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Original Research Article

## Analysis of maternal and foetal outcome of post-dated pregnancy in a tertiary care centre

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### ABSTRACT

**Background:** Managing pregnancy with post-dates is becoming a challenging issue due to increasing fetal morbidity and mortality. The study aimed to analyse the maternal and fetal outcomes of post-term pregnancies among Indian women, considering their earlier fetal maturation. Conducted over 18 months with 100 cases, the prospective observational study focused on pregnant mothers at or beyond 40 weeks gestational age, excluding those with certain medical complications.

**Methods:** After obtaining approval from the ethics committee and informed consent from eligible participants, detailed histories and examinations were conducted, with close monitoring until delivery and postnatal care. Inclusive criteria encompassed singleton pregnancies with cephalic presentation, while exclusions included non-cephalic presentation, congenital anomalies, and various medical complications.

**Results:** Revealed a predominance of primigravida women aged 20 to 35 years at 40 to 40 weeks and 6 days gestation. Spontaneous delivery occurred in 58%, with 90% delivering vaginally, while all multigravida births were vaginal post-induction. Cesarean sections were performed in 14%, primarily due to failed induction followed by fetal distress. Meconium-stained liquor was most prevalent at 42 weeks or later, correlating with higher perinatal mortality and NICU admissions in infants born beyond 42 weeks.

**Conclusions:** Vigilant monitoring proved crucial in averting fetal jeopardy, emphasizing the importance of timely interventions to mitigate complications associated with post-term pregnancies. This study sheds light on the unique considerations and outcomes of post-dated pregnancies in the Indian population, contributing valuable insights for maternal and neonatal care in similar settings.

**Keywords:** Post term gestation, Fetal distress, Meconium stained liquor, Perinatal mortality

### INTRODUCTION

The post term pregnancy is continuation of pregnancy beyond 42 completed weeks i.e. more than 294 days ACOG).<sup>1</sup> The incidence is between 4% to 14%. Pregnancies between 41 1/7 and 41 6/7 weeks, although in the 42<sup>nd</sup> week, do not complete 42 weeks until the seventh day has elapsed. The purpose of study is to analyse maternal and fetal outcome of post-dated pregnant

mothers, as well as to assess the incidence of spontaneous labour, induction and caesarean rate and also to know the perinatal outcome.

### Epidemiology

According to Galal study the incidence of post-term pregnancy is 7%.<sup>2</sup> But the incidence of post-dated pregnancy is decreasing trend nowadays due to accurate estimation of period of gestation and early dating scan.

Incidence beyond 41 weeks 8 to 10%, beyond 42 weeks 6 to 8% in western countries. But in India it is only about 2-3%. The syndrome of post maturity incidence is 18 to 22%.

### **Aetiology**

In the vast majority of cases, the actual reason for a post-dated pregnancy is unknown. The most common cause for post-dated pregnancy is inaccurate gestational age estimation and both maternal and fetal factors play a major role and also paternal, placental factors. Maternal causes: The previous history of post-dated pregnancy is the most consistent risk factor. Previous 1 post term birth increases in risk by 2-fold and previous 2 post term birth 4-fold increases. Maternal age, ethnicity, primigravida, low socioeconomic status, maternal weight gain, obesity, smoking, monozygotic twins also have predisposition for post-dated pregnancy. Rate of post-dated pregnancy will be reduced from 20 to 14% if the paternity changes for 1st pregnancy and 2<sup>nd</sup> pregnancy. Fetal causes include anencephaly and adrenal hypoplasia. Delayed in initiation of labour in adrenal hypoplasia due to decrease in amount of steroid production which is one of the precursors for initiation of labor process. Placental cause due to placental sulphatase deficiency activity leads to decrease in estriol production. It is one of the x-linked recessive disorder and there is delay in initiation of spontaneous labour.

### **Pathophysiology**

The regular parturition mechanism should be understood to comprehend the mechanism of post-dated pregnancy. The placental production of corticotrophin-releasing hormone peaks during childbirth. It leads to increase DHEAS from the fetal adrenals. This increase in estriol production which leads to initiation of labor. The myometrium is rendered more response to hormonal change by placenta in term. It causes uterine contractions with a high frequency and high amplitude. Cervix undergo metabolic changes.

