

## Labour Management and Obstetric Outcome in Nulliparous women admitted in latent phase in comparison with active phase of Labour

Hafza Zahoor<sup>1</sup>, Damandeep Kaur<sup>2</sup>, \*Rohini Jaggi<sup>3</sup>, Amita Gupta<sup>4</sup>

<sup>1</sup>Senior Resident, Department of Obstetrics and Gynaecology, Lal Ded Hospital, GMC, Srinagar.

<sup>2,3</sup>Senior Resident, Department of Obstetrics and Gynaecology, SMGS Hospital, GMC, Jammu.

<sup>4</sup>Professor, Department of Obstetrics and Gynaecology, SMGS Hospital, GMC, Jammu.

\*Corresponding author: Dr Rohini Jaggi  
Email id: rohini12@yahoo.com

### Abstract:

**Background:** Apart from hospital environment interrelated aspect of obstetric care, personal and emotional factors are likely to play an important role with respect to the course of labour. There is no consensus from available information as to when to admit a woman in labour in order to avoid subsequent adverse outcome. This study was an attempt to examine how the outcome of woman changed with timing of admission either in active or latent phase of spontaneous labour in a tertiary hospital setting.

**Methodology:** This study was a cross sectional observational study which was conducted on pregnant women admitted in latent and active phase of labour who fulfil the eligibility criteria after obtaining informed consent from the patient.

**Results:** ARM, Oxytocin and Misoprostol administration was significantly more among Latent phase of labour. Apgar score  $\leq 7$  at 1 minute was significantly more among Latent phase of labour. Meconium-stained liquor and NICU admission was significantly more among Latent phase of labour. The mean cervical dilatation at time of admission (cm) was significantly more among Active Phase of labour compared to the Latent phase. The mean duration of labour (hrs) was significantly more among latent Phase of labour compared to the active phase. There was no significant difference in mean age between Latent phase and Active Phase of labour.

**Conclusion:** Women who were admitted in latent phase of labour have higher risk of obstetric interventions than with women in active phase of labour. Vaginal delivery was more among patients admitted in active phase of labour compared to women admitted in latent phase of labour. PPH, perineal tear, cervical tear was more among women admitted in active phase of labour.

### INTRODUCTION:

Labour is “the presence of uterine contractions of sufficient frequency, duration and intensity to cause demonstrable effacement and dilatation of the cervix” (**ACOG Practice Bulletin 2003**). Attempts to define the norms and limits of labour duration have yielded variable results, undoubtedly because labour does not readily lend itself to measurement. In spite of measurement difficulties, a better understanding of the norms and slowest acceptable limits of labour duration and rates of cervical dilatation is important because this knowledge is the backbone of clinical decision – making in the intrapartum setting. (**Neal JL et al., 2010**).

Normal labour can be defined as spontaneous painful uterine contraction associated with effacement and dilatation of the cervix and descent of the head in vertex presentation (**Friedman EA 1954**).

One of the difficult decisions that women have to make during a pregnancy is the decision when to go into hospital if they think that labour may be beginning. Nulliparous women in particular have no experience of labour and so may find the timing of presentation to hospital particularly difficult to judge. The timing of hospital admission may have consequences for the progress of labour because hospital environment may affect the progress in latent phase.

Patients in labour are usually admitted to the hospital during the first stage of labour. It is important to differentiate between the active and latent phases because women admitted in latent labour tend to spend more time in the labour and have more interventions than those who are admitted during the active phase. When a pregnant woman is admitted during the latent phase of labour, physicians should set reasonable expectations for labour progress to avoid unnecessary interventions and anxiety (**Patterson DA *et al.*, 2008**). The widespread use of routine medical interventions in labour is of worldwide concern (**Cheyne H *et al.*, 2008**).

The management of labour and its complications are an issue of great importance worldwide. In low income countries, labour is commonly associated with high levels of fetal and maternal morbidity and mortality. On the other hand, in the developed world, deliveries are not problem free, although the consequences are of a lesser magnitude to the society as a whole. In both settings, however a careful and methodological approach to the management of labour and its abnormalities will be of benefit to the individual mother and her baby (**Janna JR 2013**).

