

## COMPARATIVE STUDY ON PROGRESS OF LABOUR AND DELIVERY OUTCOME AMONG INDUCED LABOUR VERSUS SPONTANEOUS LABOUR USING PARTOGRAPH

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### ABSTRACT

**Background:** The aim is to compare the progress of labour and delivery outcome among induced labour versus spontaneous labour using partograph.

**Materials and Methods:** This comparative observational study was done for a period of 2 years in 200 subjects were included in the study and divided into two groups of 100 each under induced and spontaneous group. After obtaining consent from all the subjects' detailed history and clinical examination was noted using a pre tested questionnaire. **Result:** The mean birth weight of the induced group was  $2.74 \pm 0.42$  Kgs and mean weight in the spontaneous group was  $2.63 \pm 0.39$  Kgs. Mean APGAR score at 1st minute was  $7.86 \pm 0.40$  and  $7.85 \pm 0.47$  among the induced and spontaneous group respectively. At the 5th minute the mean score was  $9.91 \pm 0.37$  and  $9.89 \pm 0.42$  respectively. NICU admission was required for 16 babies of the induced group and 13 babies in the spontaneous group. In the induced group the progress was in green zone in 86, in yellow zone in 4 and fetal distress was seen in 10. In the spontaneous group the progress was in green zone in 90 and 5 the progress was in yellow zone and 5 had fetal distress. The mean hours of induction delivery outcome was  $12.3 \pm 4.51$  hours and the mean total duration of active phase was  $2.56 \pm 3.6$  hours in the induced group and  $1.62 \pm 1.07$  hours for the spontaneous group. **Conclusion:** The association between the groups were assessed were a significant difference was noted between them. The induced group active phase (hours) was higher when compared with the spontaneous group positive and a positive correlation was obtained between them.

## 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 procedures, 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.<sup>[5]</sup>

Elective induction of labour at 39 weeks was associated with a significantly lower frequency of cesarean delivery as well as of perinatal mortality and peripartum infection. Elective induction of labour is a non-indicated intervention performed in order to induce labour. Labour induction should be avoided before 39 weeks since it is associated with adverse neonatal outcomes. 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 dilation 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 3 cm.

Induction of labour 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.

The main problem lies in the fact that success and failure in this case are not opposed. In general the success of IOL should be represented by the achievement of a vaginal birth, even if it is operative, without a defined time interval (in other words, if the birth happens within 49 hours of the induction, does it represent an unsuccessful IOL?). This is particularly true in case of obese women, for example, in whom it has been reported that IOL may take longer than in women of normal weight.

NICE defines failure of induction as the non-achievement of cervical ripening. In ACOG/SMFM consensus on the safe prevention of the primary cesarean delivery, it is stated that "if the maternal and fetal status allow, cesarean delivery for the induction of labour in the latent phase can be avoided by allowing longer duration of the latent phase (upto 24 hrs or longer) and requiring that oxytocin be administered for atleast 12-18 hours after membrane rupture before deeming the induction a failure.

Differentiating the latent phase from false labour being difficult, diagnosis is often made in retrospect.<sup>[8]</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 3 cm. There were some other minor changes which include considering two squares in 1 hour instead of one square in 1 hour in cervical dilatation curve.

WHO further modified the partograph for the third time, this time for used by skilled attendants in a health centre. This simplified partograph is colour coded. The area to the left of the alert line in the

cervicograph is coloured green, representing normal progress. The area to the right of the action line is coloured red indicating dangerously slow progress in labour. The area in between the alert and action line is coloured amber, indicating the need for greater vigilance.

## MATERIALS AND METHODS

The Cross sectional observational study was conducted among patients attending department of Obstetrics & Gynaecology of Gandhi general hospital, Secunderabad from October 2019 to September 2021. Institutional ethical committee approval was obtained prior to the initiation of the study

### Inclusion Criteria

1. Singleton pregnancy
2. Gestational age >37 weeks
3. Consenting patients.

### Exclusion Criteria

1. Multiple pregnancies
2. Elective CS
3. Congenital malformation
4. Previous caesarean section
5. In utero fetal death
6. Non- obstetrical medical disease
7. Gestational age <37 weeks and >40 weeks
8. Hypertensive disorders of pregnancy
9. Diabetes complicating pregnancy.

