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Original Research Article

Fetomaternal outcomes beyond 40 weeks of gestation: a retrospective study

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ABSTRACT

Background: Pregnancies extending beyond 40 weeks, categorized as late-term (40–41+6 weeks) or post-term (≥42 weeks), are associated with increased risks of adverse maternal and neonatal outcomes. This study aims to evaluate and compare fetomaternal outcomes in late-term and post-term pregnancies.
Methods: This retrospective observational study was conducted at the department of obstetrics and gynecology, Chettinad health and research institute. Medical records of 300 women aged 18-45 years, who delivered after 40 weeks of gestation between January 1, 2023, and December 31, 2023, were analyzed. Exclusion criteria included teenage pregnancies, elderly gravida (>45 years), past caesarean sections, and breech/transverse presentations. Data on demographic characteristics, induction methods, maternal and neonatal outcomes, and complications were collected and statistically analyzed using SPSS version 25.0.
Results: Out of 300 participants, 225 (75%) delivered at late-term, while 75 (25%) delivered post-term. Caesarean delivery rates were higher in post-term pregnancies (55%) compared to late-term (35%) ($p<0.01$). Maternal complications, including postpartum hemorrhage (PPH) (15%), perineal tears (10%), and uterine rupture (5%), were significantly more prevalent in post-term pregnancies ($p<0.05$). Neonatal complications were also higher in post-term deliveries, with increased rates of macrosomia (30% vs. 15%), NICU admissions (27% vs. 15%), and meconium-stained amniotic fluid (40% vs. 20%) ($p<0.01$). Stillbirths were exclusive to post-term pregnancies (7%).
Conclusions: Post-term pregnancies are associated with significantly higher maternal and neonatal risks compared to late-term pregnancies. Timely induction of labor and enhanced surveillance in pregnancies beyond 40 weeks are crucial to minimizing complications. These findings support the implementation of evidence-based management strategies to improve fetomaternal outcomes in prolonged pregnancies.

Keywords: Late-term pregnancy, Post-term pregnancy, Maternal outcomes, Neonatal outcomes, Induction of labor, Retrospective study

INTRODUCTION

Pregnancy is a complex physiological process, and its timely culmination is vital for optimal fetomaternal outcomes. While the standard duration of a full-term pregnancy is considered to be between 37 and 42 weeks, pregnancies that extend beyond 40 weeks-often referred to as late-term (40 to 41 weeks) or post-term (≥42 weeks)-are associated with unique challenges and risks for both the mother and the fetus. Monitoring and managing such pregnancies are critical to reducing adverse outcomes, including increased rates of maternal complications such as caesarean delivery, and neonatal complications such as stillbirth, macrosomia, and neonatal intensive care unit (NICU) admissions.[1] Globally, the prevalence of pregnancies extending beyond 40 weeks varies, with a higher incidence reported in nulliparous women and populations where early induction of labor is less routinely practiced.[2] The decision to continue or intervene in late-term pregnancies often hinges on balancing the risks of

prolonging pregnancy against the potential complications of labor induction. Evidence suggests that pregnancies beyond 40 weeks demand careful clinical surveillance due to an increased risk of placental insufficiency, oligohydramnios, and meconium-stained amniotic fluid.[3]

Understanding fetomaternal outcomes in pregnancies extending beyond 40 weeks is of paramount importance, given their association with significant clinical implications. Despite advancements in obstetric care and monitoring, post-term pregnancies remain a significant contributor to perinatal mortality and morbidity. Late-term pregnancies have been linked to fetal risks, including macrosomia, shoulder dystocia, and perinatal asphyxia, while maternal risks encompass prolonged labor, uterine rupture, and PPH.[4] These complications underline the importance of evidence-based decision-making in managing pregnancies that exceed the 40-week threshold.

Recent studies have highlighted the potential benefits of early induction policies to mitigate risks associated with prolonged pregnancies. However, debates persist regarding the timing of induction and its effects on caesarean section rates and other maternal outcomes.[5] This retrospective study aims to contribute to this ongoing discourse by examining fetomaternal outcomes in pregnancies extending beyond 40 weeks. By analyzing outcomes in a specific population, this research seeks to inform clinical guidelines and optimize the management of late-term and post-term pregnancies.

The findings of this study will provide valuable insights into the risks and benefits associated with continuing pregnancies beyond 40 weeks and offer evidence to guide obstetricians in tailoring care to improve both maternal and neonatal outcomes.