Women who delayed admission while in labour had significant less oxytocin use compared with early admitted ones 40% versus 23%, and shorter duration of labour in hospital 13.5 hours versus 8.3 hours respectively (**McNivan *et al.*, 1998**) but there were no significant differences in caesarean delivery and neonatal outcomes (**Ness A *et al.*, 2005**). Possible reason for the increased rate of intervention is that prolonged latent phase may be misdiagnosed as a protraction or arrest disorder. Prolonged latent phase is associated with a higher risk of subsequent labour abnormalities, such as postpartum haemorrhage, chorioamnionitis and neonatal admission to the intensive care unit and long hospital stay (**Nachum Z *et al.*, 2010**).

On the other hand, later admission increases the rate of spontaneous vaginal delivery (**Paul Homes *et al.*, 2001**) (**Fergal D *et al.*, 1996**) (**Jennifer L B *et al.*, 2005**) (**Rahnama P *et al.*, 2006**).

There is no consensus from available information as to when to admit a woman in labour in order to avoid subsequent adverse outcome. First of all, it needs to define the onset of labour precisely and accordingly determine the timing of admission in labour. It is better to diagnose labour only when there is evidence of progressive cervical dilatation to indicate entry into the active phase. It has been proved that initial cervical dilatation rate is useful in early identification of those patient whose deliveries are complicated either by assisted vaginal deliveries or caesarean section both in nulliparous and multiparous women (**Melmed H *et al.*, 1976**) (**Evans MI *et al.*, 1976**).

This study was an attempt to examine how the outcome of woman changed with timing of admission either in active or latent phase of spontaneous labour in a tertiary hospital setting.

### **Aims and objectives:**

The Aims and Objectives of the study were:

- To determine and compare the rate of intervention among low risk women admitted in latent and active phase of labour.

- To determine and compare the rate of complications among them.
- To determine and compare the newborn APGAR Scores and admission to NICU.

### **Materials and Methods:**

The present study “Labour management and outcome in nulliparous women admitted in latent phase compared to active phase of labour” was conducted in the Department of Obstetrics and Gynaecology, SMGS Hospital, Jammu over a period of 1 year after obtaining ethical clearance from institutional ethical committee. This study was a cross sectional observational study which was conducted on pregnant women admitted in latent and active phase of labour who fulfil the eligibility criteria after obtaining informed consent from the patient.

### **Sample Size:**

The study population was calculated by using G-power software with 80% power and 5% of the significance level. The total sample size was determined to be 200, randomly divided into 2 groups of 100 each.

### **Inclusion and Exclusion criteria**

The study subjects were chosen as per the inclusion and exclusion criteria:

#### ***Inclusion criteria***

- Maternal age between 18-35 years
- Nulliparous patients
- Singleton pregnancy
- Cephalic presentation
- Gestational age between 37-42 weeks
- Low risk (there is no medical problem associated with the pregnancy)

#### ***Exclusion criteria***

- Women booked for Elective Caesarean section
- Multiple pregnancy
- Any previous surgical intervention
- Post term pregnancy
- Any other presentations different from cephalic
- Gestational age below 37 weeks
- Abnormal placentation recorded during antenatal care by ultrasonography
- Antepartum haemorrhage observed antenatally
- Chronic medical conditions (hypertension, asthma, diabetes mellitus, epilepsy, anaemia, HIV, and sickle cell disease)
- Eclampsia
- Diagnosed anomalies or fetal death

### **Methodology:**

After approval from the Institutional Ethical committee all patients were selected as per inclusion and exclusion criteria. A detailed history, complete physical examination and routine & appropriate investigations were done for all patients.

All the cases for present study were taken after thorough history taking and examination using a prepared proforma to collect the data. Two groups of patients were created

1. Group A: Latent phase of labour (cervical dilatation < 4 cm)

2. Group B: Active phase of labour (cervical dilatation  $\geq$  4 cm)

The complete history was taken with particular attention to age, parity, past obstetric history, menstrual history, any medical disease and family history.

Careful and thorough physical examination was performed.

Pelvic examination was done to determine the degree of cervical dilatation, effacement, station and to assess the pelvis. Fetal presentation and position were assessed.

Labour was diagnosed on the basis of –

1. Regular, recurrent painful contraction
2. Presence of show
3. Cervical effacement and dilatation

Fetal heart rates were recorded by auscultation in all cases. Fetal monitoring was done by noting heart rate with intermittent auscultation and by observing the colour of liquor. Maternal monitoring was done by recording BP, pulse, temperature, urinary output.