All patients fulfilling the inclusion criteria during the study period were included in the study. A total of 200 subjects were taken into the study.

The subjects were included in the study after their consent sociodemographic details were noted. History will be taken from patients and attenders. Those who are induced with Prostaglandin E2 (PgE2) gel – 3 doses( 0.5mg ) at interval of 6 hours. All the patients who got admitted at 39 weeks with some discomfort like backpain, urinary tract infection, false labour pains, constipation without any comorbidities are included in the study and are induced with PgE2 gel at intervals 6 hours with maximum of 3 doses. Those who reached active phase of labour are included and their progress of labour is monitored by modified WHO partograph. Progress of labour is monitored by modified WHO partograph

Patients will be observed regarding for mode of delivery either spontaneous or instrumental or caesarean section. Maternal and fetal outcomes were observed in each of the groups. Patients are followed up to 1 week post delivery

The collected data was collected, coded, entered into Microsoft excel work sheet and exported to SPSS. Data was analyzed using SPSS version 21. Data is presented as percentage in categories and then presented as tables and diagrams. Chi-square test and paired t-test were used for test of significance.

## RESULTS

Majority of them were between 31- 40 years, 18 were below 20 years and 6 were between 31- 40 years. In the spontaneous group also had the same trend were

majority of them were between 21- 30 years followed by 24 were below 20 years and 9 were between 31- 40 years.

The mean gestational among the induced group was 39.2 weeks and mean gestational age in the spontaneous group was 38.2 weeks.

**Table 1: Distribution according to age**

Age	Induced group	Spontaneous group
<20 years	18	24
21- 30 years	76	67
31- 40 years	6	9
Total	100	100
Mean	24.2± 4.15 years	23.8± 4.01 years
Mean GA	39.2 weeks	38.3 weeks

**Table 2: Distribution according to comorbidities**

Comorbidities	Induced	Spontaneous
None	86	75
Hypothyroidism	8	10
Anaemia	4	12
Epilepsy	1	2
HIV +ve	1	-
PIH		1
Total	100	100

Among the induced group 14 had comorbidities and in the spontaneous group 25 had comorbidities. One patient was reported to develop hypertension after

delivery whereas the patient did not have PIH during the ante natal period.

**Table 3: Mode of delivery and Indication of LSCS**

Indication	Induced	Spontaneous
Fetal distress	10	5
Arrest of descent	4	5
Modes of delivery		
VD	78	84
Forceps assisted	8	5
Vacuum assisted	-	1
Em. LSCS	14	10

In the study among the 100 women of the induced group and 100 of spontaneous group, 14 and 10 underwent caesarean section with the indication of fetal distress and arrest of descent respectively. The mode of deliveries in the induced group was, 78 were

normal deliveries, 8 were forceps assisted and 14 were emergency caesarean sections. In the spontaneous group 84 had normal delivery, 5 and 1 were for forceps and vacuum assisted and 10 underwent emergency caesarean sections.

**Table 4: Birth weight, Colour of liquor and Bishop score distribution**

Bishop score	Induced	Spontaneous
<4	53	0
4- 7	47	33
>7	0	67
Total	100	100
Mean	3.29± 1.12	8.38± 2.26
Mean AFI	7.99± 3.52	7.64± 3
Birth weight		
Normal	70	55
Low birth weight	30	44
Very low birth weight	-	1
Total	100	100
Mean birth weight	2.74± 0.42 Kgs	2.63± 0.39 Kgs
Colour of liquor		
Clear	89	87
Meconium stained	11	13
Progress of labor		
Green	86	90
Yellow	4	5
Fetal distress (Red)	10	5

The Bishop score was calculated for both the groups, the mean Bishop score in the induced group was  $3.29 \pm 1.12$  and the mean score in the spontaneous group was  $8.38 \pm 2.26$ . The mean amniotic fluid index in the induced group was  $7.99 \pm 3.52$  and in the spontaneous group the mean was  $7.64 \pm 3$ . The mean birth weight of the induced group was  $2.74 \pm 0.42$  Kgs and mean weight in the spontaneous group was  $2.63 \pm 0.39$  Kgs. The study reported in the induced group 30 were low birth weight and in the spontaneous group

44 were low birth weight and 1 was very low. Colour of liquor, meconium stained liquor was seen in 11 of the induced group and 13 of the spontaneous group. The progress of labor was evaluated for both the groups as shown in table 13. In the induced group the progress was normal in 86, moved in 4 and fetal distress was seen in 10. In the spontaneous group the progress was normal in 90 and 5 the progress was moved and 5 had fetal distress.

