

## A STUDY ON FETAL STATION AT ONSET OF LABOUR AND LABOUR OUTCOME IN A TERTIARY CARE HOSPITAL

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Received : 19/02/2023  
Received in revised form : 15/03/2023  
Accepted : 29/03/2023

**Keywords:**

Fetal station, Fetal descent,  
spontaneous labour

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DOI: 10.47009/jamp.2023.5.2.275

Source of Support: Nil,  
Conflict of Interest: None declared

*Int J Acad Med Pharm*  
2023; 5 (2); 1302-1307



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### Abstract

**Background:** Primigravidae with vertex presentation, between 37- and 42-weeks period of gestation were identified. Those with spontaneous onset of labour with no Antepartum or Intrapartum risk factors were-observed for Maternal and Fetal outcomes in relation to presenting station. The objectives are to assess course and duration of labour in relation to station of the head at the onset of labour, to note the Mode of delivery, to study the Maternal outcome & to study the Fetal outcome. As seen by APGAR score & NICU admissions. **Materials and Methods:** Study Design: This is a Hospital based prospective observational study. Study area: Department of Obstetrics & Gynaecology, Labour delivery and recovery (LDR) rooms at Gayatri Vidya Parishad Medical College, Visakhapatnam. Study Period: January 2022 – December 2022. Study population: Primigravidae at 37 to 41 completed weeks of gestation. Sample size: Study consisted a total of 100 subjects. Sampling Technique: Simple Random technique. **Result:** Out of 100 deliveries 23% of NICU admissions are noted of these 6 admissions were in view of Meconium stained Amniotic fluid as observed following ARM. These were delivered by LSCS. Rest of 17 admissions were in view of low APGAR scores at 5 minutes. The APGAR score is universally used for Fetal assessment at the time of birth and APGAR score of  $\geq 7$  at 5 minutes is considered assuring. Fetal Acidemia is suspected when APGAR scores are  $< 7$  at 5 minutes, with increased Fetal morbidity and Mortality. **Conclusion:** In conclusion, all primigravidae set into spontaneous labour with High Fetal station need to be given a Trial of labour with good monitoring and timely decisions. It is not necessarily an ominous finding and one can be optimistic towards vaginal delivery with good operative and NICU facilities.

## INTRODUCTION

Primigravidae with vertex presentation, between 37- and 42-weeks period of gestation were identified. Those with spontaneous onset of labour with no Antepartum or Intrapartum risk factors were-observed for Maternal and Fetal outcomes in relation to presenting station.<sup>[1]</sup>

It is observed close monitoring of the progress of labour is essential. The risk of a caesarean section rises proportionately to the station of the foetal head in 70 to 80 percent of nulliparous women who present with an unengaged head in the latent phase or at the beginning of the first stage of labour.

In spite of this increased of caesarean section, 80% of women give birth vaginally.<sup>[2]</sup>

The commonly used Foetal station classification systems that are based on a quantitative measurement in centimetres of the leading bony edge and the ischial spines are used. The midpoint (0 station) being the plane of the maternal ischial spines.

The purpose of this study is to investigate the relationship of the fetal station at the onset of labour with progress of labour, the mode of delivery, the maternal and fetal outcome. Primigravidae admitted in labour room with spontaneous onset of labour pains at term gestation were observed. The labour process, mode of delivery and maternal and fetal outcome were noted. The proposed outcome of

duration of labour, maternal and fetal morbidity was studied. The prediction of complications with high fetal stations at onset of labour helps in better monitoring and appropriate interventions to decrease morbidity.

#### Objectives

1. To assess course of labour, Duration of labour in relation to station of the head at the onset of labour.
2. To note the Mode of delivery
3. To study the Maternal outcome.
4. To study the Fetal outcome.

## MATERIALS AND METHODS

**Study Design:** Hospital based prospective observational study.

**Study Area:** Department of Obstetrics & Gynaecology, Labour delivery and recovery (LDR) rooms at Gayatri Vidya Parishad Medical College, Visakhapatnam. Study Period: January 2022 – December 2022.