Each admitted patient was allocated to groups based on cervical dilatation at the time of admission. A paperless partograph was maintained in all cases. If progress of labour was not satisfactory due to weak inefficient uterine contractions, acceleration of labour was done by oxytocin augmentation. Course of labour was observed in terms of duration of labour, need for augmentation or labour analgesia in each and every case. Mode of delivery was observed regarding spontaneous or assisted vaginal delivery, caesarean section and indication for caesarean section. Routine investigations done in both groups and includes

- Blood grouping
- CBC -Hb, TLC, DLC, Platelet count, PBF
- Liver function tests -SGOT, SGPT, S.ALP, S.LDH, S.Bilirubin, Total protein, S.albumin
- Routine urine
- HIV, VDRL, HbsAg
- Blood sugar fasting/ random
- TSH, T3, T4

## **MATERNAL OUTCOMES AND PARAMETERS STUDIED**

1. Age wise distribution
2. Gravida wise distribution
3. Distribution according to gestational age
4. Latent phase vs Active phase of labour
5. Duration of labour
6. Need for interventions such as artificial rupture of membranes, augmentation with oxytocin
7. Mode of delivery
  - Normal vaginal delivery
  - Caesarean section
  - Instrumental delivery – forceps or vacuum
8. Indication of caesarean section
9. Morbidity causing parameters
  - PPH
  - Perineal injury
  - Total length of hospital stay

## **FETAL OUTCOME STUDIED**

1. APGAR Score at 1 min and 5 min
2. NICU admission: Indication
3. Birth weight

### **Statistical analysis**

The data was entered into the Microsoft excel and the statistical analysis was performed by statistical software SPSS version 25.0. The Quantitative (Numerical variables) were present in the form of mean and SD and the Qualitative (Categorical variables) were present in the form of frequency and percentage.

The unpaired t-test was used for comparing the mean values between the 2 groups whereas chi-square test was applied for comparing the frequency. The p-value was considered to be significant when less than 0.05.

### **Observation and Results:**

**Table 1: AGE PROFILE OF WOMEN**

Phase of admission	Age (years)				
	Mean	Std. Deviation	Mean Difference	t-test value	p-value
Latent phase	23.70	3.03	0.23	0.548	0.584
Active Phase	23.47	3.04			

#### **Unpaired t-test**

# Non-significant difference

The mean age was compared between Latent phase and Active Phase of labour using the unpaired t-test. There was no significant difference in mean age between Latent phase and Active Phase of labour.

**Table 2: DISTRIBUTION OF WOMEN IN TERMS OF GRAVIDA**

Obstetrical History	Phase of admission		Total
	Latent phase	Active Phase	
G2A1	6 6.0%	2 2.0%	8 4.0%
G3A2	3 3.0%	0 0.0%	3 1.5%
Primi	91 91.0%	98 98.0%	189 94.5%
Total	100 100.0%	100 100.0%	201 100.0%

**5.332, p-value = 0.070**

#### **Chi-square test**

# Non-significant difference

The distribution of parity was compared between Latent phase and Active Phase of labour using the chi-square test. There was no significant difference in distribution of parity between Latent phase and Active Phase of labour.

**Table 3: OBSTETRIC INTERVENTIONS IN WOMEN**

	Phase of admission		Total	Chi-square value	p-value
	Latent phase	Active Phase			
ARM	97	2	99	181.514	0.000

	97.0%	2.0%	49.5%		
Oxytocin	84	61	145	13.929	0.000
	84.0%	61.0%	72.5%		
Misoprostol	51	0	51	69.023	0.000
	51.0%	0.0%	25.4%		

**Chi-square test**

**\* Significant difference**

The distribution of ARM, Oxytocin and Misoprostol administration was compared between Latent phase and Active Phase of labour using the chi-square test. ARM, Oxytocin and Misoprostol administration was significantly more among Latent phase of labour.

**Table 4: MODE OF DELIVERY**

Mode of delivery	Phase of admission		Total
	Latent phase	Active Phase	
Instrumental delivery (Forceps)	3	3	6
	3.0%	3.0%	3.0%
Instrumental delivery (Ventouse)	6	7	13
	6.0%	7.0%	6.5%
LSCS for AFD (Bradycardia)	3	2	5
	3.0%	2.0%	2.5%
LSCS for AFD (Meconium)	20	1	21
	20.0%	1.0%	10.4%
LSCS for CPD	5	2	7
	5.0%	2.0%	3.5%
LSCS for non-descent of head at FD	1	1	2
	1.0%	1.0%	1.0%
LSCS for Non progression of labour	2	1	3
	2.0%	1.0%	1.5%
Normal vaginal delivery	60	83	144
	60.0%	83.0%	72.0%
<b><math>\chi^2</math> value = 25.082, p-value = 0.002*</b>			

**Chi-square test**

**\* Significant difference**

The distribution of Mode of delivery was compared between Latent phase and Active Phase of labour using the chi-square test. LSCS for AFD (Meconium) was significantly more among latent phase of labour. Normal vaginal delivery was significantly more among active phase of labour.

