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Original Research Article

## Comparison of progress of labour and maternofetal outcome among induced versus spontaneous labour in nulliparous women using modified WHO partograph

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### ABSTRACT

**Background:** Induced or spontaneous labour has implication on the eventual mode of delivery and neonatal outcome. The aim of study is to compare the progress and outcome of induced versus spontaneous labour among nulliparous women using the modified WHO partograph.

**Methods:** Comparative study involving nulliparous women in active phase of labour with the cervix at least 4cm dilated. Those whose labours were induced were compared with those on spontaneous labour; both labouring women were monitored using modified WHO partograph. Outcome measures include the mean duration of labour, the eventual mode of delivery and the Maternofetal outcome. Data were managed using SPSS software. Chi-square t-test and student t-test were used in data analysis. Level of significance was placed at  $P < 0.05$ .

**Results:** 115 women were compared in each group. There was no difference in mean age group, gestational age at delivery, cervical dilatation on admission, and the level of head of fifth palpable on admission. More women had spontaneous vaginal delivery among those in spontaneous labour (72.1% versus 64.7%)  $P = 0.0001$ . There were less caesarean section among those in spontaneous labour. The mean Apgar scores were significantly better among induced labour babies ( $P = 0.0001$ ).

**Conclusions:** Induced labour may increase the chances of caesarean section, it does not adversely affect the neonatal outcome. Therefore, it is advised induced labour can be a safe procedure among nulliparous women if labour is partographically monitored.

**Keywords:** Induced versus spontaneous labour, Labour outcome, Modified WHO partograph, Nulliparous women

### INTRODUCTION

Labour is a natural physiological process characterized by progressive increase in frequency, intensity and duration of uterine contractions resulting in effacement and dilatation of the cervix with descent of the fetus through the birth canal. This physiological process may at times become pathological. Failure to recognize would result in prolonged labour with resultant increase in the intensity in the morbidity and mortality of both the fetus

and mother.<sup>1</sup> Induction of labour is the artificial initiation of uterine contractions preceding their spontaneous onset, leading to progressive dilatation and destruction of the cervix and delivery of the baby. The indication of induction of labour must be worthy as likewise being sufficient indications for a caesarean section because if the procedure fails, the end result is caesarean section. It has been observed that for all intents and purposes, failed induction is common among primigravida and nulliparous women especially those with unfavorable

cervix prior to induction.<sup>2</sup> Due to this, there is often a great aversion for induction of labour among nulliparous women in our environment because if the induction fails, the next option is caesarean section which may adversely affect the mode of delivery in subsequent pregnancies.<sup>3</sup> In an environment such as ours with great aversion for caesarean section most women prefer spontaneous labour due to the presumed belief that it is associated with better Maternofetal outcome.

Furthermore, nulliparous women have been described as a group at risk in labour. This is because their capacity for childbearing has never previously been put to test.<sup>4</sup> There is scarcity of literature comparing spontaneous versus induced labour among nulliparous women. According to most authorities, the best way to monitor labour is with the help of a partograph. Partogram is a composite graphical record of key data (maternal and fetal) during labour entered against time on a single sheet of paper. Relevant measurements include statistics such as cervical dilation, fetal heart rate, duration of labour and vital signs. An accurate record of the progress in labour can be obtained by it. Any delay or deviation from normal may be detected quickly and treated accordingly.<sup>5</sup>

As induction has both advantages and disadvantages this study was undertaken to compare the maternal and fetal outcomes of both induced and spontaneous labour using modified WHO partograph.

The aim of this study was to compare the progress and outcome of induced versus spontaneous labour among nulliparous women using the modified WHO partograph.

