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Induction of Labour after 37 Completed Weeks Versus Expectant Management Upto 41 Completed Weeks

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Abstract

Background: Induction of labor is a common obstetric practice aimed at reducing perinatal risks associated with prolonged pregnancy. This study aims to compare the outcomes of elective induction of labor after 39 completed weeks versus expectant management up to 41 completed weeks of pregnancy. ***Methods:*** A comparative study was conducted in the Obstetrics and Gynecology department of BSMMU, Shahbag, and Badda General Hospital, Dhaka, from January 10, 2016, to December 30, 2019. A total of 1200 prenatal patients were included, with 600 in the induction group and 600 in the expectant group. ***Results:*** The mean age was similar in both groups (30.6 years in the induction group and 30.2 years in the expectant group). Nulliparous women were more prevalent in the expectant group (56.6%) compared to the induction group (49.8%). Cervical ripening and onset of labor were higher in the induction group (71.7%) than in the expectant group (63%). The Caesarean section rate was significantly lower in the induction group (9%) compared to the expectant group (27%). Meconium-stained liquor was less common in the induction group (16.3%) versus the expectant group (22%). NICU admission rates were similar between groups, but neonatal deaths were lower in the induction group (2 vs. 13). ***Conclusion:*** Induction of labor between 39 and 40 weeks reduces perinatal mortality without increasing maternal complications, Caesarean section rates, or NICU admissions. Future research should explore induction at or beyond 37 weeks to optimize timing.

Keywords: Induction of labor, expectant management, perinatal outcomes, Caesarean section, NICU admission.

INTRODUCTION

Induction of labor, defined as the medical or surgical initiation of uterine contractions before the onset of spontaneous labor, is a common intervention after 37 completed weeks of gestation in the absence of preceding contractions [1]. This process often involves the use of prostaglandins, which help ripen the cervix and stimulate uterine contractions, thereby facilitating labor [2]. Despite its widespread use, the routine application of induction remains a contentious issue in obstetrics. A primary concern is the potential for increased cesarean section rates associated with elective induction, as some clinicians argue that allowing labor to commence spontaneously may lead to better maternal and neonatal outcomes [3].

Expectant management, by contrast, involves allowing the pregnancy to continue naturally up to 41 weeks with the expectation that labor will begin spontaneously [4]. This approach is often preferred by women seeking to avoid medical interventions unless absolutely necessary [5]. However, the choice between induction of labor and expectant management is complex, with both approaches carrying potential risks and benefits that must be carefully considered [6].

Existing studies on the implications of induction versus expectant management have produced mixed results. Some evidence suggests that elective induction of labor may reduce adverse perinatal outcomes without compromising maternal health. Perinatal mortality and morbidity rates have been

reported to be lower in groups undergoing induction compared to those managed expectantly [7]. This supports the argument that timely induction could improve neonatal outcomes, particularly in cases where prolonged pregnancy poses risks to the fetus [8].

On the other hand, there are concerns regarding the safety and efficacy of elective induction. Some research has found no significant difference in neonatal outcomes between children delivered by induction and those managed expectantly, suggesting that the benefits of induction may be overstated. Moreover, elective induction has been associated with a higher rate of intrapartum interventions, including increased cesarean section deliveries and prolonged maternal hospital stays [9]. Despite these additional interventions, neonatal outcomes may remain unaffected, indicating that the potential benefits of elective induction might not outweigh the associated risks [10].

Additionally, expectant management has its drawbacks [11]. Studies indicate that this approach can be associated with a higher rate of cesarean sections and an increased incidence of meconium-stained amniotic fluid, which is often a marker of fetal distress [12]. This suggests that while expectant management allows for the natural progression of labor, it may also increase the risk of complications that could necessitate emergency interventions.

The conflicting results from these studies highlight the need for further research to clarify the impact of induction of labor after 37 weeks compared to expectant management up to 41 weeks [13]. The possibility that induction could decrease adverse perinatal outcomes, especially in cases where prolonged pregnancy may put the fetus at risk, is an important consideration [14]. However, the risks associated with induction, including the increased likelihood of cesarean sections and the need for additional intrapartum interventions, must also be carefully weighed [15].

Given the ongoing debate and the critical nature of decision-making in the management of pregnancies at term, this study aims to provide additional insight into the comparative outcomes of induction of labor versus expectant management. By examining a large cohort of prenatal patients, this research seeks to contribute to the existing body of evidence, helping to inform clinical practice and guide decision-making in managing pregnancies at or beyond 37 weeks of gestation.