**Table 5: MATERNAL COMPLICATIONS**

Maternal outcome	Phase of admission		Total	Chi-square value	p-value
	Latent phase	Active Phase			
Perineal tear	4	9	13	2.003	0.157
	4.0%	9.0%	6.5%		
Cervical tear	0	2	2	2.000	0.157
	0.0%	2.0%	1.0%		
PPH	0	22	22	24.459	0.001*
	0.0%	22.0%	11.0%		

**Chi-square test**

**\* Significant difference**

The distribution of Perineal tear, Cervical tear and PPH was compared between Latent phase and Active Phase of labour using the chi-square test. PPH was significantly more among active phase of labour.

**Table 6: SEX OF BABY**

Sex of baby	Phase of admission		Total
	Latent phase	Active Phase	
Female	49	45	94
	49.0%	45.0%	47.0%
Male	51	55	106
	51.0%	55.0%	53.0%
<b>0.241, p-value = 0.624</b>			

Chi-square test

# Non-significant difference

The distribution of gender of baby was compared between Latent phase and Active Phase of labour using the chi-square test. There was no significant difference in distribution of gender of baby was compared between Latent phase and Active Phase of labour.

**Table 7: APGAR SCORE AT 1 MIN AND AT 5 MIN AFTER BIRTH**

		Phase of admission		Total	Chi-square value	p-value
		Latent phase	Active Phase			
APGAR Score at 1 min	≤ 7	4	1	5	12.218	0.002*
		4.0%	1.0%	2.5%		
	> 7	96	99	195		
		82.0%	97.0%	89.5%		
APGAR Score At 5 minutes	> 7	10	2	12	< 0.001*	1.000
		10.0%	2.0%	6.0%		

Chi-square test

\* Significant difference

The distribution of Apgar score at 1 minute and 5 minutes was compared between Latent phase and Active Phase of labour using the chi-square test. Apgar score ≤ 7 at 1 minute was significantly more among Latent phase of labour.

**Table 8: NEONATAL OUTCOME AND NICU ADMISSIONS**

Neonatal outcome	Phase of admission		Total	Chi-square value	p-value
	Latent phase	Active Phase			
Meconium stained liquor	20	3	23	14.381	0.001*
	20.0%	3.0%	11.5%		
NICU admission	10	3	13	4.105	0.043*
	10.0%	3.0%	6.5%		

Chi-square test

\* Significant difference

The distribution of Meconium stained liquor and NICU admission was compared between Latent phase and Active Phase of labour using the chi-square test. Meconium stained liquor and NICU admission was significantly more among Latent phase of labour.

**Table 9: GESTATIONAL AGE OF WOMEN**

Phase of	Gestational Age				t-test	p-value
	Mean	Std.	Mean			

admission		Deviation	Difference	value	
Latent phase	38.47	0.72	0.01	0.146	0.884
Active Phase	38.46	0.70			

**Unpaired t-test** # Non-significant difference

The mean gestational age was compared between Latent phase and Active Phase of labour using the unpaired t-test. There was no significant difference in mean gestational age between Latent phase and Active Phase of labour.

**Table 10: CERVICAL DILATATION AT TIME OF ADMISSION**

Phase of admission	Cervical dilatation at time of admission (cm)				
	Mean	Std. Deviation	Mean Difference	t-test value	p-value
Latent phase	2.51	0.90	-4.69	-28.581	0.001*
Active Phase	7.20	1.37			

**Unpaired t-test** \* Significant difference

The mean Cervical dilatation at time of admission (cm) was compared between Latent phase and Active Phase of labour using the unpaired t-test. The mean cervical dilatation at time of admission (cm) was significantly more among Active Phase of labour compared to the Latent phase.

**Table 11: DURATION OF LABOUR**

Phase of admission	Duration of labour (hrs)				
	Mean	Std. Deviation	Mean Difference	t-test value	p-value
Latent phase	7.95	3.58	6.37	17.046	0.001*
Active Phase	1.58	1.12			

**Unpaired t-test** \* Significant difference

The mean duration of labour (hrs) was compared between Latent phase and Active Phase of labour using the unpaired t-test. The mean duration of labour (hrs) was significantly more among latent Phase of labour compared to the active phase.