## METHODS

This hospital-based comparative study was done to compare the Maternofetal outcomes and progress of labour (using modified WHO partograph) in spontaneous and induced labour. This prospective comparative study was carried out at the Obstetric and Gynecology Department of Yenepoya Medical College Mangalore, from March 2017 to July 2017. All nulliparous women in active phase of labour at 4 cm dilation were included in

this study. The two study groups were Spontaneous labour group (Group-A) and Induced labour group (Group-B). 115 nulliparous women with term, singleton live fetus with cephalic presentation were included in each group in the study after excluding bad obstetric history, medical disorders (anemia, gestational hypertension, pre eclampsia, eclampsia, gestational diabetes mellitus) placenta previa, cephalopelvic disproportion, preexisting fetal anomaly, preexisting fetal distress or intra uterine growth restriction (IUGR).

Outcome measures included the mean duration of labour, eventual mode of delivery and the Maternofetal outcomes. Data was arranged using statistical package for social sciences (SPSS). Level of significance was placed at 5% ( $P < 0.05$ ).

## RESULTS

The Demographic characteristics shows no significant difference among both groups in the mean age, weight, height, BMI, gestational age, cervical dilatation on admission, and level of head of fifth palpable per admission (Table 1).

**Table 1: General characteristics of study participants in both groups.**

Variables	Group A	Group B	T value	P value
Age (years)	27.43±5.45	27.54±5.43	1.02	0.28
Weight (kgs)	60.6±3.03	61±2.19	0.74	0.41
Height (cms)	156.74±2.13	156.44±1.71	0.67	0.40
Body mass index	24.67±1.19	24.93±0.98	0.13	0.19
Gestational age (weeks)	39.37±1.46	39.63±1.07	1.06	0.22
Cervical dilatation	4.48±0.65	4.41±0.62	0.80	0.47
Descent of head	3.22±0.84	3.25±0.79	0.23	0.86

**Table 2: Maternal outcome and characteristic of labour in both groups.**

Labour outcome	Group A (n=115)	Group B (n=115)	Statistical test	P value
Total duration of labour (hours)	6.080±2.397	6.507±2.237	t=1.314	0.15
<b>Mode of delivery</b>				
Spontaneous vaginal delivery	83 (72.1%)	71 (61.8%)	X <sup>2</sup> =17.44	0.00
Caesarean section	21 (18.2%)	44 (38.2%)		
Operative vaginal delivery	11 (9.5%)	0 (0%)		
<b>Indication for surgery</b>				
Cephalopelvic disproportion	17 (12.5%)	33 (24.3%)	X <sup>2</sup> = 14.66	0.00
Non reassuring fetal heart rate	10 (7.3%)	0 (0%)		
Failure to Progress	9 (6.62%)	10 (7.3%)		

There was no significant difference in total duration of labour ( $P= 0.15$ ). Greater percentage of those with spontaneous labour had spontaneous vaginal delivery (72.1% versus 61.8%). In contrast more of those with induced labour had caesarean section (38.2% versus 18.2%) ( $P = 0.00$ ) (Table 2).

**Table 3: Evaluation of progress in labour using modified WHO partograph.**

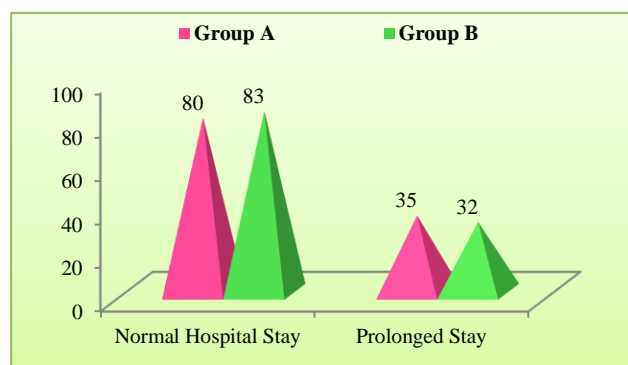
Labour Progress	Spontaneous labour (n=115)	Induced labour (n=115)	Chi square value	P value
Normal active phase	75 (55.1%)	78 (57.4%)	15.08	0.02
Moved between alert and action line	38 (33.0%)	13 (11.3%)		
Reached or crossed action line	23 (11.9%)	45 (31.3%)		

There was no difference between both groups in the progress in normal active phase of labour. More women in spontaneous labour had their cervical dilation moving between alert and action line (33.0% versus 11.3%)  $P = 0.000$  (Table 3).