**Table 5: APGAR score, NICU ADMISSION AMONG BOTH THE GROUPS**

APGAR score	Induced	Spontaneous
Mean APGAR score@ 1st minute	$7.86 \pm 0.40$	$7.85 \pm 0.47$
Mean APGAR @ 5 minutes	$9.91 \pm 0.37$	$9.89 \pm 0.42$
NICU admission		
Jaundice	6	2
Respiratory distress	7	6
Meconium stained liquor	2	2
Low birth weight	1	3
Total	16	13

The mean APGAR score at 1st minute was  $7.86 \pm 0.40$  and  $7.85 \pm 0.47$  among the induced and spontaneous group respectively. At the 5th minute the mean score was  $9.91 \pm 0.37$  and  $9.89 \pm 0.42$

NICU admission was required for 16 babies of the induced group and 13 babies in the spontaneous group.

**Table 6: Association between duration of active phase of labor of induced and spontaneous groups**

Total duration of active phase	Mean	SD	95% CI		p-value
			Lower	Upper	
Induced group	2.56	3.6	0.14	1.55	p=0.01*
Spontaneous group	1.67	1.07			

\*Level of significance:  $p < 0.05$

The association between the groups showed a significant difference between them. The induced group active phase (hours) was higher when compared with the spontaneous group. The mean

hours of induction delivery outcome was  $12.3 \pm 4.51$  hours and the mean total duration of active phase was  $2.56 \pm 3.6$  hours in the induced group and  $1.62 \pm 1.07$  hours for the spontaneous group.

**Table 7: Correlation between induced and spontaneous groups correlations**

		Induced	Spontaneous
Total duration of active phase (Induced)	Pearson Correlation	1	.217*
	Sig. (2-tailed)		0.03*
	N	100	100
Total duration of active phase (Spon.)	Pearson Correlation	.217*	1
	Sig. (2-tailed)	0.03*	
	N	100	100

\*Level of significance:  $p < 0.05$

The correlation was assessed between the groups and a positive correlation was obtained between them.

## DISCUSSION

In this study, two groups were compared, the induced group and spontaneous group. The age distributions, among the induced group showed that majority (76%) of them were between 21- 30 years, 18% were below 20 years and 6% were between 31- 40 years. In the spontaneous group also majority (67%) were between 21- 30 years followed by 24% were below 20 years and 9% were between 31- 40years. The present study findings were similar to a study by Yadav P et al,<sup>[9]</sup> in which mean age among

spontaneous group was  $27.17 \pm 1.14$  years and in induced group it was  $26.95 \pm 1.1$  years. The present study findings were similar to a study by Yadav K et al,<sup>[10]</sup> in which mean age among spontaneous group was  $25.16 \pm 7.13$  years and in induced group it was  $24.87 \pm 6.9$  years. The present study findings were comparable to a study by Patel et al,<sup>[12]</sup> in which the mean age in both spontaneous and induced group was 22.4 and 22.5 years respectively. The present study findings were similar to a study by Singh A et al,<sup>[11]</sup> in which mean age of spontaneous and induced groups was 27.4 and 27.5 years respectively.

The present study findings were similar to a study by Suchika G et al,<sup>[11]</sup> in which mean age of study subjects in spontaneous and induced group was 21.8 and 22 years respectively.

In this study, the mean gestational among the induced group was 39.2 weeks and mean gestational age in the spontaneous group was 38.2 weeks.

The present study findings were similar to a study by Yadav P et al,<sup>[9]</sup> in which mean gestational age in the spontaneous group was 39.32 weeks and in induced group it was 39.63 weeks. The present study findings were similar to a study by Yadav K et al,<sup>[9]</sup> in which mean gestational age in the spontaneous group was 39.02 weeks and in induced group it was 39.33 weeks. The present study findings were similar to a study by Patel et al,<sup>[12]</sup> in which mean gestational age in the spontaneous & induced group was 39.2 weeks. The present study findings were similar to a study by Singh A et al,<sup>[13]</sup> in which mean gestational age in the spontaneous & induced group was 39.3 and 39.6 weeks respectively.