**Table 12: BIRTH WEIGHT**

Phase of admission	Birth weight				
	Mean	Std. Deviation	Mean Difference	t-test value	p-value
Latent phase	2.91	0.43	0.03	0.544	0.587
Active Phase	2.88	0.36			

**Unpaired t-test** # Non-significant difference

The mean age was compared between Latent phase and Active Phase of labour using the unpaired t-test. There was no significant difference in mean age between Latent phase and Active Phase of labour.

### Discussion:

The need to minimize medical or surgical interventions among pregnant women in labour is a challenge in most of clinical settings. This has led to never-ending debate among scholars between natural childbirth and the techno-medical model of childbirth (**Chuma C et al., 2014**).



Primiparous women are more likely to be admitted in early labour than multiparous women. After adjusting for parity, hospital admission during early labour was significantly associated with several clinical interventions (oxytocin augmentation, artificial rupture of membranes, epidural, pharmacological pain relief, caesarean birth and caesarean for slow progress, assisted vaginal birth, vaginal examinations, neonatal resuscitation), neonatal admission to special care and maternal length of hospital stay (**Miller YD et al., 2020**).

In our study, 200 women were divided into two groups – latent phase and active phase of labour. Each group included 100 women.

#### **Age**

The mean age of the study population in the study carried out by us was  $23.70 \pm 3.03$  and  $23.47 \pm 3.04$  years in the latent and active phase groups with no statistical difference between the 2 groups. This was in line with the findings by **Sharma R et al., (2017)**, found that mean age ( $25.7 \pm 4.6$  vs  $24.9 \pm 2.3$ ) of the study population were almost similar in both groups, **Chuma C et al., (2014)**, reported that majority of the subjects had age ranging between 18–40 years with mean age of  $25.42 \pm 5.25$  years. Majority of women in both active and latent phases of labour were in the age group between 20–35 years (88.8%) and (83.2%) respectively and **Schuchi FA et al., (2019)**, most of the mothers were between 21-30 years.

#### **Gravida**

In present study, 91.0% and 98.0% respectively were in the latent and active phase of labour. **Chuma C et al., (2014)**, found that among the total of 500 women in the study, 71% were primigravida with 34% admitted in latent phase and 66% in the active phase of labour.

#### **Gestational age**

In our study, we could not find any significant difference in mean gestational age between Latent phase and Active Phase of labour. **Sharma R et al., (2017)**, found that mean gestational age ( $39.2 \pm 1.1$  vs  $38.8 \pm 1.1$ ) of the study population were almost similar in both groups.

#### **Mode of delivery**

In current study, caesarean section was significantly more among latent phase of labour whereas the vaginal delivery was significantly more among active phase of labour. This was in line with the findings by similar studies done in Iran, USA and Ethiopia by **Caughey AB et al., (2009)**, **Bailit JL et al., (2005)** and **Kwast BE et al., (2008)**. Caesarean section was more in latent phase compared to active phase of labour. But reasons for caesarean section were different. The main indication for caesarean section in our study was fetal distress whereas dystocia was the leading indication in a study done in Iraq **Albassam AN (2010)**.

**Gifford DS et al., (2000)**, found that among women who delivered by caesarean, lack of progress was commonly diagnosed in the latent phase of labour. They found that in 51% of the caesareans were done for lack of progress of labour. Other indications for the caesarean were also recorded. The most common of these was non reassuring fetal status, which was present among 21% caesareans, and their findings are similar to our findings.

**Shuchi FA et al., (2019)**, also had similar findings. **Hemminki E and Simukka R (1986)**, observed those women who admitted to the hospital in early phase had more intervention during labour, more caesarean sections, and longer postpartum hospital stay in comparison to those coming late in active phase.

**Homes P and Lawrence W (2001)**, also demonstrated that women who present to hospital early in labour have higher risk of caesarean section and oxytocin induction than those who present later. Those presenting early may have dysfunctional latent phase of labour, they might have laboured for a long time attending hospital than women who presented later. **Chelmow D et al., (1993)**, found prolonged latent phase has been shown to be independently associated with an increased incidence of caesarean section and other labour abnormality.

Our study was also in congruence to the findings of **McNiven *et al.*, (1998)**, which showed that women admitted in early labour had a caesarean delivery rate of 10.6%, whereas those admitted in active labour had a caesarean delivery rate of 7.6%.

