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## Maternal and Fetal Outcome and Complications of Spontaneous Vs Induced Labour at Term in Primigravida

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### Abstract

**Introduction:** Induction of labour is one of the most common and important obstetric interventions. It is usually indicated when the benefits of delivery of the fetus outweighs the risk of continuing the pregnancy. The incidence varies between and within countries and regions. It is higher in developed countries than in the developing countries due to increasing rate of elective induction.

**Objective:** To compare progression of spontaneous versus induced labor in primigravida women.

**Methods:** A retrospective observational time-based study was conducted between January to June 2022 in the Department of Obstetrics and Gynaecology at Shaheed Tajuddin Ahmad Medical College Hospital, Gazipur, Bangladesh. A total of 100 participants were included in the study. These were divided into 2 groups. Those who had spontaneous onset of labor (50), and those in whom labor was induced (50). Labor progression in both was compared.

**Results:** Total study participants were 100 as per data collected in the age group 18 to 25 yrs., with gestational age 40 0/7 to 40 6/7 weeks. Among these 50 had spontaneous onset of labor and 50 underwent induction of labor. The mean duration of first stage was 6.47hrs in the induced labor group, and 5.93hrs in the spontaneous onset group. The rate of caesarean section was 12.0% in the spontaneous onset of labor group and 34.0% in the induced labor group, (P<0.032).

**Conclusions:** Induction of labor when done at the right gestational age for correct indication is beneficial to women as it reduces the complications caused due to the continuation of high-risk pregnancies.

**Keywords:** Prim gravida, Spontaneous Onset, Induction of Labor

### Introduction

Induction of labour is one of the most common and important obstetric interventions. It is usually indicated when the benefits of delivery of the fetus outweighs the risk of continuing the pregnancy<sup>[1]</sup>. The incidence varies between and within countries and regions. It is higher in developed countries than in the developing countries due to increasing rate of elective induction<sup>[2]</sup>. Labor could either be spontaneous or induced. Spontaneous labor is the physiological process by which the uterus expels the products of conception after period of 28 weeks' gestation spontaneously termed as normal labor. Spontaneous labor is triggered by release of oxytocin and prostaglandin naturally and progressing to labor<sup>[3]</sup>. Induction of labor is the artificial initiation of uterine contractions prior to their spontaneous onset leading to progressive dilatation and effacement of the cervix and delivery of the baby, after 28 weeks of gestation<sup>[4]</sup>. The world has seen steady and significant rise in proportion of cases of induction of labor vis-à-vis spontaneous labor<sup>[5, 6]</sup>. Infact, the overall rate of induction of labor is rising faster than the rate of pregnancy complications that would lead to a medically indicated induction<sup>[5-7]</sup>. Other reasons include greater availability of cervical ripeners, more open attitude towards marginal or elective inductions and undue litigious constraints and considerations at the end of medical practitioners<sup>[5-7]</sup>. However, some studies have suggested a link between elective induction and subsequent interventions such as cesarean delivery<sup>[6]</sup>. The management of post term uncomplicated pregnancies is controversial. Two major approaches have been employed: elective induction of labor at 41-42 weeks, and expectant

management with intermittent fetal monitoring (e.g. cardiotocography, biophysical profile) and selective induction of labor [7]. This study is being undertaken to compare the maternal and fetal outcome in induced labor versus spontaneous onset of labor in a primigravida, beyond 40 weeks gestation in order to help in formulating evidenced based protocol in case of primigravidas in whom pregnancy extends beyond 40 weeks. This study was done to determine how the progression of labor in primigravida and multigravida women who presented with spontaneous labor differed from those who are electively induced, using a world health organization (WHO) modified partograph.

## Methods

A retrospective observational time-based study was conducted between January to June 2022 in the Department of Obstetrics and Gynaecology at Shaheed Tajuddin Ahmad Medical College Hospital, Gazipur, Bangladesh. A total of 100 participants were included in the study. These were divided into 2 groups. Those who had spontaneous onset of labor (50), and those in whom labor was induced (50). Labor progression in both was compared.

## Inclusion criteria

1. All primigravida with singleton pregnancy.
2. Without pregnancy associated complications,
3. Without any medical high risk
4. Gestational age  $\geq 40$  weeks 0/7 days – 6/7 days 5) Irrespective of their registration status (patients who were referred at the time of delivery and those registered in the antenatal period) were included.

## Exclusion criteria

1. Malpresentation.
2. Multiple pregnancies.
3. Premature rupture of membranes (PROM).
4. Oligohydramnios (AFI  $\leq 5$ ).
5. Any surgical high risk.

In this study, prim gravida of 40 -0/7 to 6/7 weeks gestational age were divided into 2 groups, those who underwent induction of labor and those who had spontaneous onset of labor. Relevant antenatal, intranatal data, method of induction, modified bishops score, details regarding augmentation of labor and method used for augmentation of labor were documented. mode of delivery, indication of cesarean section, duration of first stage of labor, induction delivery interval, maternal complications, fetal outcome and perinatal complications, were collected from the patient records and studied in both the groups.