Aim

Aim was to describe the incidence, management, associated maternal complications, perinatal morbidity and mortality in pregnancies that have crossed the expected date of pregnancy

METHODS

Study design and setting

This retrospective observational study was conducted at the department of obstetrics and gynecology, Chettinad health and research institute (CHRI). The study included all women diagnosed with postdated pregnancy who delivered at CHRI between January 1, 2023, and December 31, 2023.

Study participants

We included women aged 18-45 years with a gestational age of more than 40 completed weeks, regardless of parity or comorbidities. Exclusion criteria were teenage pregnancies (ages 13-17 years), elderly gravidas (older than 45 years), past caesarean sections, breech or transverse lie presentations, and women who delivered in other facilities or en route but were referred to CHRI for postdelivery management.

Data collection

Medical records were reviewed to extract demographic details, obstetric history, perinatal management details, maternal and neonatal outcomes, and complications. The data collection process involved the use of a structured proforma to ensure uniformity and completeness.

At CHRI, pregnant women who had not experienced spontaneous onset of labor by 41 weeks of gestation were admitted for elective induction of labor following institutional protocol. On admission, per vaginal examinations were performed to assess the cervix, calculate the Bishop score, and cardiotocography (CTG) was conducted to confirm fetal well-being. The patients were counseled about the indications, procedures, and risks of labor induction, and written informed consent was obtained.

Following methods were employed for induction of labor.

Membrane stripping: Used for cervical ripening when the Bishop score was ≤6.

Intracervical Foley's catheter: Inserted for mechanical dilation of the cervix.

Prostaglandin E2 (Misoprostol): Administered vaginally (25 mcg every 4 hours) for intact membranes. Administered orally if the membranes were ruptured. A maximum of six doses were allowed if the cervix remained unfavourable.

Oxytocin infusion: Used for labor induction when the Bishop score was ≥7 or for augmentation of labor if uterine contractions were inadequate.

Once cervical ripening was adequate and uterine contractions were documented, cervical ripening interventions were discontinued. Labor progression was closely monitored and augmented with oxytocin infusion when necessary.

Data analysis

Statistical analysis was conducted using SPSS version 25.0 to evaluate collected data comprehensively. Descriptive statistics summarized continuous variables, such as maternal age, gestational age, and birth weight, using mean and SD or median and interquartile range (IQR), depending on data distribution. Categorical variables, including mode of delivery and maternal and neonatal complications, were expressed as frequencies and percentages. Comparative analysis was performed using

independent t-tests or ANOVA for continuous variables and Chi-square/Fisher's exact tests for categorical variables. Non-parametric tests, such as Mann-Whitney U and Kruskal-Wallis tests, were applied for non-normally distributed data. Logistic regression models assessed predictors of adverse outcomes, adjusting for confounders such as maternal age, parity, and comorbidities. Correlations between variables, such as Bishop scores and induction outcomes, were evaluated using Pearson/Spearman correlation coefficients. Statistical significance set at $p<0.05$, and 95% CI were reported to ensure precision. Sensitivity analyses were conducted to validate results, particularly in smaller subgroups.

RESULTS

A total of 300 women were included in study, all of whom delivered after 40 completed weeks of gestation. The mean maternal age was 29.5±4.8 years, with 60% of participants aged between 25 and 35 years. Nulliparous women accounted for 55% (165) of population, while multiparous women made up 45% (135). Average gestational age at delivery was 41.2±0.8 weeks, with 75% (225) delivering between 40+0 and 41+6 weeks (late-term) and 25% (75) delivering at/beyond 42 weeks (post-term) (Table 1).

Spontaneous vaginal delivery occurred in 50% (150) of cases, instrumental vaginal delivery (forceps or vacuum) in 10% (30), and caesarean section in 40% (120). The primary indications for caesarean delivery were fetal distress (40% of caesarean cases [48 women]), failure to progress (30% [36]), and cephalopelvic disproportion (20% [24]). Cesarean delivery rates were significantly higher in the post-term group (55%) compared to the late-term group (35%, p=0.02) (Table 2).

Maternal complications were observed in 30% (90) of women. The most common complication was PPH, affecting 15% (45) of the total population, followed by third-degree perineal tears in 10% (30) and uterine rupture in 5% (15). Women in post-term group had significantly higher rates of complications (40% vs. 25%, $p<0.01$). Labor induction was required in 65% (195) of participants, with membrane stripping (30% [90]) and prostaglandin E2 (50% [150]) being the most commonly used methods (Table 3).

