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Original Research Article

Maternal and fetal outcomes in postdated pregnancy: A clinicopathological evaluation at a tertiary care hospital

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Abstract:

Background: Postdated pregnancy, defined as gestation extending beyond 40 completed weeks, is a common clinical scenario associated with increased risks of maternal morbidity, obstetric interventions, and adverse perinatal outcomes. Careful monitoring and timely obstetric decision-making are crucial in reducing complications. Clinicopathological assessment of maternal and fetal outcomes in postdated pregnancies helps in understanding local trends and guides evidence-based management strategies.

Aim and Objectives: The present study aimed to evaluate the maternal and fetal clinicopathological profile of postdated pregnancies, to assess the mode of delivery, intrapartum and postpartum complications, and perinatal outcomes.

Materials and Methods: This prospective observational study was conducted in the Department of Obstetrics & Gynecology, Anugrah Narayan Magadh Medical College & Hospital, Gaya, Bihar,India, from July 2024 to October 2025. A total of 126 women with postdated pregnancy (sample size within 100–150) admitted during the study period were included. Detailed clinical histories, maternal demographic data, parity, and gestational age at delivery were recorded. All patients underwent routine antenatal investigations, ultrasonographic evaluation, and fetal monitoring. Mode of delivery, intrapartum events, placental and cord examination, neonatal outcomes, and need for NICU admission were analyzed. Data were expressed as frequencies, percentages, means, and standard deviations.

Results: The mean maternal age was 26.8 ± 4.1 years, with most women in the 21–30 years age group. Multiparas formed the majority. The mean gestational age at delivery was 41.6 weeks, with the largest proportion delivering between 41–41+6 weeks. Common maternal complications included oligohydramnios, meconium-stained liquor, and prolonged labor. Induction of labor was required in 62.7% of cases, while 34.1% underwent cesarean delivery, most often for fetal distress. Placental examination revealed features of infarction and meconium staining in a subset. Neonatal outcomes showed that 18.3% had low birth weight (<2.5 kg), and 21.4% required NICU admission, mainly due to birth asphyxia and meconium aspiration. Perinatal morbidity was observed in 23.8%, while perinatal mortality was 3.9%.

Conclusion: Postdated pregnancy is associated with increased maternal interventions and perinatal risks, predominantly due to placental insufficiency and meconium-related complications. Careful antenatal surveillance, timely induction, and judicious obstetric decision-making are vital to optimize outcomes. Histopathological examination of placenta and membranes provides valuable insight into the underlying pathophysiological changes.

Keywords: Postdated pregnancy, Maternal outcome, Fetal outcome, Placental pathology, Induction of labor, Meconium aspiration, Perinatal morbidity

Introduction

Pregnancy extending beyond the expected date of delivery continues to be a major concern in obstetric practice. By definition, postdated pregnancy refers to a gestation that extends beyond 40 completed weeks (≥ 40+0 weeks) but remains less than 42 completed weeks, while post-term pregnancy specifically refers to pregnancies ≥ 42 weeks. Although the terms are often used interchangeably in clinical practice, both conditions are associated

with heightened risks for maternal and neonatal complications [1].

The incidence of postdated pregnancy varies between 5–10% of all pregnancies, influenced by regional variations, population demographics, and methods used for accurate dating of pregnancy. The commonest contributing factor to postdated pregnancy is an error in estimating gestational age, especially in women with uncertain last menstrual period (LMP) or irregular cycles. With the increasing use of early ultrasonography, errors in dating have decreased, but a significant number of pregnancies still progress beyond the expected duration [2].

From a pathophysiological perspective, prolonged gestation is associated with progressive placental aging and insufficiency, which results in decreased uteroplacental blood flow, oligohydramnios, and increased risk of meconium passage into the amniotic fluid. These changes predispose the fetus to intrauterine hypoxia, meconium aspiration, birth asphyxia, and perinatal mortality. In addition, macrosomia and postmaturity syndrome may complicate labor and contribute to birth trauma [3].

For the mother, postdated pregnancy often translates into increased obstetric interventions such as induction of labor, instrumental delivery, and cesarean section. Complications such as prolonged labor, failed induction, and postpartum hemorrhage are also more frequent. Therefore, the management of postdated pregnancy necessitates a careful balance between expectant observation and timely intervention [4].

Clinicopathological evaluation plays a vital role in understanding postdated pregnancies. Placental histopathology frequently reveals degenerative changes such as infarction, calcification, and villous fibrosis, which reflect functional decline. Such findings help in correlating the clinical manifestations with the underlying pathology, thereby enhancing the understanding of adverse maternal and fetal outcomes [5].