## Management of labor

Labor was monitored using partograph, Augmentation with oxytocin was done if cervical dilatation was  $< 1$ cm/hr. fetal monitoring was done by auscultation. Facilities for immediate cesarean delivery were kept readily available in case of failed induction or fetal distress. On admission, initial PV was done and bishop score assessed. The patient was allowed to progress on her own. PV was repeated after 4hr or on the rupture of membranes. Partograph was plotted in the active phase of labor. In case of PV findings crossing the alert line, labor was augmented with oxytocin. If the Bishops score was  $< 6$ , induction of labor was done using one of the methods (prostaglandins-PGE2 gel, PGE1, foley's catheter,

amniotomy, membrane stripping). The patient was reassessed if there was draining PV or after 6hr when an intracervical gel was used or after 4h when PGE1 misoprostole was used.

## Statistical analysis

Descriptive statistical analysis has been carried out in this study. Results on continuous measurements are presented on mean $\pm$ SD and results on categorical measurements in number (%). A p value of less than 0.05 was considered significant for the purpose of result analysis. Student t test, Chi-square test have been used to calculate the p value and data was analyzed using SPSS version 2023.

## Results

Total study participants were 100 as per data collected in the age group 18 to 25 yrs., with gestational age 40-0/7 to 40-6/7 weeks. Among these 50 had spontaneous onset of labor and 50 underwent induction of labor. The results were compared in both the induction of labor group and spontaneous onset of labor group.

**Table 1:** Number of participants who had spontaneous onset of labor and induced labor along with various methods of induction of labor (N=100)

Spontaneous onset of labor	50	50%
Induced labor	50	50%
Methods of induction		
Foleys	23	23%
Foleys followed by oxytocin	10	10%
Foleys followed by PGE2	7	7%
Oxytocin	3	3%
PGE2 gel	5	5%
Misoprostol 50mcg PO	1	1%
Misoprostol 25 mcg PV	1	1%
Total	100	100%

Among the induced group, 23.0% had undergone foleys induction which was the most common mode of induction (table-1).

**Table 2:** Modified bishop score of the participants who had spontaneous labor and those who had induced labor (N=100)

Modified Bishop score / calder score	Spontaneous onset	%	At the time of induction	%
0-3	0	0%	32	64.0%
4-5	5	10.0%	15	30.0%
$\geq 6$	45	90.0%	3	6.0%
Total	50	100%	50	100%

90.0% of the participants had favourable modified bishop score in the spontaneous group (table-2).

**Table 3:** Duration of first stage in both the groups (N=100)

Onset of labor	Number	Mean duration of first stage
Spontaneous labor	59 (Rest underwent LSCS)	5.93hrs
Induced labor	41 (Rest underwent LSCS)	6.47hrs

The mean duration of first stage was slightly more in the induced labor group, being 6.47hrs, whereas it was 5.93hrs in the spontaneous onset group (table-3).

**Table 4:** Mode of delivery (N=100)

Mode of delivery	Spontaneous onset	%	Induced	%	P value
LSCS	6	12.0%	17	34.0%	0.032
Instrumental delivery	4	8.0%	2	4.0%	
Normal delivery	40	80.0%	31	62.0%	
Total	50	100.0%	50	100.0%	

The rate of caesarean section was 12.0% in the spontaneous onset of labor group and 34.0% in the induced labor group, with P= 0.032, which was significant (table-4).

**Table 5:** Indication of caesarean section (N=100)

Indication	Spontaneous	%	Induced	%
Fetal distress	4	57.1%	5	25.0%
Secondary arrest of dilatation	1	14.2%	10	50%
Arrest of descent of head (2 <sup>nd</sup> stage)	1	14.2%	1	5.0%
Meconium stained liquor	1	14.2%	4	20.0%
Total	7	100.0%	20	100.0%

The most common indication of caesarean section in spontaneous onset of labor was fetal distress (57.1%) and secondary arrest of dilatation in the induced labor group, (50%) (table-5).

**Table 6:** Maternal complications (N=100)

Maternal complication	Spontaneous	%	Induced	%	P value
Atonic PPH, blood transfusion	3	6.0%	4	8.0%	
Need for additional uterotonics in 3 <sup>rd</sup> stage	1	2.0%	2	4.0%	
Vaginal laceration	1	2.0%	0	0.0%	
Cervical tear	0	0.0%	1	2.0%	
Puerperal sepsis	3	6.0%	2	4.0%	
Episiotomy wound gaping	1	2.0%	0	0.0%	
No complications	40	80.0%	41	82.0%	
Total	50	100%	50	100%	0.685

Though maternal complications were slightly more in the induced group, however it was not statistically significant. Atonic PPH, which required blood transfusion was the most common complication in both the groups (table-6).

**Table 7:** Fetal complications (N=100)

Fetal outcome	Spontaneous	%	Induced	%	P value
RDS	0	0.0%	3	6.0%	
NICU for observation	1	2.0%	2	4.0%	
SIRS	10	20.0%	5	10.0%	
Hyperbilirubinemia	8	16.0%	10	20.0%	
Healthy	31	62.0%	30	60.0%	
Total	50	100%	50	100%	0.241

There was no significant difference in the rate of fetal complications in both the groups (table-7).