**Study Population:** Primigravidae at 37 to 41 completed weeks of gestation.

**Sample Size:** Study consisted a total of 100 subjects.

**Sampling Technique:** Simple Random technique.

#### Inclusion Criteria

1. Primigravida.
2. Full term gestation.
3. Live singleton fetus.
4. Vertex presentation.
5. Intact membranes.
6. Spontaneous onset of labour.

#### Exclusion criteria

1. Multigravida.
2. Preterm deliveries.
3. Multiple gestations.
4. Non vertex presentations.
5. Patients with previous history of abortions.
6. Patients with obstetric complications like Hypertensive disorders of pregnancy, Gestational diabetes, Antepartum hemorrhage, Placenta praevia.
7. Patients with medical complications like Anemia, Cardiac diseases, Hepatic diseases, Renal diseases, Maternal infections, Fetal growth restriction.

#### Ethical Consideration

Institutional Ethical committee permission was taken prior to the commencement of the study.

#### Study Tools and Data Collection Procedure

A detailed history regarding period of Gestation and obstetric history is taken at admission. It was explained to women about the observational study

being undertaken. It is also explained that it causes no harm to mother as well as baby Consent taken Obstetric examination was done to confirm gestational age, lie, presentation, and station at onset of labour and was recorded. Baseline investigations were done.

- Monitoring was done by Partographs.
- Augmentation was done by ARM when no cervical changes were noted for 2 hours or cervical dilatation was <1 cm/hr.
- High dose regimen oxytocin infusions were started after an hour of ARM when no cervical changes were noted. Incremental doses were given at 30 minute intervals at the rate of 4m IU/min till adequate uterine action was reached.
- A decision of caesarean delivery was taken when
  1. Cervical changes were not noted with ARM and oxytocin infusions with adequate uterine activity for at least 2 hours – Arrest of dilation
  2. Descent of fetal head was not in the active labour with cervical dilatation–Arrest of descent (4), (5).
  3. Second stage exceeding 2 hours – Second stage arrest.
  4. Fetal heart rate abnormalities – Non reassuring fetal Cardiac status.
  5. Meconium stained amniotic fluid (MSAF).
- The mode of delivery, Fetal APGAR at 5 min after birth and NICU admissions noted.
- Fetal outcome was followed upto 7 days of life.

#### Statistical Analysis

The data was entered into MS-Excel & the statistical analysis was carried out with IBM SPSS Version 25.0. The data values for categorical variables are expressed as numbers and percentages. The connection between the groups was tested using the chi-square test. The data values for continuous variables are shown as mean & standard deviation. A student's t-test was used to compare the mean differences between groups. All P-values less than 0.05 are considered statistically significant.

## RESULTS

Numbers of teenage pregnancies ( $\leq 19$  years) were 25 (25%). 69 (69%) were in age group 20-25 years. 1 (1%) were in the age group of 31-35 years. 21% primigravidae were set into spontaneous labour between 38w1d and 39 wks. 45% primigravidae were set into spontaneous labour between 39 wks 1 day to 40 wks. 34% set into spontaneous labour between 40w1d to 41 wks. The mean gestational age of spontaneous onset of labour is 39 weeks 5 days, with standard deviation 0.82.

**Table 1: Age wise distribution of patients**

Age group	No of patients	percentage
$\leq 19$ years	25	25
20-25 years	69	69
26-30 years	5	5
31-35 years	1	1
	N=100	100

**Table 2: Distribution of study group according to fetal station at onset of labour**

Station	No of	Percentage
FF	7	7
-3	30	30
-2	30	30
-1	28	28
0	5	5
	N=10	100

7% of primigravidae set into spontaneous labour with free floating head. 30% of primigravidae at -3 station. 30% of primigravidae set into spontaneous labour at -2 station. 28% of primigravidae set into spontaneous labour at -1 station. 5% of primigravidae set into spontaneous labour with engaged head(0 station).