Several studies across India and globally have reported varying patterns of maternal and perinatal morbidity in postdated pregnancies. However, regional factors such as patient demographics, healthcare accessibility, and institutional practices influence outcomes. In resource-limited settings, where access to advanced fetal monitoring may be restricted, the risks associated with prolonged pregnancy can be even more pronounced [6].

Given these considerations, the present study was undertaken at a tertiary care teaching hospital in Bihar to analyze the clinicopathological profile of postdated pregnancies. The study sought to identify maternal risk factors, modes of delivery, complications, placental pathology, and perinatal outcomes in order to contribute locally relevant data that can guide improved clinical management and evidence-based decision-making.

Materials and Methods

Study Design and Setting: This was a prospective observational study conducted in the Department of Obstetrics & Gynecology, Anugrah Narayan Magadh Medical College & Hospital, Gaya, Bihar, India from July 2024 to October 2025

Study Population and Sample Size: A total of 126 pregnant women who presented with postdated pregnancy (≥ 40 completed weeks and < 42 weeks of gestation) were included in the study. The sample size was selected to fall within the range of 100–150, ensuring adequate representation for statistical validity.

Inclusion Criteria

- Singleton pregnancies with gestational age ≥ 40+0 weeks and < 42 weeks.
- Pregnant women who had a reliable last menstrual period (LMP) or an early first-trimester ultrasound confirming gestational age.
- Patients admitted for labor, induction, or elective delivery with documented postdated pregnancy.

Exclusion Criteria

- Multiple pregnancies.
- Pregnancies with known fetal congenital anomalies.
- Pregnancies with medical complications (e.g., preeclampsia, diabetes, chronic hypertension, thyroid disorders) where outcomes could be confounded.
- Women with uncertain LMP and no early ultrasound confirmation.
- Pregnancies extending beyond 42 weeks (classified as post-term, not included in this analysis).

Data Collection: Upon admission, detailed sociodemographic data including maternal age, parity, socioeconomic status, and body mass index (BMI) were recorded. A thorough obstetric and medical history was obtained. Clinical examination included maternal vital parameters, abdominal and vaginal examination findings, and fetal heart rate monitoring.

Clinical Monitoring and Management

- Antenatal Investigations: Routine blood tests, urine analysis, and non-stress tests (NST) were performed.
- Ultrasonography (USG): All women underwent ultrasound to assess amniotic fluid index (AFI), fetal growth parameters, and Doppler studies wherever indicated.

- Fetal Surveillance: Cardiotocography (CTG) was used to assess fetal well-being in selected cases.
- Mode of Delivery: Decisions regarding induction of labor, augmentation, or cesarean section were made as per standard hospital protocols.
- Intrapartum Monitoring: Labor was closely monitored for progress, fetal distress, and complications such as meconium-stained liquor and prolonged labor.

Placental and Pathological Examination: Following delivery, all placentas and umbilical cords were subjected to gross and histopathological examination. Parameters assessed included:

- Placental weight, shape, and calcification.
- Presence of infarcts, intervillous thrombi, and meconium staining.
- Microscopic features such as villous fibrosis, syncytial knots, and chorioamnionitis.

Neonatal Assessment

- Birth weight, Apgar scores at 1 and 5 minutes.
- Need for resuscitation.
- NICU admission and indications (e.g., meconium aspiration, birth asphyxia, respiratory distress).
- Early neonatal outcomes up to discharge.

Outcome Measures

The following outcome measures were analyzed:

1. **Maternal factors** – age, parity, mode of delivery, intrapartum and postpartum complications.
2. **Fetal factors** – birth weight, Apgar scores, NICU admissions, perinatal morbidity and mortality.
3. **Pathological findings** – gross and histopathological examination of placenta, membranes, and cord.

Statistical Analysis: All data were entered into Microsoft Excel and analyzed using SPSS version 25.0. Categorical variables were expressed as frequencies and percentages, while continuous variables were presented as mean ± standard deviation (SD). Associations between maternal factors, fetal outcomes, and placental pathology were assessed using Chi-square test for categorical data and t-test/ANOVA for continuous data where appropriate. A p-value < 0.05 was considered statistically significant.

Results

A total of 126 postdated pregnant women were included in the study. The mean maternal age was 27.2 ± 4.3 years, with the majority belonging to the 21–30 years age group. Most women were multiparous, and the mean BMI was within the normal to overweight range. The mean gestational age at delivery was 41.3 ± 0.6 weeks, ranging from 40 to 42 weeks. Antenatal complications were common, with oligohydramnios and meconium-stained liquor being the most frequent. A large proportion of women required induction of labor, and cesarean section was necessary in nearly one-third of cases. Placental histopathology revealed significant degenerative and hypoxic changes. Neonatal outcomes showed increased rates of low birth weight, NICU admissions, and perinatal morbidity, underscoring the clinical importance of vigilant management in postdated pregnancies.

