

## **To ascertain any differences in fetomaternal outcomes in induced and spontaneous labour among multiparous women delivering at term without an identified indication for induction**

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### **Abstract**

**Background:** To ascertain any differences in fetomaternal outcomes in induced and spontaneous labour among multiparous women delivering at term without an identified indication for induction.

**Methods:** This was a prospective study of 212 women with spontaneous labour and 104 women with induced labour who were delivered at 37 weeks to 40+6 weeks gestation, all without identified medical and obstetrical indications for induction.

**Results:** Initial Bishop score in the induced group was low ( $\leq 5$ ) in 58.7% compared to 40.6% in spontaneous group ( $p=0.002$ ). Mean duration of total labour ( $8.8\pm 4.4$  vs  $7.58\pm 4.4$  hours), first stage of labour ( $8.26\pm 2.4$  vs  $7.02\pm 1.3$  hours) was significantly short in induced group as compared to spontaneous group ( $p<0.001$ ). Caesarean section rate was found to be insignificantly higher in induced group (18.3%) compared to (16.5% in) spontaneous group ( $p=0.69$ ). Instrumental delivery rate was also higher in induced group (10.6%) as compared to spontaneous group (8.5%) but statistically insignificant ( $p=0.54$ ), no difference was found regards second and third stage, duration of rupture of membranes, vaginal lacerations, 1 minute and 5 minute apgar scores, admission to NICU and hospital stay.

**Conclusions:** Multiipara who have spontaneous onset of labour the initial mean Bishop score is more compared to the subjects who have induced labour. The study did not demonstrate an increase in rate of caesarean section when Bishop Score was  $\leq 5$  ( $p=0.97$ ). Compared to those with spontaneous labour, multiparas with induced labour are more likely to have short duration of labour specially the first stage but the mode of delivery is not affected.

**Keywords:** Induction of labour, spontaneous labour, caesarean delivery, instrumental delivery, neonatal outcome.

### **1. Introduction**

Induction of labour is the artificial initiation of labour before its spontaneous onset for the purpose of delivery of the fetoplacental unit. It is performed when the benefits of delivery outweigh the risks of continuing the pregnancy [1]. Induction of labour is increasing in the U.S. The overall induction rate has increased from 9.5 percent in 1990 to 22.1 percent in 2004 [2]. This increase in induction was mirrored by an increase in the caesarean section rate from 23% in 1990 to 30% in 2005 [3]. Induction of labour that is not indicated for a medical reason, also termed elective induction of labour, appears to be rising as well and at a rate even more rapidly than that of the overall induction of labour [4]. Many think that this intervention exposes the parturient patient and her baby to a cascade of related events each contributing its own

hazards, the culmination of which is less favorable outcome than would be obtained if nature were allowed to follow its course [5,6]. The commonly held dogma regarding induction of labour is that it increases the risk of cesarean delivery, which in turn is associated with a host of maternal and neonatal complications in present and future pregnancies [2]. Although the literature on elective induction is limited, advantages and disadvantages have been described [6,7]. Opinions differ regarding whether benefits outweigh the risks to mother and fetus during induction of labour. With this background knowledge, the present study was planned with an aim to compare the fetomaternal outcomes of spontaneous and induced labour in multiparas. It is hoped that the results of this study would add to the body of evidence on this subject.

## 2. Material and methods

The study was conducted in the Department of Obstetrics and Gynecology, Kamla Nehru Hospital for mother and child, Indira Gandhi Medical College, Shimla for one year duration from 1<sup>st</sup> June, 2011 to 31<sup>st</sup> May, 2012 which included all multiparous women undergoing elective induction who fulfilled the following criteria: women willing to participate in study, multiparous women, gestational age between 37 completed weeks to 40+6 weeks as determined by the last menstrual period/ positive pregnancy test at 5 weeks/ Per vaginal examination and/or by ultrasound scan in first trimester, singleton viable fetus, cephalic presentation, no contraindication to vaginal delivery. Exclusion Criteria included primiparous women, women with an intrauterine fetal death, known lethal anomaly, multifetal gestation, abnormal placentation, abnormal presentation, women with previous caesarean section or previous uterine surgery, women with all medical disorders, women with other obstetric complications like PIH and IUGR, any other indication for Caesarean delivery.

A complete history was taken as per pre-designed proforma. General physical and obstetrical examination was carried out. Per vaginal examination was done to know the Bishop score and adequacy of pelvis for vaginal delivery. The following observations were made in each parturient: duration of first stage, duration of second stage, duration of rupture of membranes, lacerations, mode of delivery (normal, instrumental, vaginal or caesarean), indication of caesarean delivery, third stage duration and any occurrence of PPH was noted.