In this study, the mean Bishop score in the induced group was  $3.29 \pm 1.12$  and the mean score in the spontaneous group was  $8.38 \pm 2.26$ . The mean amniotic fluid index in the induced group was  $7.99 \pm 3.52$  and in the spontaneous group the mean was  $7.64 \pm 3$ . The present study findings were different to a study by Patel et al,<sup>[12]</sup> in which mean Bishop score was 4.34 in spontaneous group and it was 5.15 in the induced group. The present study findings were comparable to a study by Aparna KS et al,<sup>[14]</sup> in which among spontaneous group and induced group - 5% & 6% had mild oligohydraminos respectively

In the present study, the mode of deliveries in the induced group showed - 78% were vaginal deliveries, 8% were forceps assisted and 14% were emergency caesarean sections. In the spontaneous group 84% had vaginal delivery, 5% and 1% were for forceps and vacuum assisted and 10% underwent emergency caesarean section. The present study findings were similar to a study by Yadav P et al,<sup>[9]</sup> in which among spontaneous group 73.3% had vaginal delivery, 20% underwent Caesarean section and 6.7% had instrumental delivery. In the induced group, 53.3% had vaginal delivery, 41.7% underwent Caesarean section and 5% had instrumental delivery.

The present study findings concurred with a study by Orji E et al in which spontaneous vaginal delivery rate was 72.1% among those in spontaneous labour and 64.7% in induced group. The caesarean section rate was 20.6% among spontaneous group patients as compared to 35.3% in induced group.

The present study findings were different when compared to the study by Yadav K et al.<sup>[9]</sup> in which spontaneous vaginal delivery rate was 76% among those in spontaneous labour and 58% in induced group. The caesarean section rate was 24% among spontaneous group patients as compared to 42% in induced group.

The present study findings concurred with a study by Patel et al,<sup>[12]</sup> in which 84% had vaginal delivery, 10.7% had instrumental delivery and 5.3% had caesarean section. Among the induced group, 86.7% had vaginal delivery, 6.2% had instrumental delivery and 7.1% had caesarean section.

The present study findings were comparable to a study by Singh A et al,<sup>[13]</sup> in which among spontaneous group 72.1% had vaginal delivery, 18.2% had caesarean section and 9.5% had instrumental delivery. In the induced group, the normal vaginal delivery rate was 61.8%, caesarean section rate was 38.2%.

The present study findings were similar to a study by Suchika G et al,<sup>[11]</sup> in which 88.9% and 80% had vaginal delivery among spontaneous and induced groups respectively. In this study, the mean birth weight of the induced group was  $2.74 \pm 0.42$  Kgs and mean weight in the spontaneous group was  $2.63 \pm 0.39$  Kgs. The study reported in the induced group 30% were low birth weight and in the spontaneous group 44% were low birth weight and 1% was very low birth weight.

The present study findings were similar to a study by Yadav P et al,<sup>[9]</sup> in which mean birth weight among spontaneous and induced group was 3 and 2.98 kgs respectively.

The present study findings were similar to a study by Patel et al,<sup>[12]</sup> in which mean birth weight among spontaneous group was 2.7 kg and in induced group it was 2.6 kg.

The present study findings were similar to a study by Singh A et al,<sup>[13]</sup> in which mean birth weight among spontaneous group was 3.01 kg and in induced group it was 2.9 kgs. In this study, meconium stained liquor was seen in 11% of the induced group and 13% of the spontaneous group.

The present study findings were similar to a study by Patel et al,<sup>[12]</sup> in which 4% and 7.8% subjects from spontaneous group and induced group had meconium stained liquor. The present study findings were different to a study by Aparna KS et al,<sup>[14]</sup> in which 39% and 17% had meconium stained liquor in spontaneous and induced group respectively

In this study, the mean Apgar score at 1st minute was  $7.86 \pm 0.40$  and  $7.85 \pm 0.47$  among the induced and spontaneous group respectively. At the 5th minute the mean score was  $9.91 \pm 0.37$  and  $9.89 \pm 0.42$  respectively.