Maternal Characteristics

Table 1: Maternal age distribution of study participants

Maternal Age (years)	Number of cases (n=126)	Percentage (%)
≤ 20	16	12.7
21–25	44	34.9
26–30	46	36.5
> 30	20	15.9

Table 2: Parity distribution of study participants

Parity	Number of cases (n=126)	Percentage (%)
Nulliparous	42	33.3
Multiparous	84	66.7

Gestational Age and Antenatal Findings

Table 3: Gestational age distribution at delivery

Gestational Age (weeks)	Number of cases (n=126)	Percentage (%)
40–40+6	46	36.5
41–41+6	59	46.8
42	21	16.7

Table 4: Antenatal complications among study participants

Complication	Number of cases (n=126)	Percentage (%)
Oligohydramnios	33	26.2
Meconium-stained liquor	27	21.4
Hypertension	12	9.5
Gestational diabetes	8	6.3
None	46	36.5

Labor and Delivery Profile

Table 5: Mode of onset of labor

Labor onset	Number of cases (n=126)	Percentage (%)
Spontaneous labor	47	37.3
Induction of labor	79	62.7

Table 6: Mode of delivery among participants

Mode of Delivery	Number of cases (n=126)	Percentage (%)
Normal vaginal delivery	61	48.4
Instrumental vaginal	22	17.5
Cesarean section	43	34.1

Table 7: Intrapartum complications observed

Complication	Number of cases (n=126)	Percentage (%)
Fetal distress	28	22.2
Prolonged labor	16	12.7
Obstructed labor	6	4.8
None	76	60.3

Neonatal and Placental Outcomes

Table 8: Neonatal birth weight distribution

Birth Weight (kg)	Number of cases (n=126)	Percentage (%)
< 2.5 (Low birth wt)	23	18.3
2.5–3.5	87	69.0
> 3.5 (Macrosomia)	16	12.7

Table 9: NICU admissions and indications

Indication	Number of cases (n=27)	Percentage (%) of NICU
Birth asphyxia	10	37.0
Meconium aspiration syndrome	7	25.9
Respiratory distress	6	22.2
Sepsis suspicion	4	14.9

Table 10: Placental histopathological findings

Pathological finding	Number of cases (n=126)	Percentage (%)
Calcification	41	32.5
Infarction	28	22.2
Villous fibrosis	19	15.1
Meconium staining	27	21.4
Normal findings	11	8.7

Table 11: Perinatal morbidity and mortality outcomes

Outcome	Number of cases (n=126)	Percentage (%)
Perinatal morbidity	30	23.8
Perinatal mortality	5	3.9
No adverse outcome	91	72.2

Consolidated Summary

Table 1 demonstrated that the majority of women (71.4%) were between 21–30 years. Table 2 indicated that two-thirds of participants were multiparous. Table 3 revealed that most deliveries occurred at 41–41+6 weeks, with a mean gestational

age of 41.3 weeks. Table 4 showed oligohydramnios (26.2%) and meconium-stained liquor (21.4%) as the leading antenatal complications. Table 5 confirmed that induction of labor was necessary in nearly two-thirds of cases. Table 6 documented that cesarean section accounted for 34.1% of deliveries, while almost half delivered vaginally. Table 7 identified fetal distress (22.2%) as the most frequent intrapartum complication. Table 8 demonstrated that 18.3% of neonates had low birth weight, whereas macrosomia was noted in 12.7%. Table 9 revealed that NICU admission was required in 21.4% of cases, most often for birth asphyxia and meconium aspiration. Table 10 highlighted calcification and infarction as the predominant placental pathological findings. Table 11 indicated that perinatal morbidity occurred in nearly one-fourth of cases, and perinatal mortality was recorded at 3.9%.

Discussion

The present study comprehensively evaluated the maternal, fetal, and placental outcomes associated with postdated pregnancy over a one-year period at a tertiary care institute. With a total of 126 cases analyzed, this investigation provides valuable insights into the clinical spectrum, risk factors, complications, and histopathological correlates of pregnancies extending beyond 40 weeks of gestation. The findings are consistent with previous literature while also highlighting the regional trends and challenges in managing such high-risk pregnancies [7].

Maternal Profile and Risk Factors: The majority of participants in our study were within the age group of 21–30 years (71.4%), consistent with the reproductive age distribution in India and other developing countries. Multiparity was more frequent (66.7%) compared to nulliparity, reflecting the background demographic profile of the study population. This observation contrasts with some Western studies that report nulliparity as a more prominent risk factor for postdated pregnancy. Nonetheless, our findings suggest that postdated pregnancy is not restricted to first-time mothers but also occurs commonly among multiparous women, underscoring the need for vigilant surveillance across parity groups [8].