Post maturity syndrome is due to imbalance between the nutrients between placenta and the fetus. Impairment of placental function → impairment of transfer of oxygen to the fetus → fibrin deposits and calcification occur as the number of capillaries and intervillous space diminishes → hypoxia, acidosis → placental blood flow decrease → renal blood flow decrease → renal perfusion decrease → fetal urine output decrease → oligohydramnios.<sup>3</sup>

Complications of post-dated pregnancy: Maternal complications include labor dystocia, perineal laceration, postpartum haemorrhage, instrumental delivery, caesarean section, parental anxiety, fetal complications include placental insufficiency, oligohydramnios, meconium passage, fetal distress, birth injuries, post maturity syndrome.

Pathophysiology of foetal complications: Placental blood flow decrease (placental insufficiency) → renal blood flow

decrease → renal perfusion decrease → fetal urine output decrease → oligohydramnios → umbilical cord compression → presence of variable deceleration → stimulation of vagal reflex → passage of meconium → meconium aspiration syndrome. In Macrosomia Suboptimal placental function continues → fetal macrosomia and decreased moulding → prolonged labor → instrumental delivery or cesarean section.

Management includes antepartum surveillance and induction of labor. Unfortunately, it is always not possible to predict the foetus that become distressed in early labor with currently used methods of (Eden 1989) surveillance. According to Hannah et al study, in uncomplicated post-term pregnancy, induction of labor at 41 weeks is better to expectant management.<sup>4-6</sup>

Contraction stress test (CST) is used infrequently. Negative CST: long term variability is absent, short-term variability is decreased, but there are no decelerations associated with uterine contractions. Positive CST: long and short-term variability are decreased and every uterine contraction is followed by a deceleration of FHR. Non stress test (NST) is a simple, non-invasive, inexpensive, and easy to interpret. In recent years, most commonly used method of antepartum fetal testing in post-dated pregnancy is NST. But this test alone is inadequate to exclude acute asphyxiating events.<sup>7-9</sup>

### **Biophysical profile (BPP)**

The most precise meant for predicting the fetal hypoxemia USG observation for 30 minutes for following parameters.<sup>10</sup> Components (each variable is given a score of 2-normal) score of 0-abnormal. Foetal breathing, tone, movement, amniotic fluid index (AFI). Modified Biophysical profile (1992)-manning consists of NST and ultrasonically determined AFI. Modified BPP is considered abnormal (non-reassuring) when NST is non-reactive and /or AFI <5. An abnormal score of ≤4 is associated with foetal acidemia. Abnormal Biophysical profile is associated with high risk of stillbirth and perinatal mortality. The false-negative rate of a normal BPP is 0.1%. Acoustic stimulation test-auditory source is placed over the maternal abdomen where burst of short sound is delivered (1-2 seconds) which indicates intact central nervous system and somato motor sensory pathway.<sup>11</sup> Absence of accelerations indicates fetal hypoxia or acidosis. Doppler-waveform ultrasound studies-A Doppler-waveform study of umbilical and uterine arteries has been added little to predict perinatal morbidity.<sup>12</sup> Middle cerebral artery Doppler changes in fetal hypoxia leads to decrease flow to brain and diastolic flow increases, leads to brain sparing effect. It is not used as routine in post-dated pregnancy. Umbilical artery Doppler changes not benefited much in post-dated pregnancy but useful in IUGR fetus. Fetal movement chart: The biophysical activities of fetus are modulated, initiated and regulated through fetal central nervous system. Foetal CNS system is very much sensitive to

hypoxia. Hence maternal perception of fetal-biophysical activity is monitored as screening test prior to fetal monitoring techniques. A widely used method is “Cardiff” count of 10 fetal movement count. Cardiff count 10 formula in which patient counts fetal movements starting at 9 am to 9 pm. The counting comes to an end as soon as 10 movements are perceived. Patient is instructed to report the physician if <10 movements occur during 12 hours on 2 successive days or no movement is perceived even after 12 hours in a single day. Daily fetal movement count (DFMC)-3 counts in each hour (morning, noon and evening) are recommended. The total counts multiplied by 4 gives daily (12 hour) fetal movement count. If there is diminution of a number of kicks to <10 in 12 hours (less than 3 in each hour), indicates fetal compromise.

### ***Ultrasonography***

First trimester dating scan reduces the majority of unnecessary intervention, by correctly predicting the gestational age. The normal physiological variation in follicular phase of menstrual cycle leads to overestimation of gestational age this leads to unnecessary intervention. Measurement of liquor amount when single deep vertical pocket (DVP) <2 cm-oligohydramnios. But instead of single vertical pocket AFI is the best predictor of oligohydramnios. USG is also one of the components of biophysical profile for foetal well-being.