**Chuma C *et al.*, (2014)**, found that there was no difference in the proportion of women who had assisted vaginal delivery. Regarding mode of delivery, studies in Bangladesh and Ethiopia found that normal vaginal delivery was significantly higher in active phase of labour than in latent phase of labour, the finding which relate to this study **Janna JR and Chowdhury SB (2013)**.

**Leitch CR and Walker JJ (1998)**, demonstrated failure to progress remain the major indication underlying the decision to perform caesarean section followed by fetal indication. The present study and other two studies by **Parvin Z (2003) and Rahman T (2007)**, also reflects the same. Here major indication of caesarean section was dystocia which included failure to progress followed by fetal distress.

### **Augmentation**

In our study, augmentation with ARM, Oxytocin, Misoprostol was significantly more among latent phase of labour. This coincided with the study by **McNiven PS *et al.*, (1998)**, showed a statistically significant increase in oxytocin use and epidural administration among women admitted in early labour.

**Chuma C *et al.*, (2014)**, found that women who were admitted in their latent phase of labour have increased obstetric interventions compared to those in active phase of labour, the findings which are similar to the previous studies done in Scotland and USA **Cheyne H *et al.*, (2008)** and **Bailit JL *et al.*, (2005)**. The most frequent interventions were augmentation with oxytocin which was high in women admitted in latent phase than active phase of labour (33.6% vs 20.8 p < 0.05). This was similar to other studies done in Iraq (58.3% vs 41.5%) **Albassam AN (2010)** and Columbus (80.4% vs 48.9%). **Albassam AN (2010)** and **Jessica Bruns SN (2011)**. However, these findings are different from the study done in Iran which found that the rate of oxytocin augmentation was similar in both groups **Rahnama P *et al.*, (2006)**.

**Sharma R *et al.*, (2017)**, showed a higher percentage of women needed oxytocin for augmentation both in group I and group II but difference did not reach statistical significance. It was found that women who were admitted in their latent phase of labour have increased obstetric interventions compared to those in active phase of labour, the findings which are similar to the previous studies done by **Cheyne H *et al.*, (2008)** and **Bailit JL *et al.*, (2005)**.

**Holmes P *et al.*, (2001)**, found greater frequencies of use of oxytocin and epidural analgesia by women presenting earlier in labour compared to women in active labour. However our results were not consistent with the studies done by **Albassam AN (2010)** (58.3% vs 41.5%) and **Jessica Burns SN (2011)** (80.4% vs 48.9%).

Our finding of frequent oxytocin administration shortly after admission in the early admission group could suggest that labour progress in these women is hampered from the beginning and continue to be such during the complete course of labour **Petersen A *et al.*, (2013)** and **Tracy SK *et al.*, (2007)**. However, the early use of oxytocin can also contribute to the observed elevated risk for caesarean section: women who receive oxytocin early in labour may be exhausted by the time they reach the second stage, resulting in the diagnosis of dystocia at this late stage **Svardby K *et al.*, (2006)**.

Interesting observation is that oxytocin administration was associated with no change in risk of caesarean among women in earliest and latest studied admission groups, while it was in the intermediate admission group. This suggests a non-linear effect of oxytocin on the mode of birth in the process of labour. Non-linear effects of interventions have been observed regarding labour duration and mode of birth only recently **Gross MM *et al.*, (2014)**.

The odds of oxytocin augmentation was more than three times higher for women admitted in early labour than those admitted in active labour, consistent with associations found in all **Homes P et al., (2001)**, **Bailit JL et al., (2005)**, **Rota A et al., (2017)**, **Hemminki E and Simukka R (1986)**, **Albassam AN (2010)**, **Neal JL et al., (2014)** and **Mikolajczyk RT et al., (2016)**. Our findings indicate an absolute 24–27% difference (depending on the cut-point for defining early labour) in rate of oxytocin augmentation between women admitted in early and active labour. Others have reported differences in the rate of augmentation between women admitted in early versus active labour from - 0.50% **Rahnama P et al., (2006)** to 47.0% **Mikolajczyk RT et al., (2016)**. Our findings of the absolute differences in rates and the odds of oxytocin augmentation were persistent across the alternative definitions of early labour applied here.

### **Duration of labour**

In our study, the mean duration of labour (hrs) was significantly more among latent Phase of labour compared to the active phase. The association between timing of admission and length of maternal hospital stay was attenuated after accounting for mode of birth in this study, but retained significance even after adjustment when early labour was defined as < 5 cm cervical dilatation. **Miller YD et al., (2020)**, reported that women admitted in early labour had 2.8–3.5 times the odds of caesarean than those admitted in active labour (after accounting for parity), and their infants had 1.5–1.6 times the odds of special care nursery admission, indicates a significant combined burden of early admission on both women and the healthcare system.

