



TO STUDY THE MATERNAL AND FETAL OUTCOME AMONG SPONTANEOUS AND INDUCED LABOUR IN PRIMIGRAVIDAE USING PARTOGRAPH IN TERTIARY CARE CENTRE

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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 duration of labour and materno-fetal outcome of induced versus spontaneous labour among primigravidae using partograph.

**Methods:** The study was conducted in primigravidae admitted at term in active phase of labour (with cervical dilatation at least 4 cm) either spontaneous or induced, both labouring women were monitored using partograph. Outcomes measures include duration of labour, eventual mode of delivery and the materno fetal outcome.

**Results:** A total 100 women were compared in each group. There was no difference in mean age group, gestational age. More women had spontaneous vaginal delivery among those with spontaneous labour (83% versus 67%) (p=0.009). The mean duration of first and second stage of labour was not calculated for patients who were taken for cesarean section in first stage of labour. The mean Apgar scores was found to be better than induced group. Induced onset of labour with increased rate of caesarean deliveries.

**Conclusions:** Study concluded from our study that in spontaneous group mean duration of labour was less than induced group and most of the patient delivered vaginally. In induced group rate of caesarean was higher than spontaneous group. Maternal complications were also found more in induced group than spontaneous group whereas neonatal outcome was found to be slightly better in spontaneous group. We observed in our study that induced labour can be a safe procedure among primigravidae if labour is partographically monitored by partograph.

**Keywords:** Induced Labour, Nulliparous Women, Spontaneous Labour, World Health Organization Partograph.

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. Labour induction is one of the most common obstetrical procedure, involving nearly 20% of all deliveries; and the rate continues to rise.<sup>1</sup> In the US, the rate of labour induction has increased steadily from 9.5% in 1990 to 22.8% in 2007.<sup>2</sup> Induction of labour is the artificial initiation of uterine contraction prior to their spontaneous onset, leading to progressive dilatation and effacement of the cervix and delivery of the baby.<sup>3,4</sup> Induction of labour is indicated when benefits (maternal or fetal) of elective early delivery outweigh potential risks imposed by continuing the pregnancy, typically in instances of post-term pregnancy, premature rupture of membranes (PROM), oligohydramnios, fetal growth restriction, hypertension, diabetes mellitus, and other maternal or fetal diseases.<sup>5</sup> There are certain risks associated with induction of labour like prolonged labour, caesarean delivery, postpartum haemorrhage, fetal heart rate abnormalities, chorioamnionitis and possible birth trauma.

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 dilatation, 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>6</sup>

The first WHO partograph or 'composite partograph', covers a latent phase of labour of up to 8 hours and an active phase beginning when the cervical dilatation reaches 3 cm. The active phase is provided with an alert line and an action line, drawn 4 hours apart on the partograph as aids to monitoring labour. This partograph is based on the principle that during active labour, the rate of cervical dilatation should not be slower than 1 cm/hour. A lag time of 4 hours between slowing of labour and the need for intervention is unlikely to compromise the foetus or the mother and avoids unnecessary intervention. Vaginal examination should be performed as infrequently as is compatible with safe practice (4 hours is recommended). Moreover, differentiating the latent phase from false labour being difficult, diagnosis is often made in retrospect.<sup>7</sup> To alleviate these disadvantages, a WHO 'modified partograph' was introduced by removing the latent phase and considering the beginning of active phase at 4 cm dilatation of cervix instead of 3cm.

This study was conducted to compare the maternal fetal outcome in primigravidae by using modified WHO partograph.



## Methods

After receiving approval from departmental research committee, the present study was conducted in the department of obstetrics and gynaecology, on Dr Susheela Tiwari Government Hospital and Medical College, Haldwani which was prospective study conducted from January 2019 to September 2020.

A total 200 women was enrolled in the study after fulfilling the inclusion and exclusion criteria. Proper counseling was done and written informed consent was taken. In which we recruited women whose Labour was either electively induced or spontaneous at term.