Neonatal outcome was monitored in terms of any gross congenital anomaly, birth weight, sex, apgar score at 1 and 5 minutes was noted and duration of hospital stay in nursery and neonatal deaths if any were noted.

Labour induction was commenced in accordance of hospital protocol as follows:

- 1) In unfavourable cervix (Bishop's score  $\leq 5$ ), 25  $\mu$ g of misoprostol was placed in posterior fornix of vagina and repeated every 4 hourly to a maximum of five doses or till the women enter into active phase of labour or dinoprostone gel 0.5 mg was instilled intracervically to a maximum of 2 doses 8 hours apart.
- 2) In favourable cervix (Bishop's score  $\geq 6$ ), artificial rupture of membranes (ARM) was done and after 2 hours, oxytocin infusion was started if labour pains were inadequate and dose escalation was done if required according to geometrical progression.

Labour was monitored using WHO partogram in all the women.

Success of induction was defined as:

Normal vaginal delivery after induction of labour. On the basis of onset of labour women were classified into

two groups, first with spontaneous onset of labour and second with induced labour.

### 2.1 Statistical Analysis of the Data

The percentage of each qualitative variable and the mean, standard deviation, minimum and maximum values for the quantitative variables were measured.

Data were entered into statistical software package SPSS version 17 and epi info. The t-test was used for quantitative data and Pearson Chi square or fisher's exact test was used for categorical databases. Multivariate logistic regression was performed using all the significant variables with p value  $< 0.05$  in the univariate test.

## 3. Results

There were 6111 deliveries in Kamla Nehru State Hospital for Mother and Child, Indira Gandhi Medical College from 1<sup>st</sup> June, 2011 to 31<sup>st</sup> May, 2012 of which only 316 were included in the study which fulfilled the inclusion criteria. 212 (67.1%) women had spontaneous labour (Group 1) and 104 (32.9%) women had induced labour (Group 2). Induction was done with misoprostol, dinoprostone or oxytocin infusion.

Labour induction was commenced in accordance of hospital protocol (dinoprostone gel/misoprostol/ ARM + Oxytocin) and was monitored by WHO partogram. The outcome of labour, delivery and neonate's details were obtained and recorded from the clinical notes after delivery. As and when required operative interference was done to expedite instrumental vaginal delivery or caesarean delivery for the safety of the mother, baby or both. Data was analysed using t-test, Pearson-Chi square, fisher's exact test and multivariate logistic regression using epi info software and SPSS software.

Mean age of subjects were 24.74 $\pm$ 3.51 years in group 1 and 25.40 $\pm$ 3.05 years in group 2 (p value 0.098). Age wise both the groups matched each other.

Mean height was 155.97 $\pm$ 3.857cms in group 1 and 155.57 $\pm$ 3.413 cms in group 2 (p=0.37), and this was comparable.

Mean weight was 59.25 $\pm$ 4.77 kg in group 1 and 59.33 $\pm$ 3.8 kg in group 2 (p value 0.88), and was comparable.

Mean BMI in group 1 was 24.34 $\pm$ 1.53 kg/m<sup>2</sup> and in group 2 was 24.54 $\pm$ 1.65 kg/m<sup>2</sup> (p=0.29), both the groups matched each other.

The mean gestational age was 39.23 weeks and 39.3 weeks in group 1 and group 2 respectively (p=0.54) which was found to be almost same in both groups.

Subjects with Bishop score  $\leq 5$  had caesarean delivery rate of 17% and those with Bishop score  $\geq 6$  had caesarean rate of 17.16% (p=0.97).

**Table 1: Relationship of Bishop score with mode of delivery**

S. No	Bishop Score	Vaginal delivery (n=262)		Caesarean section (n=54)		p value
		No	Percent	No	Percent	
1.	≤5	122	83	25	17	0.97
2.	≥6	140	82.84	29	17.16	

Initial Bishop score in the induced group was low (≤5) in 58.7% of patients (mean Bishop score 4.5±1.4) compared to 40.6% in spontaneous group (mean Bishop score 5.7±1.2, p=0.002). The caesarean rate in induced group was insignificantly high 18.3% vs 16.5% (p=0.69).

**Table 2: Comparison of Bishops score and onset of labour**

Bishop score	Group 1(n=212)		Group 2 (n=104)		P value
	No	Percent	No	Percent	
1. ≤5	86	40.6	61	58.7	0.002
2. ≥6	126	59.4	43	41.3	0.002

Mean duration of total labour (8.8±4.4 vs 7.58±4.4) hours and first stage of labour (8.26±2.4 vs 7.02±1.3) hours was significantly short in induced group as compared to spontaneous group (p<0.001).