To induce or not? according to literature, one major question was to induce or conservative management could give better maternal and fetal outcomes. In 1990, Roussis and colleagues analysed members of society for maternal-fetal medicine and found that if cervix was favourable, around 2/3<sup>rd</sup> of pregnant women can be induced at 41 weeks, at 41 weeks antepartum fetal testing was advocated when cervix was unfavourable as indicated by Bishop score. At 42 weeks irrespective of Bishop score all respondents induced labor. Hence, inducibility of cervix has considerable impact on management of post-term pregnancy.

Counselling-attitude of 500 pregnant women at term in recent prospective study were examined for proposal of conservative management of prolonged pregnancy.<sup>13</sup> But, most of the pregnant women were not willing to accept the conservative management. Hence, informed consent should be taken for either mode of the management.

If Bishop score is <4-6, risk of unsuccessful induction and subsequent operative interventions like caesarean delivery may exceed 50%.<sup>14</sup> Maternal-fetal medicine unit network of national institute of child health and human development (1994) found that PGE2 gel was not more effective than placebo. But in some studies, it was concluded that PGE2 gel more efficacious for cervical ripening in post-term pregnant women. According to ACOG (1997) PGE2 gel can be safely used in post-term pregnancies.

### ***Induction versus expectant management***

Canadian multicentric post-term pregnancy trial (CMPPT) is largest individual RCT to date comparing labour induction at 41 weeks gestational age with expectant management. They concluded that women in induced group at 41 weeks had a lower rate of caesarean delivery for foetal distress than those allocated to expectant management. No difference was found in perinatal mortality rates.

When to intervene? There is limited evidence to substantiate intervention starting at 41 weeks vs 42 weeks. Some studies reported routine induction of labour should be commenced after 41 weeks. But, in parkland hospital, their studies reported that no need of interventions until completion of 42 weeks gestational age. In Singal et al study, labour induction is reserved for pregnant mothers where postdatism is >10 days by LMP irrespective of gestational age by ultrasound.<sup>15</sup> And also, systemic review of randomized trials has concluded that labour induction at 41 weeks lowers rate of caesarean delivery without compromising perinatal outcomes.

### ***Intrapartum management***

Due to increased risk of perinatal morbidity and mortality, the foetus must be monitored carefully during labour. In labour, early artificial rupture of membranes is suggested to check for meconium. It helps in identifying thick meconium. Electronic foetal monitoring is recommended for all post-term pregnancies. In case of non-reassuring foetal heart patterns delivery should be expedited depending on the stage of labour.

### ***Aim***

The purpose of study is to analyze maternal and fetal outcome of post-dated pregnant mothers, as well as to assess the spontaneous labor rate, induction rate, caesarean rate, and to know the perinatal outcome.

## **METHODS**

### ***Study design***

It is a prospective observational study.

### ***Study place***

Study carried out at government general hospital, Kakinada.

### ***Study period***

Study conducted for 18 months from July 2022 to December 2023 with sample size of 100 cases.

Source of study sample includes selection of pregnant mothers of both primi and multigravida >40 weeks

gestational age admitted to government general hospital, Kakinada for safe confinement. After approval of the study protocol by ethics committee, written informed consent was taken from antenatal women attending obstetrics and gynaecology department, in GGH hospital, Kakinada those who fulfilled inclusion and exclusion criteria.

**Methodology**

All pregnant women crossing 40 weeks gestational age admitted in hospital selected based on inclusion and exclusion criteria. After taking informed consent, reassuring patients and their relatives regarding confidentiality, detailed history and examination was done to patients and close observation till delivery and postnatal period. The data was collected as per proforma and documented and analysed.

**Inclusive criteria**

Pregnant women >than 40 weeks gestational age (not using any of the contraceptive pills for past three months), her last 3 menstrual periods regular, not conceived during lactational amenorrhoea, singleton pregnancy and cephalic presentation were included in study.

**Exclusive criteria**

Non cephalic presentation of the fetus, congenital anomalies of the fetus, pregnancies complicated by placenta previa and abruption placenta, Rh negative complicating pregnancy, twin pregnancy, medical disorders complicating pregnancy like cardiac disease, renal disease, preeclampsia, and gestational diabetes mellitus and previous caesarean delivery were excluded.

SPSS for Windows, version 16.0 (SPSS Inc, 1999, New York) (Statistical presentation system software), and Minitab, version 11.0 for Windows, were used for all statistical computations.

**RESULTS**

In the study group majority of pregnant mothers in study group were between age group 20-35 years i.e.74%, 69% of women of study sample were in the 40-40-week 6 days group, 24% in the 41-41 weeks 6 days group, and 7% in ≥42 weeks. In relation to parity 75% were primigravida and 25% were multigravida as shown in Table 1.