The study was conducted in primigravidae coming at term in active phase of labour (with cervical dilatation at least 4 cm) either spontaneous or induced. The study population was divided into two equal groups:

- Spontaneous onset of labour, who reached  $\geq 4$ cm dilatation
- Labour induced with inducing agents and who reached  $\geq 4$ cmdilatation.

## Inclusion criteria

- Those who were willing for study
- Singleton pregnancy
- Completed 37 week
- Reactive NST
- Vertex presentation
- Spontaneous true labour pain
- Need for induction of labour.

## Exclusion criteria

- Those who are not willing for study
- Multiple Pregnancies.
- Antepartumhaemorrhage
- Abnormal Presentation
- Previous caesareansection
- In utero fetaldeath
- Medical complication of pregnancy where delivery is urgent
- Cord Prolapse

Gestational age was estimated by the date recorded as the first day of the last menstrual period or using prenatal ultrasound measurements.

Patient who had spontaneous onset of labour and reached  $\geq 4$  cm of cervical dilation was included in Group A and patient who were induced and reached  $\geq 4$ cm were included in Group B, and progress of labour was monitored by partograph.

Fetal heart rate was recorded half hourly. The state of membrane "I" if membranes are intact, "C" if membranes were ruptured and liquor clear, "M" if membranes were ruptured and liquor meconium stained. Moulding of head at initial examination and subsequent vaginal examination was noted and scoring was done as + or++.

The most important measures of progress in labour, the rate of dilatation of the cervix and the rate of descent of the fetal presenting part, were recorded by plotting the cervical dilation on the vertical line on the left-hand side of the graph in centimeters from 4 to 10 cm (Figure 1).