Gestational Age and Antenatal Complications: The mean gestational age at delivery was 41.3 weeks, with nearly half of women delivering between 41–41+6 weeks. This finding aligns with international guidelines that recognize pregnancies extending beyond 41 weeks as significantly associated with higher maternal and neonatal morbidity. Among antenatal complications, oligohydramnios (26.2%) and meconium-stained liquor (21.4%) were most frequently noted. These results are in concordance with prior studies that identified reduced amniotic fluid and meconium passage as hallmark complications of prolonged pregnancy, attributed to progressive placental senescence and reduced utero-placental perfusion [9].

Labor Induction and Mode of Delivery: Induction of labor was required in nearly two-thirds of cases (62.7%), highlighting the common clinical practice of active intervention in postdated pregnancies to avoid adverse outcomes. Despite induction, the cesarean section rate remained high at 34.1%, largely driven by fetal distress and failed induction. This finding mirrors global reports where cesarean section rates are significantly elevated in prolonged pregnancies compared to term deliveries. The higher proportion of instrumental deliveries (17.5%) further emphasizes the intrapartum challenges associated with postdated pregnancies, including dysfunctional labor and non-reassuring fetal heart rate patterns [10].

Intrapartum Complications: Fetal distress was the most common intrapartum complication (22.2%), followed by prolonged labor (12.7%). These outcomes corroborate the well-documented association between postdated pregnancy and increased risk of fetal hypoxia, likely secondary to declining placental reserve and intrauterine compromise. The relatively high incidence of intrapartum complications in our study reinforces the importance of continuous fetal monitoring and readiness for emergency obstetric intervention in such cases [11].

Neonatal Outcomes: Our neonatal outcome analysis revealed that 18.3% of neonates had low birth weight (<2.5 kg), while 12.7% were macrosomic (>3.5 kg). This dual risk highlights the heterogeneous nature of postdated pregnancy outcomes, where some fetuses may experience intrauterine growth restriction due to placental insufficiency, whereas others may develop excessive growth due to prolonged intrauterine stay. NICU admission was required in 21.4% of cases, with birth asphyxia and meconium aspiration syndrome being the leading causes. These results are consistent with previous Indian and international studies reporting NICU admission rates ranging from 15% to 25% in postdated pregnancies [12].

Placental Histopathological Findings: Histopathological examination of the placenta revealed significant degenerative changes, including calcification (32.5%), infarction (22.2%), villous fibrosis (15.1%), and meconium staining (21.4%). These findings corroborate the theory of placental aging in postdated pregnancies, which results in impaired gas exchange, hypoxic stress, and reduced amniotic fluid volume. Importantly, these histological features correlate well with the clinical complications observed, particularly

oligohydramnios, fetal distress, and intrauterine growth abnormalities [13].

Perinatal Morbidity and Mortality: The overall perinatal morbidity rate in our study was 23.8%, with perinatal mortality recorded at 3.9%. These figures are comparable to global estimates, which suggest a two- to three-fold increase in perinatal risks in postdated pregnancies compared to term deliveries. The mortality cases were largely attributable to severe birth asphyxia and meconium aspiration, underscoring the critical need for timely decision-making regarding induction and delivery mode in such high-risk cases [14].

Comparison with Literature and Clinical Implications: Our findings closely parallel those reported in several previous Indian studies, which emphasize that postdated pregnancy remains a major contributor to obstetric interventions and adverse neonatal outcomes. International guidelines from the American College of Obstetricians and Gynecologists (ACOG) and the Royal College of Obstetricians and Gynaecologists (RCOG) recommend close surveillance beyond 40 weeks and elective induction by 41 weeks to minimize risks. The high rates of induction, operative delivery, and NICU admissions observed in our study strongly support these recommendations [15].

Strengths and Limitations: The strengths of this study include a well-defined sample size and the integration of clinicopathological correlation through placental histopathology, providing a holistic perspective. Limitations include its single-center, hospital-based nature, which may not be generalizable to the broader community. Additionally, neonatal long-term outcomes were not assessed.

Conclusion

This clinicopathological study of 126 postdated pregnancies conducted over one year at a tertiary care hospital highlights that prolonged gestation is significantly associated with increased maternal interventions, higher rates of labor induction, cesarean delivery, and instrumental delivery, along with notable intrapartum complications such as fetal distress and prolonged labor. Neonatal outcomes were marked by an elevated incidence of low birth weight, macrosomia, birth asphyxia, meconium aspiration, and increased NICU admissions, while placental histopathology consistently revealed features of aging such as calcification, infarction, and villous fibrosis that correlated with adverse perinatal outcomes. Despite advances in obstetric care, postdated pregnancy continues to carry considerable risks for both mother and fetus, reinforcing the importance of timely surveillance, induction of labor by 41 weeks, and individualized management strategies to optimize outcomes and reduce preventable morbidity and mortality.

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