**Table 3: Mean duration of active phase according to fetal stations.**

Station	No of cases	Mean active phase (hours)	SD
FF	02	8.50	0.7
-3	16	6.24	1.998
-2	19	5.284	1.256
-1	26	4.526	1.829
0	05	2.92	1.12

F=79.53, p=0.0029, Sig.

The mean duration of active phase in higher stations i.e. FF, -3, -2 and -1 was longer as compared to 0 station.

**Table 4: Need for Augmentation of labour in relation to fetal station at onset of labour**

Station	No. of cases	Augmentation		ARM		ARM + oxytocin	
		No.	%	No.	%	No.	%
FF	7	7	100	2	28.6	5	71.4
-3	30	27	90	5	18.6	22	81.4
-2	30	23	76.6	3	13.04	20	86.95
-1	28	16	55.6	9	56.2	7	43.8
0	5	1	20	1	20	0	0
	N=100	74	74	20	27	54	73

F=43.66, p=0.007, Sig.

In cases of dysfunctional labour, due to inefficient uterine contractions, augmentation of labour was done either with ARM only or ARM along with oxytocin. 26 cases did not require augmentation. Percentages of cases requiring augmentation were more with higher stations. 80% of cases in 0 station did not require any augmentation.

The augmentation of labour was required in 74 cases. 100 % of cases with free required augmentation. 90% of cases with -3 stations,

76.6 % of cases with -2 station, 55.6% of cases with -1 station required augmentation. Only 20% of cases with 0 station required augmentation.

**Table 5: Mode of delivery in relation to fetal station at onset of labour**

Station	No of	FTNVD		OUTLET FORCEPS		LSCS	
		No	%	No	%	No	%
FF	7	0	0	2	28.5	5	71.4
-3	30	15	50	1	7.6	14	46.6
-2	30	17	56.6	2	6.6	11	36.6
-1	28	25	89.2	1	3.5	2	7.1
0	5	5	100	0	0	0	0
	N=100	62	62	6	6	32	32

Among the primigravidae in whom the fetal head was free floating at the time of spontaneous onset of labour, none had normal vaginal delivery, 28.5 % had outlet forceps delivery and 71.4 % delivered by caesarean section.

Among the primigravidae, who had fetal head at -3 station, 50 % had vaginal delivery, 7.6% delivered by outlet forceps and 46.6 % underwent caesarean section. The primigravidae with fetal head at -2 station, 56.6 % had vaginal delivery, 6.6 % delivered by outlet forceps and 36.6 % underwent caesarean section. The primagravidae with -1 fetal station, 89.2% had vaginal delivery, 3.5% had outlet forceps delivery, and 7.1 % underwent caesarean section.

100% of primigravidae with fetal head at 0 station had vaginal delivery.

**Table 6: Fetal station at onset of labour and arrest of progress of labour.**

Station	No of cases	Arrest of progress	
		No	%
FF	7	2	28.5
-3	30	9	30
-2	30	7	23.3
-1	28	1	3.5
0	5	0	0
Total	N=100	28	28
F=18.1, p=0.023,S			

The incidence of arrest of progress of labour in patients with higher fetal stations was higher when compared with lower fetal stations. Arrest of progress was seen in 28.5% of free floating fetal head station and 30% with fetal head at -3 station. There was no case of arrest of progress of labour in 0 group.

In the study group 6 cases (18.75%) had LSCS for arrest of descent and 7 cases (21.87%) had LSCS for arrest of dilatation. 7 cases (21.87%) had LSCS for second stage arrest. 6 cases (18.75%) had LSCS for non-reassuring fetal status and 6 cases (18.75%) had LSCS for meconium stained amniotic fluid (MSAF). No LSCS were noted in 0 station group.