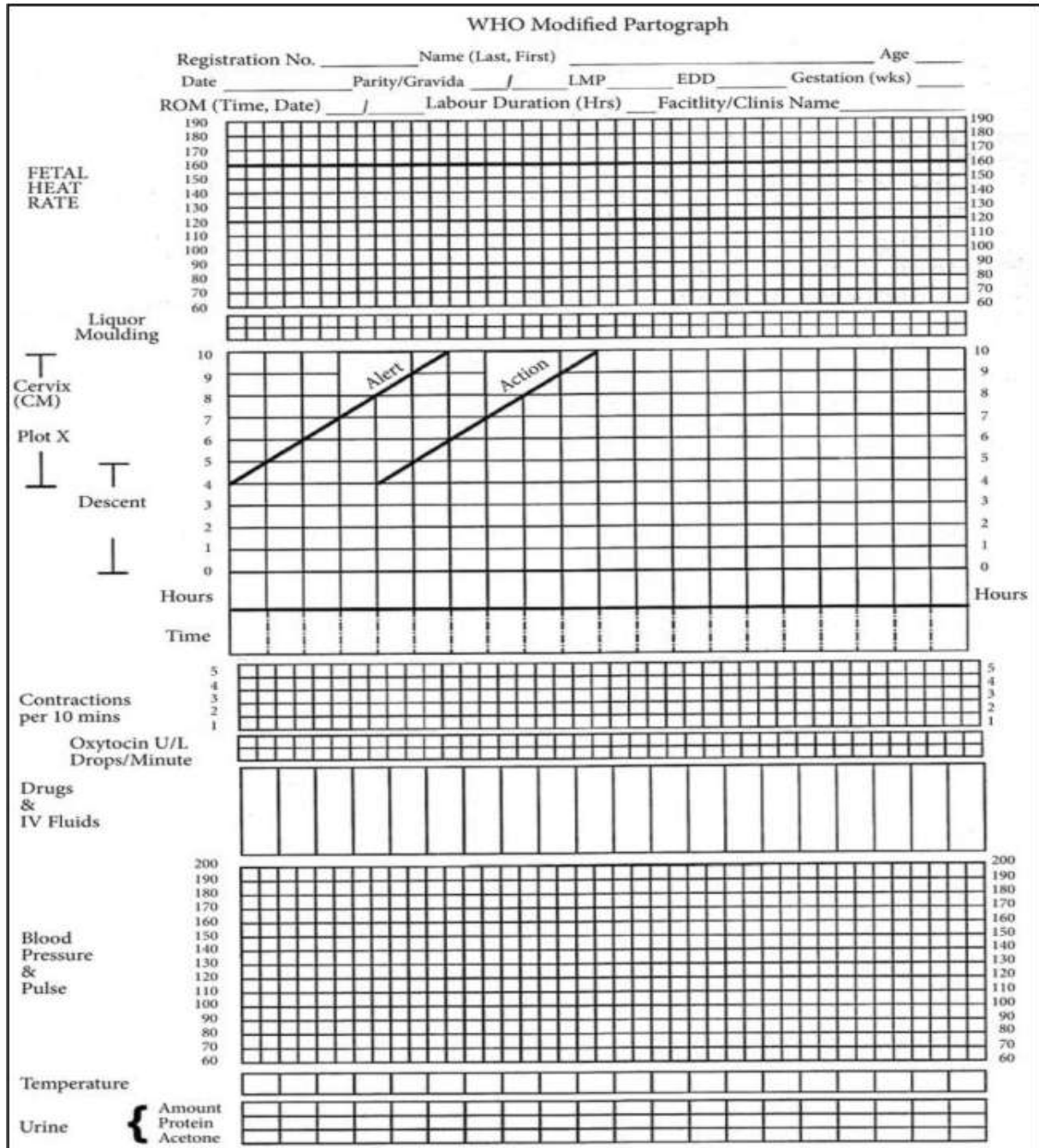


Figure 1: WHO modified partograph.

Statistical analysis

The analysis included profiling of patients on different demographic, clinical, new-born and maternal parameters. Descriptive analysis of quantitative parameters were expressed as means and standard deviation.

Categorical data were expressed as absolute number and percentage. Independent Student t-test was used for

testing of mean value of numerical variables between two independent groups. Cross tables were generated and Chi square test used for testing of associations. P-value < 0.05 is considered statistically. All analysis was done using SPSS software, version 24.0.



**Result**

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

Variables	GroupA	GroupB	p value
Age (years)	23.1±3.9	23.3±3.5	0.903
Gestational age (weeks)	38.6±0.9	39.9±1.5	<0.0001

There was no statistically significant difference in age group. The gestational age at which patient were induced were higher than patient with spontaneous group. However, the difference was very low and was statistically not significant. (Table 1)

**Table 2: Distribution of cases in both the groups according to mode of delivery.**

Mode of Delivery	of Group (NA=100)	AGroup (NB=100)	Bp value
LSCS	17(17%)	33(33%)	0.009
NVD	83(83%)	67(67%)	

A total 83% cases were delivered through vaginal delivery in Group A whereas 67% cases in Group B. Caesarean section was 17% and 33% in Group A and Group B respectively. The occurrence of vaginal delivery and caesarean section was observed to be statistically significant (p 0.009) (Table 2).

**Table 3: Distribution of cases of both the groups according to active phase and second stage of labour (NA= 84 NB=68).**

Sr. No.	Group	N	Mean±SD (Range)
First stage	A	84	246±79 (120 – 480)
	B	68	415± 83 ( 270 – 630)
Second stage	A	84	31±27 (10 – 160)
	B	68	32±16 (15 – 120)

First and second stage of labour was not calculated for the patient who were taken for cesarean delivery in first stage of labour. (Table 3)

**Table 4: Group wise division of patients based on alert and action line.**

Partogram	Group A	Group B
Left to alert line	72(72%)	67(67%)
Between the alert and action line	25(25%)	33(33%)
Right to action line	3(3%)	0(0%)

In Group A 28 patients and in group B 33 patient crossed the alert line on partograph. (Table 4)

**Table 5: Distribution of both groups according to maternal complications.**

Maternal complications	Group (NA=100)	AGroup (NB=100)	B
Uterine tachysystole	0 (0%)	5 (5%)	
Fever	2 (2%)	7 (7%)	
Vomiting	10 (10%)	14 (14%)	
Atonic PPH	2 (2%)	5 (5%)	