The present study findings were similar to a study by Yadav P et al,<sup>[9]</sup> in which mean Apgar score in spontaneous and induced group at 1st minute was 7.1. At 5th minute, the mean Apgar score was 9.3 in both spontaneous and induced groups.

The present study findings were similar to a study by Yadav K et al,<sup>[9]</sup> in which mean Apgar score in spontaneous and induced group at 1st minute was 7.58 and 7.8 respectively. At 5th minute, the mean Apgar score was 8.09 and 8.33 in spontaneous and induced groups respectively.

The present study findings were comparable to a study by Patel et al,<sup>[12]</sup> in which 60% of study subjects had an Apgar score of  $<7$  at 1 min of life in spontaneous group and 8% had  $<7$  at 5 min of life with a mean Apgar score of 6.4 at 1 min of life and 8.7 at 5 min of life. In the induced group, 58.2% had an Apgar score of  $<7$  at 1 min of life and 6.2% had an Apgar score of  $<7$  at 5 min of life with a mean



Apgar score of 6.4 at 1 min of life and 8.3 at 5 min of life.

The present study findings were similar to a study by Singh A et al in which mean Apgar score at 1 min and 5 min was 7.6 and 8.9 in spontaneous group and 8.4 and 9.4 in induced group respectively. The present study findings were comparable to a study by Suchika G et al,<sup>[11]</sup> in which mean Apgar score at 1 min and 5 min was 7.3 and 8 in spontaneous group and 7.8 and 8.4 in induced group respectively. In the present study, NICU admission was required for 16% babies of the induced group and 13% babies in the spontaneous group. The present study findings were similar to a study by Patel et al,<sup>[12]</sup> in which 8% of babies in spontaneous group and 9.1% of babies in induced group needed NICU admission.

The present study findings were different to a study by Prysak M et al,<sup>[15]</sup> in which rate of NICU admissions were very low i.e. 4.6% among induced group and 3.9% in spontaneous group. The present study findings were different to a study by Guerra GV et al,<sup>[16]</sup> in which 4.3% and 4.5% in spontaneous and induced group needed NICU admission. The present study findings were similar to a study by Sujata P et al,<sup>[17]</sup> in which 15% of babies in Spontaneous group and 8% of babies in induced group needed NICU admission.

In the present study, in induced group the progress of Labour in partograph was in green zone in 86% of study subjects, in yellow zone in 4% and fetal distress was seen in 10%. In the spontaneous group the progress was in green zone in 90% and in 5% the progress was in yellow zone and 5% had fetal distress. The present study findings were different to a study by Singh A et al in which among spontaneous group - 55.1% in green zone, 33% yellow zone and 11.9% had fetal distress. In the Induced group, 57.4% were in green zone, 11.3% in yellow zone and 31.3% had fetal distress. The present study findings were similar to a study by Orji E et al,<sup>[18]</sup> in which among spontaneous group - 55.1% in green zone, 27.9% in yellow zone and 16.9% had fetal distress. In the Induced group, 57.4% in green zone, 9.6% in yellow zone and 33.1% had fetal distress.

In the present study, the mean hours of induction delivery outcome was  $12.3 \pm 4.51$  hours and the mean total duration of active phase was  $2.56 \pm 3.6$  hours in the induced group and  $1.62 \pm 1.07$  hours for the spontaneous group. The present study findings were comparable to a study by Ramya D et al in which mean induction to delivery time was  $10.29 \pm 7.19$  hours. The present study findings were similar to a study by Yadav K et al,<sup>[9]</sup> in which the mean duration of active phase in Spontaneous Group was 3.48 hours and in Induced Group was 3.54 hours.

