby, a female, weighed >/=4000gms. The Pearson chi - square value of 2.563 and p - value of 0.278 suggest there is no statistically significant association between the baby's sex and birth weight in this sample.

Table d: Birth weight among study participants

Birth Weight	Baby		Total
	Female	Male	
2000 to 2900gms	11	11	22
3000 to 3900gms	7	14	21
>/=4000gms	1	0	1
Total	19	25	44
Pearson chi - square = 2.563, p - value = 0.278			

e) APGAR scores at 1 and 5 minutes among study participants

The APGAR scores at 1 and 5 minutes show that the majority of newborns in post - dated pregnancies had favorable outcomes. At 1 minute, 95.5% of the babies scored 6/10, indicating satisfactory initial health, while only 2.3% scored 3/10 or 4/10. By 5 minutes, 97.7% of babies improved to a score of 8/10, reflecting strong recovery after birth, with only 2.3% having a score of 5/10. This indicates that most babies born in post - dated pregnancies had good overall health outcomes based on APGAR scores.

Table e: APGAR scores at 1 and 5 minutes among study participants

APGAR	Frequency	Percent
1min		
3\10	1	2.3
4\10	1	2.3
6\10	42	95.5
5min		
5\10	1	2.3
8\10	43	97.7

f) NICU admission among study participants

The study data shows that 22.7% of newborns from post - dated pregnancies required NICU admission. The most common reason for NICU referral was meconium aspiration syndrome (MAS), affecting 11.4% of the cases. Respiratory distress syndrome (RDS) was the reason for NICU admission in 4.5% of cases, and one case had both RDS and early neonatal death (ENND). Other causes included hyperbilirubinemia (2.3%) and macrosomia (2.3%). Additionally, 4.5% of maternal complications involved postpartum hemorrhage (PPH). Overall, the findings suggest that a notable proportion of post - dated pregnancies led to NICU admissions, primarily due to respiratory issues.

Table f: NICU admission among study participants

NICU admission	Frequency	Percent
Yes	10	22.7
Reason for referral		
HYPERBILIRUBINAMIA	1	2.3
MACROSOMIA	1	2.3
MAS	5	11.4
RDS	2	4.5
ENND	1	2.3
MATERNAL COMPLICATION		
PPH	2	4.5

4. Discussion

The results of this prospective observational study on post - dated pregnancies reveal insightful findings on the maternal and perinatal outcomes associated with gestation extending beyond 40 weeks. The study's demographic analysis highlights that post - dated pregnancies are most prevalent in women aged 21 - 25 years, accounting for 61.4% of cases, followed by 25% of women aged 18 - 20 years. Additionally, nearly half of the women (47.7%) were primigravidas (G1).

In terms of delivery methods, the data reveals a significant inclination towards lower segment cesarean sections (LSCS) in post - dated pregnancies. Of the 44 cases observed, 61.4% were delivered via LSCS and 38.7% delivered vaginally. This high rate of LSCS aligns with previous research suggesting an increased risk of cesarean delivery in post - dated pregnancies due to factors such as decreased amniotic fluid volume, fetal distress, and other complications that often arise when pregnancies extend beyond term. Induced labor was also relatively common, accounting for 11 cases, which were more frequent in the earlier gestational period. Spontaneous deliveries were notably less frequent, occurring in only 5 cases, and forceps deliveries were rare with just one

occurrence. Statistical analysis using the Pearson chi - square test (1.050) and the p - value (0.789) indicated that there was no significant association between the mode of delivery and gestational age range. However, the trend toward LSCS suggests that post - dated pregnancies may pose a higher risk for complications necessitating surgical intervention, highlighting the need for careful monitoring and management as pregnancies approach and surpass 40 weeks.

The indications for LSCS in this cohort were diverse, with fetal distress being the leading cause, accounting for 48.8% of cesarean deliveries. Other indications for LSCS included severe oligohydramnios (22.2%), cephalopelvic disproportion (CPD) (11.1%), failed induction (7.4%), and non - progression of labor (7.4%). was also a notable indication but accounted for a smaller percentage of the total cases. The high rate of LSCS and its associated indications point to a need for timely decision - making regarding delivery methods to ensure optimal maternal and fetal outcomes.

An analysis of birth weights among newborns in post - dated pregnancies showed that a significant proportion of babies (50%) had birth weights between 2000gms to 2900gms kg, equally distributed between male and female infants. Meanwhile, a higher number of male babies (14) than female babies (7) were in the 3000gms to 3900gms category, suggesting a trend toward heavier male newborns. Only one baby, a female, had a birth weight in the>4000gms. The study also evaluated the APGAR scores at 1 and 5 minutes to assess the immediate health status of newborns. The results showed that at 1 minute, 95.5% of the babies had an APGAR score of 6/10, indicating satisfactory initial health. Only a small percentage (4.6%) scored lower, with scores of 3/10 or 4/10, suggesting minor concerns at birth. By the 5 - minute mark, 97.7% of newborns showed significant improvement, with scores rising to 8/10, reflecting strong recovery and adaptation post - delivery. Only one baby had a score of 5/10 at 5 minutes, which may indicate a need for closer monitoring but overall a favorable outcome. These APGAR scores suggest that while some newborns of post - dated pregnancies may experience initial challenges, the majority have good overall health outcomes and adapt well after birth, highlighting the potential for positive neonatal recovery even in cases where initial health is compromised.

The study's analysis of neonatal intensive care unit (NICU) admissions revealed that 22.7% of newborns from post - dated pregnancies required specialized care. The primary reason for NICU referral was meconium aspiration syndrome (MAS), which affected 11.4% of the cases, indicating that respiratory complications are a significant concern in post - dated pregnancies. Respiratory distress syndrome (RDS) accounted for 4.5% of NICU admissions, and one case involved both RDS and early neonatal death (ENND), emphasizing the need for rapid and effective neonatal care in such circumstances. Additional causes of NICU admission included hyperbilirubinemia and macrosomia, each affecting 2.3% of cases. Moreover, maternal complications, particularly postpartum hemorrhage (PPH), were present in 4.5% of cases.

5. Conclusion

In conclusion, this study provides valuable insights into the demographics, delivery outcomes, neonatal health, and complications associated with post - dated pregnancies. The findings emphasize the critical need for vigilant monitoring, timely interventions, and comprehensive care for both mother and baby to ensure optimal health outcomes. Given the increased risk of complications in post - dated pregnancies, healthcare providers must be prepared to make informed decisions regarding the mode of delivery and neonatal care to support favorable outcomes for this population. Further research is warranted to explore strategies for improving outcomes in post - dated pregnancies, including the benefits of earlier induction of labor and targeted interventions for at - risk women.

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