Vomiting was most common side effect presenting in 24 patients out of which 14 were in induced group and 10 were in spontaneous group. 2 % patients in Group A and 5 % patient in Group B experienced atonic PPH. It shows that occurrence of maternal complications were higher in Group B as compared to Group A. (Table 5)

**Table 6: Distribution of cases of both the groups according to Apgar score.**

Groups	Apgar score at 1 minute		Apgar score at 5 minutes	
	>8	<8	>8	<8
A	94(94%)	6(6%)	98(98%)	2(2%)
B	88(88%)	12(12%)	93(93%)	7(7%)
p value	0.138		0.088	

The Apgar score of the babies at 1 and 5 minutes in the spontaneous group was found to be better than the induced group. (Table 6)

**Discussion**

Present study is a prospective hospital based clinical trial conducted on primigravidae women. Two hundred pregnant women were selected at random and were divided into two equal groups-Group A included the patients who had spontaneous onset of labour and reached ≥4 cm of cervical dilation and Group B included the patients who were induced and reached ≥4 cm of cervical dilatation. Progress of labour was monitored by partogram and maternal and fetal outcome were compared. The study had following observations as discussed with available literature.





The mean maternal age was 23.1 in Group A and 23.3 in Group B. This corresponds favourably to studies conducted by Johnson et al.<sup>43</sup>. The gestational age at which patients were induced were higher than patients with spontaneous labour however the difference was very low and not significant. On an average most of the women entered into spontaneous labour at around 38 wk. This was consistent with study by Robert L Goldenberg which shows black, Asian women delivery at 39 compared with American. These results were in comparison to the study by Heffner et al.<sup>8</sup>

Caesarean section rate was 33% in Group B where as in Group A it was 17%. Thus, the mode of delivery among the groups was observed to be statistically significant ( $p=0.009$ ). Patients with spontaneous onset of labour had higher chances of vaginal deliveries. These observations are similar to Orji and Olabode et al study in which larger number of women had spontaneous vaginal delivery among those in spontaneous labour group (72.1% versus 64.7%)  $p=0.0001$ .<sup>9</sup> There were less caesarean section among those in spontaneous labour (20.6% versus 35.3%). Gupta S et al also found more women had spontaneous vaginal delivery among those with spontaneous labour (88.96% versus 80%) ( $p=0.0396$ ).<sup>10</sup> Sujata P et al, found the rate of primary cesarean section in induced group was 56% whereas 21% in spontaneous labour group.<sup>32</sup> Anamikasingh et al, found more women had spontaneous vaginal delivery among those in spontaneous labour (72.1% versus 64.7%)  $p=0.0001$ .<sup>11</sup>

In this study the mean duration of first stage of labour in Group A was 246 minute and in Group B was 415 minutes i.e., statistically insignificant. And mean duration of second stage of labour in group A was 31 minute and in group B was 32 minutes. First and second stage of labour was not calculated for patients who were taken for cesarean section in first stage of labour.

Majority of the women delivered when partograph was within alert line followed by when partograph was between alert and action line and when partograph crossed action line. In 1992, Dujardin<sup>12</sup> et al. showed the value of alert and action line in the partograph.

Most common complication was vomiting in both the group, Uterine tachysystole found only in Group B. The occurrence of maternal complications were higher in Group B. Similar results were observed in the study by Gupta S et al.<sup>10</sup>

The mean Apgar scores at 1 minute and 5 minutes in group A was observed to be better than group B. Orji et al 29 studied that mean Apgar score at 1 minute was 7.68 in Group A as compared to 8.72 in group B. The difference was statistically significant.

## Conclusion

Study concluded that induction of labour when compared to with spontaneous labour at term, does not affect the maternal and neonatal outcome in carefully selected patient population. However, the increased rate of cesarean section posed by induction of labour should be a part of informed consent discussion with a patient who need induction. Maternal complications were also found more in induced group than spontaneous group. This study observed that induced labour can be a safe procedure among nulliparous women if labour is partographically monitored by WHO modified partograph.

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