The mean birth weight of neonates was 3.4±0.6 kg, with 20% (60) classified as macrosomic (>4 kg). Apgar scores at 1 minute were <7 in 12% (36) of neonates, and at 5 minutes in 4% (12). 18% (54) of neonates required admission to the NICU, primarily for respiratory distress syndrome (50% of NICU admissions [27]) and meconium aspiration syndrome (30% [16]). Meconium-stained amniotic fluid was documented in 25% (75) of cases, with a higher incidence in post-term pregnancies (40% vs. 20%, p=0.01) (Table 4).

Stillbirths occurred in 1.5% (5 cases), all of which were in the post-term group. Neonatal morbidity, including shoulder dystocia (10% [30]) and jaundice requiring phototherapy (15% [45]), was significantly higher in post-term pregnancies ($p<0.01$).

Labor induced in 65% (195) of participants. Successful vaginal delivery achieved in 70% (136) of induced cases, while remaining 30% (59) required caesarean delivery. Women with Bishop score >7 at admission had a higher rate of successful vaginal delivery (85%) compared to those with a score ≤6 (50%, $p<0.01$). Mean duration of labor 10.5±2.3 hours, with no significant difference between late-term and post-term groups (Table 5).

Maternal and neonatal outcomes differed significantly between 2 groups: Cesarean delivery rates were 35% in the late-term group versus 55% in post-term group ($p<0.01$). NICU admissions were 15% in late-term group compared to 30% in post-term group (p=0.02). Macrosomia observed in 15% of late-term pregnancies versus 30% of post-term pregnancies ($p<0.01$).

Table 1: Demographic and clinical characteristics.

Characteristics	Total, (n=300)	Late-term, (n=225)	Post-term, (n=75)	P value
Mean maternal age (in years)	29.5±4.8	29.3±4.6	30.2±5.1	0.15
Nulliparous	55% (165)	52% (117)	64% (48)	0.05
Mean gestational age (weeks)	41.2±0.8	40.8±0.4	42.4±0.2	<0.01

Table 2: Mode of delivery.

Mode of delivery	Total, (n=300)	Late-term, (n=225)	Post-term, (n=75)	P value
Spontaneous vaginal	50% (150)	55% (124)	34% (26)	<0.01
Instrumental vaginal	10% (30)	10% (22)	11% (8)	0.80
Cesarean section	40% (120)	35% (79)	55% (41)	<0.01

Table 3: Maternal outcomes.

Outcome	Total, (n=300)	Late-term, (n=225)	Post-term, (n=75)	P value
PPH	15% (45)	12% (27)	24% (18)	0.02
Perineal tears	10% (30)	8% (18)	16% (12)	0.04
Uterine rupture	5% (15)	3% (7)	11% (8)	0.01

Table 4: Neonatal outcomes.

Outcome	Total, (n=300)	Late-term, (n=225)	Post-term, (n=75)	P value
Mean birth weight (kg)	3.4±0.6	3.3±0.5	3.6±0.7	<0.01
Macrosomia	20% (60)	15% (34)	30% (26)	<0.01
Apgar score <7 at 1 min	12% (36)	10% (23)	17% (13)	0.08
NICU admission	18% (54)	15% (34)	27% (20)	0.02

Table 5: Perinatal Complications.

Complication	Total, (n=300)	Late-term, (n=225)	Post-term, (n=75)	P value
Stillbirths	1.5% (5)	0% (0)	7% (5)	<0.01
Shoulder dystocia	10% (30)	8% (18)	16% (12)	0.04
Meconium-stained amniotic fluid	25% (75)	20% (45)	40% (30)	0.01
Neonatal jaundice	15% (45)	12% (27)	24% (18)	0.02

Table 5: Induction and labor outcomes.