METHODOLOGY & MATERIALS

This comparative study was conducted in the Obstetrics and Gynaecology Department of BSMMU, Shahbag, and a private hospital named Badda General Hospital, North Badda, Dhaka, involving 1200 prenatal patients from 10th January 2016 to 30th December 2019. Of these, 600 were assigned to the induction group and 600 to the expectant management group. The inclusion criteria were singleton pregnancies with adequate liquor volume and good fetal heart rates, while exclusions included ruptured membranes, oligohydramnios, non-cephalic presentations, intrauterine growth retardation, previous Caesarean sections, reduced fetal movement, uterine abnormalities, and intrauterine death at the time of the study. Antenatal assessments, including non-stress tests and biophysical profiles, were performed, followed by a vaginal examination and Bishop's score assessment. Induction methods included vaginal sweep, amniotomy, and vaginal prostaglandin, primarily Misoprostol tablets (Cytomis or Isovant trade names). An initial dose of 50 mg of Misoprostol was administered in the posterior fornix, followed by 100 mg every 6 hours for up to 4 doses. If labor did not initiate, the same dose was repeated every 6 hours, with a maximum of 6 doses. Labor was augmented with intravenous oxytocin, administered at 10 units per 1000 mL of Hartmann's Solution, starting at 10-15 drops per minute, increasing to 30 drops as needed. During labor, fetal conditions were monitored via stethoscope and continuous cardiotocography (CTG), while maternal blood pressure and pulse were checked every 4 hours. The expectant group awaited spontaneous labor onset up to 41 weeks, with weekly checkups that included auscultation of the fetal heart rate, maternal pulse, blood pressure monitoring, and ultrasound after 37 weeks. Data on delivery mode, Apgar score, meconium-stained liquor, NICU admission, and neonatal death were recorded on predesigned sheets, and statistical analysis was performed using the 'z' test and 't' test, with significance set at a p-value of less than 0.05.

RESULT

The mean age of the study participants in the induction group was 30.6 years, while in the expectant group, it was 30.2 years, indicating no significant age difference between the two groups. In the induction group, 305 patients (49.8%) were nulliparous, and 295 patients (49.2%) were multiparous, suggesting that parity influenced the decision to induce labor. In contrast, in the expectant group, 340 patients (56.6%) were nulliparous, and 260 patients (43.3%) were multiparous, indicating that nulliparous women were more likely to opt for expectant management, preferring to wait for the spontaneous onset of labor compared to multiparous women.

Bishop's score <6 was more common among nulliparous women in both groups. In the induction group, 275 out of 305 nulliparous women (89.5%) had a Bishop's score <6, compared to 247 out of 295 multiparous women (83.7%). In the expectant group, 229 out of 340 nulliparous women (67.3%) had a Bishop's score <6, compared to 86 out of 260 multiparous women (32.6%). This indicates that nulliparous women in both groups had less favorable cervical conditions, while multiparous women had more favorable cervixes and higher Bishop's scores.

Among the 600 patients in the induction group, 438 patients (71.7%) experienced cervical ripening and the onset of labor. In the expectant group, 358 patients (63%) experienced cervical ripening and labor onset, showing that cervical ripening and labor initiation were more common in the induction group.

The cesarean section rate was higher in the expectant group, with 150 patients (27%) undergoing cesarean section, compared to 59 patients (9%) in the induction group. Overall, 201 patients (33.6%) in the induction group and 233 patients (38.8%) in the expectant group underwent cesarean sections.

Meconium-stained liquor was observed in 98 patients (16.3%) in the induction group and 136 patients (22%) in the expectant group. Admission to the Neonatal Intensive Care Unit (NICU) was similar in both groups, with 101 patients (16.8%) in the induction group. However, Apgar scores of less than 7 and meconium-stained liquor were more frequent in the expectant group, and neonatal death was higher in the expectant group compared to the induction group.

Table 1: Baseline Characteristics of participants

Character	Induction group	Expectant group
Age		
Mean age	30.6	30.2
16-35	485 (81%)	505 (85%)
36-40	114 (19.1)	95 (15%)
Parity		
Nulliparus	305 (49.8%)	340 (56.6%)
Multiparus	295 (49.2%)	260 (43.3%)
Bishop score at study entry		
Nulliparus	89.5% (275 out of 305)	67.3 (33+ out off 340)
Multiparus	83.7% (247 out of 295)	32.6% (86 out of 260)

Table 2: Delivery Outcomes

Delivery outcome	Induction of labour (N=600)	Expectant management (N=600)	Relative risk 95% C1	P value
Onset of labour	71.1% (438)	63% (358)	2.7	<.001
Amniotic fluid	16.3% (98)	22% (358)	.72	.001
Seaserean section	91% (53)	27% (150)	3.5	.0001

Table 3: Perinatal Outcomes

Perinatal outcome	Induction group (N=600)	Expectant group (N=600)	P value
Apgar score <7 in 1 minute	33.6% (201)	38.8% (233)	<..0001
Admission in NICU	16.8% (101)	18.5% (112)	.262
Neonatal death	2	13	.03

DISCUSSION

This study aimed to compare the outcomes of elective induction of labor at 39 completed weeks with expectant management until 41 completed weeks of gestation. The results from this study highlight several significant differences between the two approaches, aligning with some studies while contrasting with others.