## Discussion

The present study was primarily aimed at formulating a protocol by comparing induction of labor with spontaneous onset of labor term in a primigravida. With the availability of

various methods of induction, whether to induce primigravidas or wait for spontaneous onset of labor even beyond their EDD remains a dilemma for most obstetricians. This study aims to find out the better of the two options, which enables a vaginal delivery along with best maternal and fetal prognosis. The study comprises of 100 participants, of which 50 had spontaneous onset of labor and 50 underwent induction of labor. The rate of induction of labor in pregnancies that continue beyond the EDD is higher and varies from 20-40%. In our study the rate of induction was 50.0%. Study by Chaudhari *et al.* [8] showed 38%. In our study, the duration of first stage of labor was shorter in the group with spontaneous onset of labor. However, in the study conducted by S. Babu *et al.* [9], the duration of first stage was similar in spontaneous (6.85hrs) as well as induced labor (6.65hrs). Also, in the study conducted by P. Yadav *et al.* [10], the mean duration of labour after 4cm of cervical dilation in spontaneous labour onset group was 5.43 hours and in the induced group was 5.41hours with p value 0.865, which was statistically not significant. In our study the rate of caesarean section was higher in the induction of labor group (34.0%) than the spontaneous onset of labor group (12.0%). This was similar to the study conducted by Thangarajah *et al.* [11] who found that within the subgroup of primiparous women, there was higher risk of caesarean delivery in the induction of labor (IOL) group. However, Runa *et al.* [12] found that there was no difference between the study groups in the rate of caesarean delivery (28 and 33 in the induction and monitoring group, respectively. Vahratian A. *et al.* [13], however found that the rate of caesarean section was linked to low bishop score, women who had an elective induction with cervical ripening had 3.5 times the risk of caesarean delivery during the first stage of labor (95% confidence interval 2.7-4.5). In our study the modified bishop score of 93.6% participants in the induced group was low ie <6, and thus required cervical priming; whereas it was only 10.0% in the spontaneous onset of labor group. The caesarean section rates were almost 3 times more in the induced group in our study. In our study, the rate of caesarean section was more in induced group and the most common indication for caesarean section in the spontaneous onset of labor group was fetal distress whereas in the induced labor group the most common indication for caesarean section was secondary arrest of labor in first stage. Cammu H *et al.* [14] also found higher caesarean section rate in the induced group and attributed the higher rate to significantly more first-stage dystocia in the induced group. Runa *et al.* [12] also found no significant difference between operative vaginal delivery between induced labor group and group with expectant management. (32 compared with 27, P.49). Cammu H *et al.* [14] did a study and found that instrumental delivery was more in induced rather than spontaneous onset of labor group, (31.6% vs 29.1%), however it was not significant. In our study, instrumental delivery was more in the spontaneous 9.1% onset of labor group. In our study the maternal and fetal outcome was same in both the groups which was similar to the study conducted by Thangarajah *et al.* [11] who found that in primi parous women, the rate of lacerations did not differ between the two groups. Increased rate of caesarean deliveries in the induced group may also be due to the fact that this group included the patients who were high risk and had comorbidities such as hypertension, preeclampsia, postdated, and Rh-ve pregnancy. APGAR scores of the newborn of the spontaneous group were better in comparison to the induced group. Incidence of

PPH & neonatal complications also higher in induced group as compare to spontaneous group. Also, they did not found any significant difference between maternal and perinatal outcome in the two groups. S. Babu *et al.* [9], found atonic PPH as the most common complication in induced labor group, whereas atonic PPH, perineal tear, and vaginal tear as the most common complication in the spontaneous labor group. However, there was no statistically significant increased risk of complications between the groups. Also, P. Yadav *et al.* [10] found similar maternal complications rate and neonatal outcome in both the groups, however PPH was more common in induced labor group. Study conducted by Glantz *et al.* [15], found no difference in perinatal outcome between the mode of onset of labor. Same was true in the study conducted by S. Babu *et al.* [9] who found no difference in the perinatal; outcome in both the groups. In a study conducted by Singh *s et al.* [16] found the rate of NICU admissions to be more than 3 times higher in pregnancies that prolonged beyond 41 weeks. This emphasizes that the perinatal outcome depends on the gestational age at the time of delivery rather than the mode of onset of labor. However larger studies on advanced gestational age are required to further corroborate the findings of this study.

### Conclusion

To conclude, induction of labor is associated with a shorter active and second stage of labor in primigravidas, but this difference was not significantly seen in multiparous women. When compare both groups the incidence of neonatal complication also slightly higher in induced group as compare to spontaneous groups. So taking into account of both maternal and fetal outcomes, there is a strong association between cesarean delivery rate and induction of labor, compared to spontaneous labor. Induction did not increase perinatal morbidity and mortality. Correct choice of mode of induction, monitoring the fetus and mother during intrapartum period vigilantly plays a crucial role in the outcome.

### Conflict of Interest

Not available

### Financial Support

Not available

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