Outcome	Total, (n=300)	Late-term, (n=225)	Post-term, (n=75)	P value
Induction of labor	65% (195)	60% (135)	80% (60)	<0.01
Successful vaginal delivery	70% (136)	75% (101)	58% (35)	<0.01
Mean labor duration (hours)	10.5±2.3	10.3±2.2	11.0±2.5	0.10

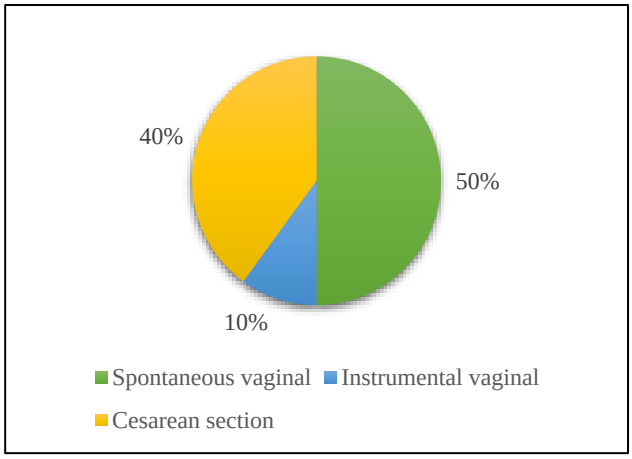

Figure 1: Mode of delivery.

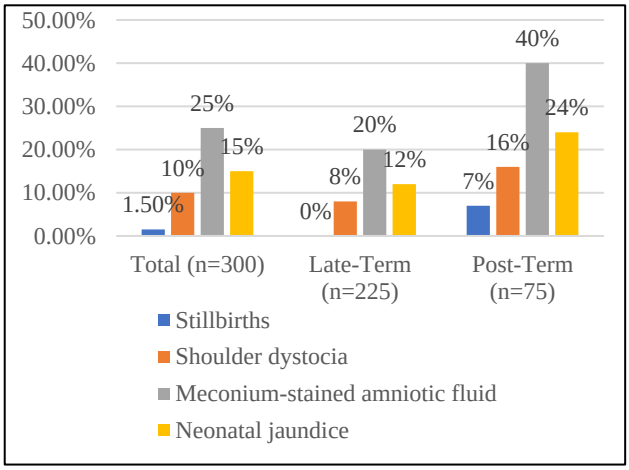

Figure 2: Neonatal complications.

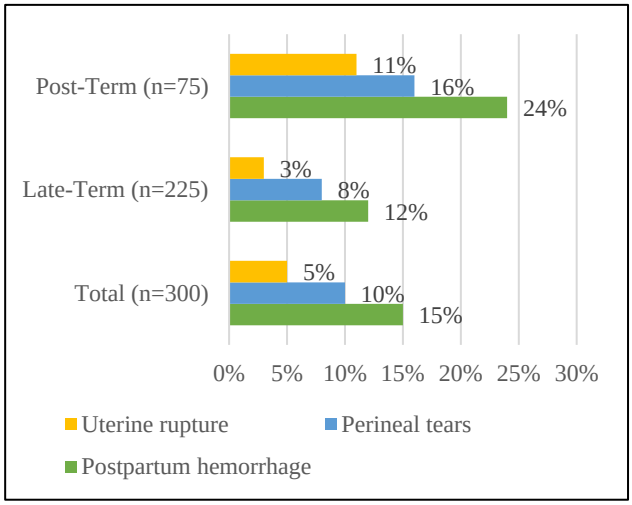

Figure 3: Maternal outcomes.

DISCUSSION

This study evaluated the fetomaternal outcomes of pregnancies extending beyond 40 weeks, comparing late-term (40–41+6 weeks) and post-term (≥42 weeks) pregnancies. The findings highlight the significant maternal and neonatal risks associated with prolonged pregnancies, aligning with existing literature and contributing to evidence-based strategies for optimal management.

The study revealed that maternal complications such as PPH, perineal tears, and uterine rupture were significantly higher in post-term pregnancies. A systematic review by Wennerholm et al similarly reported increased risks of maternal morbidity, including PPH and operative interventions, in post-term pregnancies.[6] The higher caesarean delivery rates observed in the post-term group

(55% vs. 35% in late-term) are consistent with findings from Caughey et al who identified increased caesarean rates in pregnancies beyond 41 weeks due to factors such as failed labor induction and macrosomia.[7] Other studies, including a large cohort analysis by Reddy et al emphasized the importance of gestational age in maternal outcomes, reporting that risks of labor dystocia, uterine rupture, and PPH escalate progressively after 40 weeks.[8] This highlights the need for individualized labor management strategies to minimize complications in prolonged pregnancies.