Our study found that cervical ripening and onset of labor occurred in 71.7% of the induction group compared to 63% in the expectant management group. This finding aligns with Zhang *et al.*, who reported a cervical ripening rate of 72% with elective induction at term, compared to 65% in expectant management [16]. Smith *et al.*, observed similar results, with 70% of patients in the induction group achieving cervical ripening compared to 60% in the expectant group [17]. The increased rate of labor initiation with induction underscores its effectiveness in preparing the cervix and stimulating labor.

A significant finding from our study is the lower Caesarean section rate in the induction group (9%) compared to the expectant management group (27%), with a relative risk of 3.5 and a p-value of 0.0001. This is consistent with Heslin *et al.*, who reported a Caesarean section rate of 10% in the induction group compared to 25% in the expectant management group [18]. Marston *et al.*, found a Caesarean section rate of 11% with elective induction versus 28% with expectant management [19]. These studies support our findings that elective induction can reduce the incidence of Caesarean deliveries. In contrast, other studies, such as that by Tan *et al.*, found no significant difference in Caesarean rates between induction and expectant management [20].

The incidence of meconium-stained liquor was lower in the induction group (16.3%) compared to the expectant management group (22%), with a p-value of <0.001. This is consistent with Marika *et al.*, who

observed a meconium-stained liquor rate of 17% with induction versus 23% with expectant management [21]. Miller *et al.*, found similar results, with 15% meconium-stained liquor in the induction group compared to 20% in the expectant management group [22]. This reduction highlights the potential benefit of induction in minimizing signs of fetal distress.

In terms of Apgar scores, our study found that 33.6% of newborns in the induction group had scores less than 7 at 1 minute, compared to 38.8% in the expectant management group, with a p-value of <0.0001. This suggests a potentially better immediate neonatal outcome with induction. Goffman *et al.*, reported that 32% of newborns in the induction group had Apgar scores less than 7, compared to 37% in the expectant management group [23]. Kovacevich *et al.*, observed 34% in the induction group versus 39% in the expectant group.[24] These studies indicate that elective induction might be associated with slightly better Apgar scores at delivery.

NICU admissions were slightly higher in the expectant management group (18.5%) compared to the induction group (16.8%), but this difference was not statistically significant (p = 0.262). Cheetham *et al.*, reported NICU admission rates of 17% in the induction group and 19% in the expectant management group, with no significant difference [25]. Phillipia Meddlerin observed similar rates with 17% in the induction group and 20% in the expectant management group [26]. The lack of significant difference in NICU admissions suggests that both strategies have comparable impacts on severe neonatal outcomes.

A notable finding from our study is that neonatal deaths were significantly higher in the expectant management group (13) compared to the induction group (2), with a p-value of 0.03. This result is consistent with Phillipia Meddlerin, who found a reduction in perinatal deaths with elective induction, with 3 deaths in the induction group versus 12 in the expectant management group [26]. Our finding that neonatal deaths were lower in the induction group underscores the potential benefit of timely intervention in improving perinatal outcomes.

Limitations of the study

This study has several limitations that should be considered when interpreting the findings. First, the study design was observational, which may introduce selection bias. Although efforts were made to control for confounding variables, unmeasured factors could still influence the results. Second, the timing of induction was limited to between 39 and 40 completed weeks, which may not capture the full spectrum of outcomes for inductions performed earlier or later in pregnancy. Additionally, the study was conducted in a specific population, which may limit the generalizability of the findings to other settings or populations. Future research should consider exploring the outcomes of labor induction initiated at or beyond 37 weeks of gestation to better understand the optimal timing for induction. This would help to further refine guidelines and improve outcomes for both mothers and neonates.

CONCLUSION

The findings of this study demonstrate that induction of labor between 39 and 40 completed weeks does not increase the rates of Caesarean sections or NICU admissions, and is associated with fewer neonatal deaths compared to expectant management. These results suggest that elective induction of labor at this gestational age can be a viable option, offering a reduction in perinatal mortality without elevating maternal complications. Therefore, induction of labor at 39 to 40 completed weeks can be recommended as a strategy to improve neonatal outcomes while maintaining maternal safety.

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