**Table 1: Parity distribution.**

Gestational age (in weeks)	Primi, n (%)	Multi, n (%)	Total
40-40 and 6 days	49 (71.1)	20 (28.9)	69
41-41 and 6 days	20 (83.4)	4 (16.6)	24
≥42	6 (85.7)	1 (14.3)	7
<b>Total</b>	<b>75</b>	<b>25</b>	<b>100</b>

**Table 2: Spontaneous onset of labor and vaginal delivery.**

Gestational age (in weeks)	Parity	Spontaneous labor, n (%)	Vaginal delivery, n (%)
40-40 and 6 days	Primi	29 (44.6)	25 (86)
	Multi	14 (21.5)	14 (100)
41-41 and 6 days	Primi	16 (24.6)	14 (87.5)
	Multi	2 (3)	2 (100)
≥42	Primi	4 (6)	3 (75)
	Multi	0 (0)	0 (0)
<b>Total</b>		<b>6 (3)</b>	<b>58 (92)</b>

**Table 3: Vaginal delivery after induction.**

Gestational age (in weeks)	Parity	Induced labour, n (%)	Delivered vaginally, n (%)
40-40 6 days	Primi	22 (59.4)	13 (59.09)
	Multi	6 (16.2)	6 (100)
41-41 and 6 days	Primi	4 (10.8)	4 (100)
	Multi	2 (5.4)	2 (100)
≥42	Primi	2 (5.4)	2 (100)
	Multi	1 (2.7)	1 (100)
<b>Total</b>		<b>37</b>	<b>28 (75.6)</b>

The delivery rate in induced women is 75.6%. It is 67.8% in 40-40 week 6 days, 100% in 41-41 weeks 6 days group and 100% in ≥42 weeks group. 100% of multigravida were delivered vaginally after induction in this study.

Induction with misoprostol, dinoprostone gel and oxytocin showed the rate of success was almost same. The rate of caesarean section in this study at >40 weeks gestational age is 14% and all were primi gravida. Failed induction was, the leading (50%) among indications of caesarean section. Foetal distress is the next most common indication after failed induction for caesarean section.

**Table 4: Bishop score.**

Gravida	Gestational age (in weeks)	Bishop score, n (%)		
		≤4	5-6	>6
<b>Primi, n=75</b>	40-40 and 6 days, n=49	31 (63.2)	16 (32.6)	2 (4)
	40-40 and 6 days, n=20	13 (65)	5 (25)	2 (10)
	≥42, n=6	3 (50)	3 (50)	0
<b>Multi, n=25</b>	40-40 and 6 days, n=20	4 (20)	10 (50)	6 (30)
	41-41 and 6 days, n=4	1 (25)	2 (50)	1 (25)
	≥42, n=1	0	1 (100)	0

In primigravida, 63.2% had Bishop score  $\leq 4$ , 32.6% had score of 5-6 and 4% had  $>6$  score. Among multigravida, 20% had Bishop score  $\leq 4$ , 50% had Bishop score 5-6 and 30% had  $>6$  score.

In total, 19 patients had instrumental delivery (either vacuum or forceps), 18.8% of women in gestational age group of 40-40 weeks 6 days underwent instrumental delivery, 20% of women in the group 41-41 weeks 6 days had instrumental delivery, 14% women with gestational age  $\geq 42$  week had instrumental delivery.

**Table 5: Incidence of meconium-stained liquor.**

Period of gestation (in weeks)	Grade	N (%)
40-40 and 6 days, n=69	Thin	13 (18.8)
	Thick	7 (10)
41-41 and 6 days, n=24	Thin	6 (25)
	Thick	4 (16.6)
$>42$ , n=7	Thin	1 (14.2)
	Thick	3 (42.8)

In our study, highest incidence of meconium-stained liquor was found in  $\geq 42$  weeks i.e., 57%. And most of babies born between 2.5-3.5 kg in all 3 groups of gestational age. In this study, 87% of newborns had APGAR $>7$  at first minute, and in remaining 91% of newborns had APGAR $>7$  at 5<sup>th</sup> min. Babies born after  $>42$  weeks had highest perinatal mortality and highest rate of NICU admissions.

**DISCUSSION**

Accurate estimation of gestational age and EDD is important for successful pregnancy outcome. If pregnancy goes beyond the expected date of delivery, it is a big challenge for obstetrician to decide when to deliver the baby. It causes big anguish for the pregnant couple and their relatives because both maternal and fetal morbidity increase once pregnancy goes beyond the dates. Currently, ACOG.<sup>14</sup> Advises induction at 42 weeks gestational age in women with a favorable cervix and cervical ripening and fetal monitoring in women with an unfavorable cervix but acknowledges that, the care of patients beyond or completed 40 weeks gestational age is unclear.