Duration of second stage of labour was comparable between the two groups. No significant difference was found between the two groups with respect

to the duration of third stage and duration of rupture of membranes.

Caesarean section rate was found to be insignificantly higher in induced group (18.3%) compared to (16.5% in) spontaneous group (p=0.69). Instrumental delivery rate was also higher in induced group (10.6%) as compared to spontaneous group (8.5%) but statistically insignificant (p=0.54).

**Table 3: Comparison of mode of delivery between two groups**

S. No.	Mode of Delivery	Group 1 (n=212)		Group 2 (n=104)		p value
		No	Percent	No	Percent	
1.	Normal vaginal delivery	159	75	74	71.2	0.46
2.	Instrumental delivery	18	8.5	11	10.6	0.54
3.	Caesarean section	35	16.5	19	18.3	0.69

Most common indication for caesarean was found to be fetal distress. It was comparable in both the groups (p=0.8).

**Table 4: Comparison of Indication of caesarean by onset of labour**

S. No	Indication of caesarean	Group 1 (212)		Group 2 (104)		P Value
		No	Percent	No	Percent	
1.	Fetal Distress	35	16.5	16	15.4	0.8
2.	Dystocia	0	0	1	0.96	0.15
3.	Failed Induction	0	0	2	1.92	0.04

There was no significant difference between the two groups as far as post partum haemorrhage was concerned (p=0.73). Both groups were comparable as regards lacerations, placental weight (p=0.16), 1 and 5 minute apgar score (p=0.99).

Mean birth weight in induced group was found to be significantly higher than in spontaneous group 3.059±0.42 Kg vs 2.782±0.37 Kg (p<0.001).

**Table 5: Comparison of neonatal birth weight in two groups**

S. No.	Birth weight(g)	Group 1 (n=212)		Group 2 (n=104)		P value
		No	Percent	No	Percent	
1.	<2000	7	3.3	1	1	0.2
2.	2000-2499	51	24.1	12	11.5	0.008
3.	2500-2999	123	58	48	46.2	0.046
4.	3000-3499	27	12.7	29	27.9	0.0009
5.	3500-3999	4	1.9	14	13.5	0.00007
		Mean=2782		Mean=3059		
		Min=1800		Min=1800		
		Max=4300		Max=4000		
		SD=37		SD=42		
p value =0<0.001						

Both groups were comparable in terms of admission ( $p=0.68$ ) and indications of admission to neonatal ward, duration of hospital stay. There were no neonatal deaths in any of the groups during the study period.

#### 4. Discussion

The present study demonstrated no significant correlation between Bishop score at time of induction/onset of spontaneous labour and the caesarean delivery rates among the multipara being 17% in those with Bishop score  $\leq 5$  and 17.6% in those with Bishop score  $> 6$  ( $p<0.97$ ). The present study is comparable to study conducted by Macer *et al* [7] where the caesarean delivery rate was 5.4% in multiparous subjects with Bishop score  $\leq 5$  and 6.5% among subjects with Bishop score  $> 5$  at the time of induction/ onset of spontaneous labour. Hence the Bishop score has no bearings on the caesarean rate in multipara.

In terms of mean duration of labor the present study is comparable to Smith *et al* [6] (7.6 hours and 6.1 hours in group 1 and group 2) ( $p<0.05$ ) and Dunne *et al* [4] ( $5.71\pm 3.61$  hours vs  $4.03\pm 2.75$  hours in the two groups) ( $p<0.001$ ). These studies demonstrated a significantly short mean duration of labor in the induced group compared to the spontaneous group in multiparous subjects.

The present study is in contrast to Macer *et al* [7] who could not demonstrate any significant relation in terms of duration of first stage between the two groups in multiparous subjects. The present study shows a significantly shorter mean duration of first stage in the induced group compared to the spontaneous group ( $8.26\pm 2.4$  vs  $7.02\pm 1.3$ ) ( $p<0.001$ ).

In the present study duration of second stage is comparable in both the groups ( $35.05\pm 15.85$  min in group 1 vs  $33.69\pm 15.8$  min in group 2) ( $p=0.5$ ). This is in contrast to Dunne *et al* [4] who showed a significant longer second stage in induced group compared to spontaneous group ( $40.8\pm 52.8$  vs  $34.8\pm 47.4$  min) ( $p=0.004$ ). This extra time in the second stage could plausibly permit more accommodation by the bony pelvis and stretching of vaginal and pelvic tissues, factors that might have protected the perineum at delivery. Such findings were not observed in the present study.