**Miller YD et al., (2020)**, had finding that admission before 5 cm cervical dilatation as associated with 2.8 times the odds of caesarean birth, was consistent with findings from another study in Australia that employed the same criteria for early labour admission and found it to be associated with 2.4 times the odds of caesarean birth **Davey MA et al., (2013)**.

In studies by **Albers LL et al., (1996)**, **Albers LL (1999)** and **Jones M and Larson E (2003)**, the investigators specifically aimed to identify the duration of spontaneous ‘active labour’ (i.e., no oxytocin, no epidurals, no operative deliveries) among low-risk, nulliparous women delivering vaginally. Defining ‘active labour’ as the time necessary for the cervix to dilate from 4 to 10 cm, these investigators reported that spontaneous ‘active labour’ lasts 6.2–7.7 hours on average with wide variability. The mean ‘active u duration of 7.7 hours reported by **Albers LL et al., (1996)** and **Albers LL (1999)** in their 2 studies was longer among ‘active labour’ duration.

### **Maternal complications**

In current study, post-partum haemorrhage was significantly more among active phase of labour.

**Chuma C et al., (2014)**, showed that more women had perineal tear and PPH in the active phase group than those in the latent phase group. PPH in the active phase group in this study occurred largely among primiparous women in approximately 50% of cases; thus the difference in labour complication pattern from other studies could be attributed to human resource constraints. The midwife to patient ratio in labour ward at Bugando Medical Centre is insufficient to allow provision of the standard active management of third stage of labour to every woman who gives birth.

**Sharma R et al., (2017)**, reported that more women had perineal tear (6.2%) and PPH (6.2%) in group 1, similar to this, **Bailit JL et al., (2005)**, observed more cases of PPH (5.7%) in latent phase group and none was found in active phase group whereas **Janna JR and Chowdhury SB (2013)**, observed no differences in PPH in the two groups.

### **Neonatal outcome**

Apgar score  $\leq 7$  at 1 minute in the present study was significantly more among Latent phase of labour. In current study, Meconium stained liquor and NICU admission was significantly more among Latent phase of labour.

Similar to our study, **Sharma R et al., (2017)**, found no statistical difference between the birth weights between the 2 groups. **Janna JR and Chowdhury SB et al., (2013)**, stated that the infant birth weight failed to show any significant difference (mean  $3.0 \pm 0.3$  kg vs  $2.9 \pm 0.3$  kg). Mean infant birth weight difference between two groups was insignificant by other studies also **Bailit JL et al., (2005)** and **Impey L et al., (2000)**.

Dissimilar to our study, the studies in Iraq and USA **Bailit JL et al., (2005)** and **Albassam AN (2010)**, found no statistical significant difference in fetal outcomes in terms of Apgar score and admission in Neonatal Intensive Care Unit between newborns delivered by women in latent compared to those delivered by women in active phase of labour. Since there was no difference in fetal outcomes between the two groups one may argue that a subset of women in latent phase group received unnecessary interventions.

With regard to birth asphyxia of baby, **Parvin Z (2003)** and **Rahman T (2007)**, found a high proportion of baby from group I asphyxiated than baby from group II (71.3% and 62.5% respectively). **Janna JR and Chowdhury SB (2013)**, found that 5.7% from group I and 4.0% from group II and mean Apgar difference was statistically insignificant. It is presumed that difference in outcome regarding asphyxia might have influenced by the strict exclusion criteria of the present study which enrolled only low risk term gravidas.

#### LIMITATION OF THE STUDY:

The sample size of present study was small. So, the result cannot be generalized, and a larger prospective, randomized trial would be needed to confirm whether exposure to the medical system confers additional risk to the patient admitted in latent phase labour.