The present study findings concurred with a study by Kumari G et al,<sup>[19]</sup> in which the mean duration of active phase in Spontaneous Group was 3.42 hours and in Induced Group was 3.58 hours. The present study findings were similar to a study by Patel et al,<sup>[12]</sup> in which mean hours of induction delivery outcome was 13.4 hours. The present study findings

were similar to a study by Adair et al,<sup>[16]</sup> in which mean hours of induction delivery outcome was 12.5 hours. The present study findings were different to a study by Singh A et al,<sup>[13]</sup> in which total duration of labour in spontaneous and induced group was 6 and 6.5 hours respectively. The present study findings were comparable to a study by Madan A et al,<sup>[21]</sup> in which, the mean duration of the active phase in spontaneous group among primigravida was  $4.08 \pm 2.30$  hrs and in multigravida was  $4.02 \pm 2.20$  hrs. In induced group, the mean duration of active phase in primigravidas was  $7.24 \pm 1.39$  hrs and in multigravidas was  $6.48 \pm 1.40$  hrs.

In this study, the association between the groups was assessed and a significant difference was noted. The induced group active phase (hours) was higher when compared with the spontaneous group. The correlation between the two groups was a positive correlation. The present study findings were different to a study by Yadav K et al,<sup>[9]</sup> in which the mean difference of active phase of labour in spontaneous and induced group was found to be statistically insignificant.

The present study findings were similar to a study by Madan A et al,<sup>[21]</sup> in which the mean difference of active phase of labour in spontaneous and induced group was found to be statistically significant. The present study findings were similar to a study by Tilde B O et al,<sup>[22]</sup> in which the active phase was longer in induced labors than in labors with spontaneous onset in nulliparous women. The estimated median duration using survival analyses was 433 min in spontaneous vs. 541 min in induced labors [unadjusted hazard ratio 0.76 (95% confidence interval 0.71–0.82) and adjusted hazard ratio 0.88 (95% confidence interval 0.82–0.95)].

## CONCLUSION

This comparative observational study was conducted in the department obstetrics and gynaecology of Gandhi general hospital, Secunderabad. The study was done from October 2019 to September 2021 with an aim to compare the progress of labour and delivery outcome among induced labour at 39 weeks versus spontaneous labour using partograph. A total of 200 subjects were included in the study and divided into two groups of 100 each under induced and spontaneous group. After obtaining consent from all the subjects' detailed history and clinical examination was noted using a pre tested questionnaire.

The results of the study suggested the mean age in the study was  $24.2 \pm 4.15$  and  $23.8 \pm 4.01$  years respectively.

Mean gestational age among the induced group was 39.2 weeks and mean gestational age in the spontaneous group was 38.2 weeks. The induced group 14 had comorbidities and in the spontaneous group 25 had comorbidities.

Among the 100 women of the induced group and 100 of spontaneous group, 14 and 10 underwent caesarean section respectively.

The mean Bishop score of the induced group was  $3.29 \pm 1.12$  and  $8.38 \pm 2.26$  for the spontaneous group. The mean amniotic fluid index in the induced group was  $7.99 \pm 3.52$  and in the spontaneous group the mean was  $7.64 \pm 3$ .

The mode of deliveries in the induced group was, 78 were vaginal deliveries, 8 were forceps assisted and 14 were emergency caesarean sections. In the spontaneous group 84 had vaginal delivery, 5 and 1 were for forceps and vacuum assisted and 10 underwent emergency caesarean sections.

The mean birth weight of the induced group was  $2.74 \pm 0.42$  Kgs and mean weight in the spontaneous group was  $2.63 \pm 0.39$  Kgs. Meconium stained liquor was seen in 11 of the induced group and 13 of the spontaneous group.

Mean APGAR score at 1st minute was  $7.86 \pm 0.40$  and  $7.85 \pm 0.47$  among the induced and spontaneous group respectively. At the 5th minute the mean score was  $9.91 \pm 0.37$  and  $9.89 \pm 0.42$  respectively.

NICU admission was required for 16 babies of the induced group and 13 babies in the spontaneous group.

In the induced group the progress was in green zone in 86, in yellow zone in 4 and fetal distress was seen in 10. In the spontaneous group the progress was in green zone in 90 and 5 the progress was in yellow zone and 5 had fetal distress.

The mean hours of induction delivery outcome was  $12.3 \pm 4.51$  hours and the mean total duration of active phase was  $2.56 \pm 3.6$  hours in the induced group and  $1.62 \pm 1.07$  hours for the spontaneous group.

The association between the groups were assessed were a significant difference was noted between them. The induced group active phase (hours) was higher when compared with the spontaneous group positive and a positive correlation was obtained between them.

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