**Table 7: Fetal station at onset of labour and maternal complications.**

Station	No of cases	Perineal tear	
		No	%
FF	7	1	14.3
-3	30	2	6.66
-2	30	2	6.66
-1	28	1	3.5
0	5	0	0
Total	N=100	6	6
F=27.78, p=0.013,S			

1 (14.3%) of free-floating group and 2 (6.66%) in -3 group, 2 (6.66%) in -2 group and 1 (3.5%) in -1 group had extension of episiotomy to third or fourth degree perineal tears. No postpartum haemorrhage, exhaustion and sepsis were noted in the study group. No maternal deaths were noted in the study group.

**Table 8: Comparison of mean birth weight with fetal stations.**

Station	FF	-3	-2	-1	0
Mean birth weight	2.95 Kg	2.86 Kg	2.836 Kg	2.77Kg	2.66 Kg

F=82.61, p=0.0028, Sig.

The mean birth weights were found to be more with higher fetal stations. 2.95 kgs in FF group, 2.86 kgs in -3 station group, 2.83 kgs in -2 station group, 2.77 kgs in -1 station group and 2.66 in 0 station group.

23% of NICU admissions are noted out of 100 deliveries. 6 admissions were in view of Meconium-stained amniotic fluid following ARM and were delivered by LSCS. 17 admissions were in view of APGAR scores <7 at 5 minutes. The apgar score is universally used for fetal assessment at the time of birth and apgar score of  $\geq 7$  at 5 minutes is considered assuring. Fetal Acidemia suspected when APGAR scores are < 7 at 5 minutes where fetal Morbidity and Mortality can be anticipated.

The NICU admissions were 57.14% in free floating group, 20% in -3 group, 26.6% in -2 group, 14.2% in -1 group and 20% in 0 group. No fetal deaths were noted in the study group.

8 cases (34.7%) were admitted for less than 24 hours, 12 cases (52.7%) admitted for 24-72 hours and 3 cases (13.04%) which needed intubation were admitted for more than 72 hours and discharged before 7 days of life.

**Table 9: Mean duration of nicu stay in relation to fetal station at onset of labour**

Fetal station	Ff	-3	-2	-1	0
Mean duration of NICU Stay	54 Hours	47 Hours	36.25 Hours	29.5 Hours	24 Hours

F=237.8, p=0.0005, HS

The mean duration of stay at NICU was 54 hours in FF group, 47 hours in -3 group, 36.25 hours in -2 group, 29.5 hours in -1 group and 24 hours in 0 group.

## DISCUSSION

Primigravidae with higher stations of fetal heads are considered as additional risk factor and need more investigation and follow up at time of labour and delivery. Therefore, such patients should be referred appropriately to hospitals with operative and NICU

facilities. In this study evaluation of relation of fetal station at onset of labour with progress of labour, mode of delivery and fetal outcome was done.

In the study group 69% (69 cases) primigravidae belong to 20-25 years age group and 5% (5 cases) belong to 26-30 yrs age group comparable to the study done by Dayal S et al where 70% primigravidae belong to 20-35 yrs group.<sup>[6]</sup> Teenage primigravida pregnancies were 25% (25 cases) which is an additional risk factor for increased maternal complications.<sup>[7]</sup> 20% (5 cases) cases delivered by caesarean section, 76% (19 cases) delivered by vaginal delivery and 4% (1 case) delivered by outlet forceps delivery.

In the study group, 21% (21 cases) set into spontaneous labour between 38w1d and 39 wks, 45% (45 cases) primigravidae set into spontaneous labour during 39w1d to 40w gestational age and 34% (34 cases) set into spontaneous labour between 40w1d and 41 weeks. Mean gestational age for onset of labour in the study group was 39w5d.

The distribution of primigravidae according to fetal stations were comparable to other studies of Shivamurthy et al (2014),<sup>[8]</sup> and Chougut et al,<sup>[9]</sup> and included 7% (7 cases) with free floating station, 30% (30 cases) with -3 station, 30% (30 cases) with -2 station, 28% (28 cases) with -1 station and 5% (5 cases) with 0 station i.e., engaged fetal head.<sup>[8]</sup>

The mean duration of active phase was longer with higher fetal stations i.e., 8.5 hours in FF station, 6.24 hours in -3 station, 5.28 hours in -2 station and 4.52 hours in -1 station and 2.92 hours in 0 station. It was comparable to the study done by Shivamurthy et al,<sup>[8]</sup> who had longer mean duration of active phases with higher stations. Freedman and Sachtlein,<sup>[10]</sup> demonstrated that higher station at onset of labour were associated with an increase in the duration of labour and in the incidence of dysfunctional labour patterns.