In the present study 16.5% of group 1 had caesarean delivery and 18.25% of group 2 had caesarean delivery ( $p=0.69$ ). Our findings were similar to observations made by Smith *et al* [6] who demonstrated 1.7% and 1.8% caesarean rates in the two groups which was not significant, Dublin *et al* [8] who demonstrated 3.6% and 3.8% caesarean delivery rates in the two groups which was comparable, Dunne *et al* [4] also demonstrated

caesarean rate between the two groups which was comparable ( $p=0.855$ ). Macer *et al* [7] reported 6.2% among multigravidas in both group 1 and group 2 which was again insignificant.

The present study is contrary to study by Prysak *et al* [9] where fetal distress accounted for 0.9% and 1.5% of caesarean deliveries in group 1 and 2 and the difference was non significant, dystocia was responsible for 7.6% and 3.5% of caesarean deliveries in the two groups ( $p<0.001$ ), Seyb *et al* [10] reported 1.7% and 4.2% incidence of caesarean delivery in group 1 and group 2 respectively for fetal distress which was non significant and 6.1% vs 13.3% incidence of caesarean delivery due to dystocia in the two groups which was statistically significant ( $p<0.05$ ). However these studies included both the primiparous and multiparous subjects. In the present study fetal distress accounted for 15.4% and 16.5% caesareans in study and control groups ( $p=0.8$ ). There were 2 caesareans (1.92%) in our study which were done for failed induction. These were the cases who had Bishop score  $\leq 5$  and did not have active labour even after using cervical ripening agents. Other studies have not observed such findings.

The present study is comparable to Dunne *et al* [4] who also demonstrated no significant relationship in terms of post partum hemorrhage between the two groups in the primipara ( $p=0.5$ ) and multipara subjects ( $p=0.82$ ).

The present study is comparable to Macer *et al* [7] who also reported no significant difference in the study and control groups as regards lacerations. Dunne *et al* [4] observed no difference between the two groups in cervical tears among primipara and multipara subjects and vaginal tears among primipara subjects. However they reported a statistically significant less perineal tears in the induced group in both primipara and multipara subjects ( $p$  value 0.02 and 0.002 respectively) and vaginal tears among multipara subjects only ( $p = 0.006$ ).

The present study ( $p=0.99$ ) is comparable to Dunne *et al* [4] who reported comparable 1 minute apgar score in multiparas (6.3% in group 1 and 5% in group 2) ( $p=0.202$ ). The five minute apgar score was also reported insignificant in the above study (0.4% vs 0.6% in group 1 and group 2,  $p=0.565$ ) just like the present study ( $p=0.99$ ).

The present study is comparable to Macer *et al* [7] (mean birth weight in group 1 was  $3434\pm 437$ g compared to  $3553\pm 385$ g in group 2,  $p=0.0007$ ), Seyb *et al* [10] (mean weight in group 1 was 3400g and in group 2 was 3548g,  $p<0.05$ ), Maslow *et al* [11] (mean weight in group 1 was  $3513\pm 433$ g and in group 2 was  $3596\pm 458$ g,  $p<0.01$ ), Hoffman *et al* [12] (mean weight in group 1 was  $3373\pm 434$ g compared to  $3438\pm 401$ g in group 2,  $p<0.001$ ), Dunne *et al* [4] (mean weight in group 1 was  $3413\pm 412$ g compared to  $3522\pm 403$ g in group 2,  $p<0.001$ ). These studies reported a significant difference as regards mean

birth weight between group 1 and 2 being higher in induced group. According to Macer *et al* [7] average birth weight in the induced group was higher and this did not appear to affect the delivery outcome.

However Cammu *et al* [13] (mean weight in group 1 was 3456±264g and mean weight in group 2 was 3461±264g) and Vrouenraets *et al* [14] (mean weight in group 1 was reported to be 3360±470g compared to 3435±542g in group 2, p=0.183) have also reported slightly increased mean birth weight in group 2 but the difference was not statistically significant.

It is pertinent to mention that in the above studies both primiparous and multiparous subjects have been taken into account.

The present study is contrary to Cammu *et al* [13] who observed increased rate of NICU admission in induced group among multipara but insignificant.

In the present study, mean duration of stay in NICU in group 1 was 1.22 days and in group 2 was 1.11 days. The difference in hospital stay between the two groups was found to be non significant. The present study is comparable to study by Prysak *et al* [9] who reported mean of 2.2±1.8 days of NICU admission in group 1 and 3.8±2.8 days in group 2 and no statistical significance was reported though this study was done on both primiparous and multiparous subjects. Thus it is concluded that induction of labour does not increase the mean duration of NICU length of stay in multiparas.

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