**Table 4: Neonatal outcome in both the groups.**

Variables	Group A	Group B	T value	P value
Birth Weight	3.01±0.17	2.99±0.19	0.675	0.72
Apgar Scores at 1 minute	7.68±2.50	8.42±2.15	4.454	0.00
Apgar Scores at 5 minutes	8.93±1.87	9.45±1.10	2.891	0.008

The neonatal outcome shows Apgar scores at 1 and 5 minutes were significantly better among those with induced labour compared at those in spontaneous labour (Table 4).



**Figure 2: Post operative period in induced and spontaneous group.**

In group A 35 patients are indicated for prolonged hospital stay while in the group B only 32 patients are

indicated for prolonged hospital stay. However, both the groups doesn't show any statistical significance  $P= 0.86$  (Figure 2).

**Table 5: Indication for prolonged hospital stay in neonates in both groups.**

Reasons	Group A	Group B
Physiological jaundice	31	27
Respiratory distress syndrome	04	05

## DISCUSSION

Induced or spontaneous labour has implications on the eventual mode of delivery and maternal as well as neonatal outcome. The objective of the study was to compare the progress of labour and outcome of spontaneous v/s induced labour among nulliparous women using Modified WHO Partograph. The study revealed pertinent findings which are very useful in labour management among nulliparous women.

Rate of caesarean section was significantly higher in induction of labour group than in spontaneous labour (38.2% v/s 18.20%) in present study. Present finding was consistent with the study done by Barbara et al who observed that women who had induction between 38-42 weeks had a significantly higher rate of caesarean section than spontaneous labour group.<sup>6</sup> Grivell et al also reached a similar conclusion stating that induction of labour was associated with a 67% increased relative risk for caesarean section compared with spontaneous labour.<sup>7</sup> Hoffman et al also stated that caesarean section rate was elevated in induction group (3.92% v/s 2.30%,  $P < 0.05$ ) but reported a lower rate of cesarean section in both groups.<sup>8</sup>

The mean total duration of labour among comparison group was similar (6.080 versus 6.507 hours). This is less than the mean duration of 8.83 hours reported among primigravidae in spontaneous labour in uncomplicated pregnancies but comparable to the study conducted by Orji EO et al.<sup>9</sup>

We found that more women in the induced group crossed action line as compared to spontaneous group and this was found statistically significant ( $p=0.02$ ). Present study was comparable to a study done by Orji EO et al in which they also found similar results i.e. 55.1% patients had normal active phase, 27.9% patients moved between alert and action line and 16.9% patients reached or crossed action line in spontaneous group while 57.4% patients had normal active phase 9.6% patients moved between alert and action line and 33.1% patients reached or crossed action line in induced group.<sup>9</sup>

Regarding mode of delivery, spontaneous onset of labour had more vaginal delivery compared to induced labour group while vice versa for caesarean section. Present results were similar to the study done by Orji EO et al

and Yadav P et al. in which they concluded that larger proportion of women in spontaneous group had vaginal delivery compared to induced group and also lesser proportion of caesarean section in spontaneous group.<sup>9,10</sup>

However, despite these apparent advantages, the neonatal Apgar Scores at 1 and 5 minutes were better among babies delivered by induced labour compared to those in spontaneous labour. This shows statistical significant difference. The result was in accordance to the study conducted by Yadav P et al and Gupta S et al.<sup>10,11</sup>

## CONCLUSION

We can draw from this study that while induced labour may increase the chances of caesarean section, there is no much difference in post operative recovery, it does not adversely affect the neonatal outcome. We therefore suggest that induced labour can be a safe procedure among nulliparous women if labour is partographically monitored. Also, when labour progress becomes slow in spontaneous labour, a high index of suspicion for cephalopelvic disproportion should be kept in mind.

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