Neonates born in the post-term group exhibited higher risks of adverse outcomes, including macrosomia, NICU admissions, and meconium-stained amniotic fluid. Similar trends were reported by Heimstad et al where post-term pregnancies were associated with a twofold increase in macrosomia and perinatal morbidity.[9] Our findings of higher NICU admission rates (27% vs. 15% in late-term pregnancies) align with research by Smith et al which attributed increased NICU admissions in post-term pregnancies to complications such as neonatal asphyxia, respiratory distress, and infections.[10] A landmark study by Dekker et al compared outcomes between labor induction at 41 weeks and expectant management beyond 41 weeks.[11] They found a lower risk of perinatal morbidity in the induction group, suggesting that timely labor induction could mitigate complications. Similarly, the ARRIVE trial demonstrated improved neonatal outcomes with elective induction at 39-40 weeks, showing the role of active management in reducing risks associated with advancing gestational age.[12]

The stillbirth rate in the post-term group (7% vs. 0% in late-term pregnancies) reflects the well-documented association between prolonged pregnancies and increased perinatal mortality. Studies by Zhang et al and Morken et al reported a gradual rise in stillbirth risk after 41 weeks, with the risk doubling at 42 weeks.[13,14] This is likely attributable to placental aging and reduced fetal oxygenation, emphasizing the importance of close fetal surveillance and timely delivery in post-term pregnancies.

The significantly higher caesarean delivery rate in the post-term group aligns with findings by Bailit et al who reported increased operative deliveries due to fetal distress, macrosomia, and labor dystocia in prolonged pregnancies.[15] Our study also found that labor induction success was strongly associated with a favorable Bishop score, a finding supported by Bishop et al who demonstrated the importance of cervical readiness in determining induction outcomes.[16] Our findings are consistent with a meta-analysis by Stock et al which found that induction of labor at 41 weeks reduced caesarean rates and perinatal morbidity compared to expectant management.[17] Similarly, Keulen et al demonstrated that active management strategies, including induction, improved maternal and neonatal outcomes in prolonged pregnancies without significantly increasing caesarean rates.[18]

Heimstad et al conducted a randomized controlled trial comparing induction at 41 weeks to expectant management and found a significant reduction in neonatal morbidity and mortality in the induction group.[9] This supports our observation that proactive labor management reduces risks in post-term pregnancies. Additionally, a retrospective cohort study by Boulvain et al highlighted the risks of meconium aspiration syndrome and perinatal asphyxia in post-term pregnancies, findings that align closely with our results.[2]

The study highlights the need for tailored management strategies in prolonged pregnancies. Frequent antenatal monitoring, including biophysical profiles and Doppler studies, is critical for identifying fetuses at risk. Timely labor induction, especially at 41 weeks, may help reduce complications, as supported by the findings of this study and corroborated by other research. Counselling patients about the risks of prolonged pregnancies and involving them in shared decision-making are essential for optimizing outcomes.

A key strength of this study is the detailed comparison of maternal and neonatal outcomes across gestational age groups, supported by a structured analysis of medical records. However, its retrospective design introduces limitations, including potential biases in documentation and lack of randomization. Additionally, the study's single-center setting may limit its generalizability. Future multicenter prospective studies are warranted to validate these findings and refine management guidelines for prolonged pregnancies. This study demonstrates that post-term pregnancies are associated with significantly higher maternal and neonatal risks compared to late-term pregnancies. These findings align with existing literature, emphasizing the importance of proactive management, including timely induction and enhanced surveillance, to mitigate complications in prolonged pregnancies. The results contribute valuable evidence to inform clinical guidelines and improve fetomaternal outcomes in this high-risk population.

CONCLUSION

This study highlights the increased maternal and neonatal risks associated with pregnancies extending beyond 40 weeks, particularly in post-term pregnancies (≥42 weeks). The findings demonstrate that post-term pregnancies are significantly associated with higher rates of complications, including postpartum hemorrhage, caesarean delivery, macrosomia, NICU admissions, and stillbirths, compared to late-term pregnancies (40–41+6 weeks). Labor induction was a common intervention, with better outcomes observed in women with a favourable Bishop score, emphasising the importance of cervical readiness in determining successful delivery outcomes. The study emphasizes the critical need for timely and proactive management strategies, including regular antenatal surveillance and appropriate labor induction, to mitigate risks in prolonged pregnancies. Counselling pregnant

women on the potential complications of delayed delivery and involving them in shared decision-making can further optimize outcomes. While this retrospective study provides valuable insights, further prospective multicenter research is necessary to validate these findings and refine clinical guidelines. This evidence reinforces the importance of individualized care to ensure the safety of both mothers and neonates, particularly as gestational age advances.

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