In cases of dysfunctional labour due to inefficient uterine contractions, augmentation of labour was done with either ARM or with ARM and oxytocin. Cardozo LD, et al,<sup>[11]</sup> showed that Primary dysfunctional labour could be improved by oxytocin, had an incidence of 93.8% vaginal delivery. The vaginal delivery rate was only 22.7% when there was no improvement in the rate of cervical dilatation when oxytocin was administered. In the study group 26% (26 cases) needed no augmentation and delivered by vaginal delivery and 74% (74 cases) needed augmentation. 20% (20 cases) needed only ARM and 54% (54 cases) needed ARM and oxytocin.

The incidence of patients requiring augmentation of labour was higher in higher fetal stations as compared to 0 station. 100% (7 cases) in FF station, 90% (27 cases) in -3 station, 76.6% (23 cases) in -2 station, 55.6% (16 cases) of -1 station and 20% (1 case) of 0 station required augmentation. The results were comparable to study done by Shivamurthy et al.<sup>[8]</sup>

In 20 cases where ARM was done 30% (6 cases) underwent caesarean section in view of MSAF and 70% (14 cases) delivered by vaginal delivery. In 54 cases where ARM and oxytocin was used for induction, 48.2% (26 cases) underwent caesarean section in view of Dysfunctional labour or Non-reassuring fetal status. 11.2% (6 cases) delivered by outlet forceps application and 40.6% (22 cases) delivered by vaginal delivery.

In 100 primigravidae, 62% (62 cases) had normal vaginal delivery, 6% (6 cases) delivered by Forceps application and 32% (32 cases) of primigravidae delivered by caesarean section. Among the primigravidae in whom fetal head was free floating at the time of admission, none had vaginal delivery, 28.5% (2 cases) had outlet forceps delivery and 71.4% (5 cases) delivered by caesarean section.

In -3 group, 50% (15 cases) had vaginal delivery, 7.6% (1 case) had outlet forceps delivery and 46.6% (14 cases) delivered by caesarean section. In -2 group, 56.6% (17 cases) had vaginal delivery, 6.6% (2 cases) had outlet forceps delivery and 36.6% (11 cases) delivered by caesarean section. In -1 group, 89.2% (25 cases) had vaginal delivery, 3.5% (1 case) had outlet forceps delivery and 7.1% (2 cases) delivered by caesarean section.

In 0 group, 100% (5 cases) had vaginal delivery. All primigravidae with engaged fetal head (0 station) had normal vaginal delivery. These results of the study done by Shivamurthy et al were 80% of FF group delivered by caesarean section, 21.7% of -3 group delivered by caesarean section and 6% of 0 station delivered by caesarean section.<sup>[8]</sup>

60% (57 cases) of primigravidae with unengaged fetal head at onset of labour had vaginal delivery, 6.31% (6 cases) had outlet forceps delivery and 33.68% (32 cases) delivered by caesarean section which was significant. Results were comparable to the studies done by Iqbal et al (2009) and Assadi et al (2005).<sup>[12,13]</sup>

Complications like Arrest of progress of labour were studied. 28% (28 cases) primigravidae had Arrest of progress. It was higher in higher fetal stations when compared to 0 station. 28.5% (2 cases) had arrest of progress in free floating group, 30% (9 cases) in -3 group, 23.3% (7 cases) in -2 group and 3.5% (1 case) had arrest of progress in -1 station and no cases had arrest of progress in 0 station group. Results were comparable to study done by Friedman et al.<sup>[10]</sup>

32% primigravidae underwent LSCS. The indications being arrest of descent in 18.75% (6 cases), arrest of dilatation in 21.87% (7 cases), second stage arrest in 21.87% (7 cases), non-reassuring fetal status in 18.75% (6 cases) and MSAF in 18.75% (6 cases). In FF group 5 cases underwent LSCS. The indications were MSAF in 40% (2 cases), arrest of descent in 20% (1 case), arrest of dilatation in 20% (1 case) and non-reassuring fetal status in 20% (1 case) which had a true knot of umbilical cord.