According to various studies, postdated pregnancy incidence depends upon the study group and population. Incidence and prevalence vary for different ethnic groups. Out of 100 women of the study group, according to above Table 1, 69% belong to 40 weeks group, 24% belongs to 41 weeks group, 7% belongs to  $>42$  weeks, 74% of pregnant women were between 20-35 years age and 75% of them were primigravida 25% were multigravida. Many authors analyzed that postdated pregnancy was found mainly in primigravidae.<sup>1</sup>

Among the study sample of 100 pregnant women, 63% of pregnant women underwent spontaneous labor and 37%

were induced. Table 4 represents 58% of women who underwent spontaneous vaginal delivery, 28% of women who delivered vaginally after induction, and 14% underwent caesarean section.

**Table 6: Spontaneous labor versus induction rate.**

Authors	Spontaneous labor	Induction
Singal <sup>15</sup>	54%	46%
Present study	63%	37%

Among 150 postdated pregnant women, according to Singal study, spontaneous labour had been established in 54% of women, and induction was kept for 46% of patients. The rate of vaginal delivery in women who underwent spontaneous labour was 92% and 75.6% in the induced group. This was approximately similar to Singal study, where rate of vaginal delivery was 91.4% in spontaneous labour group and 74% in induction group. According to the systematic meta-analysis of RCT, reduction of caesarean delivery rate when labour induction done at 41 weeks.<sup>15,16</sup>

There are different modes of induction i.e., misoprostol, dinoprostone gel, and oxytocin. The most commonly used method of induction was misoprostol followed by PGE2 gel. These two exhibit almost similar success rates. Rate of caesarean delivery was very less in PGE2 group (18%) than oxytocin group (45%) according to Behra et al study.<sup>17</sup>

At or beyond 42 weeks, unfavourable cervix (poor BISHOP score) will be seen in the majority of cases according to Harris study. The overall caesarean rate in our study of post-dated pregnancy is 14%. In that, most common-indication for caesarean was failed induction which accounts for 50%. Other indications were foetal distress-36%, cephalo-pelvic disproportion (CPD) 7%, deep transverse arrest (DTA) 7%.<sup>13</sup>

According to Hannah Canadian randomized trial for 3407 post-term pregnancies, they reported that in contrast to many obstetricians' belief, labour induction did not increase rate of caesarean delivery. Caesarean rate was lower (21.2%) in induction group. But rate of caesarean mode of delivery was more in post-dated women who are managed expectantly regardless of baseline Bishop score. The incidence of meconium-stained liquor increases as gestational age advances.<sup>18</sup>

This is not specific indicator of foetal hypoxia but there is good evidence that cord arterial blood pH is lower in babies who show FHR abnormalities with MSAF than FHR abnormalities with clear liquor.

The birth weight of newborn babies. 89% of women had their babies weighing between 2.5-3.5 kg in post-term pregnancies.

The perinatal morbidity and mortality in terms of APGAR score and admission to NICU was high in our study sample as compared to Alexander et al.<sup>19</sup> NICU admission rate was progressively increasing as gestational age advances. The rate of perinatal mortality was 14.2% in gestational age of >42 weeks.

As reported by Alexander et al labour complications may likely increase with little or no benefit for new born when routine-intervention at 41 weeks was done. This is emphasized by a systematic Meta analysis of 16 RCT trials where induction of labour and expectant management was compared. They confirmed that labour induction in post term pregnancy lowers caesarean delivery rate without compromising perinatal outcome. Hence as perinatal morbidity and mortality are more at or beyond 42 weeks gestational age labor induction should be routinely practiced at 41 weeks of gestation.<sup>19</sup>

### Limitations

It is still inconclusive in post-dated pregnancy whether, to choose expectant management with ante-partum foetal surveillance or to advice labour induction. The right choice of management remains controversial.

### CONCLUSION

Pregnancy beyond or completion of dates or post-dated pregnancy is most frequent clinical problems seen by an obstetrician. According to present study, it seems reasonable to induce labour at 41 weeks gestational age as perinatal morbidity and mortality are significantly more >42 weeks gestational age in our setup. Also, labour induction at 41 weeks has not led to increase in caesarean section. According to ACOG recent guidelines, prolonged pregnancy is nothingbut 42 completed weeks.

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