In -3 station group 14 cases underwent LSCS. The indications were arrest of descent in 28.75% (4

cases), arrest of dilatation in 35.7% (5 cases), MSAF in 14.28% (2 cases), non-reassuring fetal status in 14.28% (2 cases) and second stage arrest in 7.14% (1 case) due to cephalo pelvic disproportion.

In -2 station group 11 cases underwent LSCS. The indications were second stage arrest in 45.5% (5 cases) due to occipito posterior position and cephalopelvic disproportions, MSAF in 18.18% (2 cases), non-reassuring fetal status in 18.18% (2 cases) which had 2 loops of cord around fetal neck, arrest of descent in 9.09% (1 case) and arrest of dilatation in 9.09% (1 case).

In -1 station group 2 cases underwent LSCS. The indications were second stage arrest in 50% (1 case) and non-reassuring fetal status in 50% (1 case) with 3 loops of cord around fetal neck. In 0 station group no LSCS were noted.

Perineal tears as a result of extension of episiotomy were 6% (6 cases) in the study group. In FF group 28.5% (2 cases) had outlet forceps delivery and 14.3% (1 case) had extension of the episiotomy wound to third degree. In -3 group 6.66% (2 cases), in -2 group 6.66% (2 cases), 3.5% (1 case) in -1 group had extension of episiotomy to third degree. No fourth degree tears were noted in the study group. The results in the study done by shivamurthy et al were 20% in FF group, 8.7% in -3 group and 2% in 0 station group.<sup>[8]</sup>

The mean birth weights were more with higher fetal stations. Mean birth weight was 2.95 kgs in FF group, 2.66 kgs in -3 station group, 2.736 kgs in -2 station group, 2.77 kgs in -1 station group and 2.66 kgs in 0 station group. Results were comparable to other study of Dayal et al,<sup>[6]</sup> and Choudary et al.<sup>[14]</sup>

The outcomes of neonate noted in terms of apgar scores and admission to NICU done when apgar<7 and MSAF noted. 23% admissions were noted in the study group. 57.14% (4 cases) of FF group had NICU admission. 20% (6 cases) of -3 station, 26.6% (8 cases) of -2 station, 14.2% (4 cases) of -1 station and 20% (1 case) of 0 station had NICU admission. Low fetal apgar values are more noted in higher fetal stations than in 0 station group. One NICU admission in 0 station group was due to tight loop of cord around fetal neck. Results were comparable to Choudary et al study.<sup>[14]</sup>

The neonates admitted in NICU were followed. 8 cases (34.7%) were admitted for less than 24 hours in view of MSAF, 12 cases (52.7%) admitted for 24-72 hours for MSAF and APGAR<7; and 3 cases (13.04%) belonged to FF group (1 case) and -3 group (2 cases) which needed intubation were admitted for more than 72 hours in view of outlet forceps delivery and were discharged before 7 days of life. No neonatal deaths were noted in the study group.

The mean duration of stay was found to be more in higher fetal station group. In FF group it was 54 hours, 47 hours in -3 group, 36.25 hours in -2 group, 29.5 hours in -1 group and 24 hours in 0 station

group. Longterm outcome of the infants with MSAF and their long-term developmental outcome need to be studied even if they respond to conventional treatment well.<sup>[15]</sup>

## CONCLUSION

In conclusion, all Primigravidae set into spontaneous labour with High fetal station need to be given a Trial of labour with good monitoring and timely decisions. It is not necessarily an ominous finding and still one can be optimistic towards vaginal delivery with good operative and NICU facilities.

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