#### References:

1. Abasian Kasegari F, Pazandeh F, Darvish S, Huss R, Nasiri M. Admitting women in active labour: A randomised controlled trial about the effects of protocol use on childbirth method and interventions. *Women Birth.* 2020;33(6):e543-e548.
2. ACOG Practice Bulletin Number 49. Dystocia and augmentation of labor. American College of Obstetricians and Gynaecologists. *Obstet Gynecol.* 2003;102(6):1445-54.
3. ACOG Practice Bulletin No. 40. Clinical management guidelines for obstetrician – gynaecologist: *Obstet Gynecol* 2002;100(5 Pt 1):1045-50.
4. Albassam AN. The outcome of latent phase vs Active phase admission to labour room of low risk nulliparous women in labour. *J Fac Med Baghdad.* 2010;52(2):147-51.
5. Albers L. Rethinking dystocia: Patience please. *Midwifery Information and Resource Service (MIDIRS) Midwifery Digest.* 2001;11(3):351-53.
6. Albers LL. The duration of labor in healthy women. *J Perinatol.* 1999;19(2):114-9.
7. Albers LL, Schiff M, Gorwoda JG. The length of active labor in normal pregnancies. *Obstet Gynecol.* 1996;87(3):355-9.
8. Bailit JL, Dierker L, Blanchard MH, Mercer BM. Outcomes of women presenting in active versus latent phase of spontaneous labor. *Obstet Gynecol.* 2005;105(1):77-9.
9. Bohra U, Donnelly J, Oconnell MP, Geary MP, Macquillan K, Keane DP. Active management of labour revisited:the first (1000) primiparous labours. *Obstet Gynaecol.* 2003;23:118-20.

10. Boujenah J, Carbillon L, Banh P, Sibony O, Korb D. Term spontaneous trial of labor in nulliparous women of short stature: A hospitals-based cohort study. *Eur J Obstet Gynecol Reprod Biol.* 2020;246:181-186.
11. Caughey AB, Sundaram V, Kaimal AJ, Cheng YW, Gienger A, Little SE, *et al.* Maternal and neonatal outcomes of elective induction of labor. *Evid Rep Technol Assess (Full Rep).* 2009;(176):1-257.
12. Chelmow D, Kilpatrick SJ, Laros RK. Maternal & Neonatal Outcomes after Prolonged Latent Phase. *Obstet Gynaecol.* 1993;81(4):486-91.
13. Cheyne H, Hundley V, Dowding D, Bland JM, McNamee P, Greer I, Styles M, Barnett CA, Scotland G, Niven C. Effects of algorithm for diagnosis of active labour: cluster randomised trial. *BMJ.* 2008;337:a2396.
14. Chuma C, Kihunrwa A, Matovelo D, Mahendeka M. Labour management and obstetric outcomes in pregnant women admitted in latent phase compared to active phase of labour at Bugando Medical Centre in Tanzania. *BMC Pregnancy Childbirth.* 2014;14(68):1471-2393.
15. Davey MA, McLachlan HL, Forster D, Flood M. Influence of timing of admission in labour and management of labour on method of birth: results from a randomised controlled trial of caseload midwifery (COSMOS trial). *Midwifery.* 2013;29(12):1297-302.
16. Evans MI, Lachman E, Kral S, Melmed H. Predictive value of cervical dilatation in labour in multiparous women. *Isr J Med Sci.* 1976;12(12): 1399-403.
17. Friedman E. The graphic analysis of labor. *Am J Obstet Gynecol.* 1954;68(6):1568-75.
18. Gichuhi JW, Aruasa WK, Oyieke JBO. The relationship between cervical dilatation at initial presentation in labour and subsequent intervention at Kenyatta National Hospital labour ward. *ijst.* 2014;3(6):pp.47-60.
19. Gifford DS, Morton SC, Fiske M, Keeseey J, Keeler E, Kahn KL. Lack of progress in labor as a reason for cesarean. *Obstet & Gynaecol.* 2000;95(4):589-95.
20. Gross MM, Fromke C, Hecker H. The timing of amniotomy, oxytocin and neuraxial analgesia and its association with labour duration and mode of birth. *Arch Gynecol Obstet.* 2014;289(1):41–8.
21. Gross MM, Haunschild T, Stoexen T, Mathner V, Guentar HH. Women's recognition of the spontaneous onset of labor. *Birth* 2003;30(4):267-71.
22. Hemminki E, Simukka R. The timing of hospital admission and progress of labour. *Eur J Obstet Gynecol Reprod Biol.* 1986;22(1-2):85-94.
23. Holmes P, Oppenheimer LW, Wen SW. The relationship between cervical dilatation at initial presentation in labour and subsequent intervention. *BJOG.* 2001;108(11):1120-4.
24. Impey L, Hobson J, O'herlihy C. Graphic analysis of actively managed labor: prospective computation of labor progress in 500 consecutive nulliparous women in spontaneous labor at term. *Am J Obstet Gynecol.* 2000;183(2):438–43.
25. Iobst SE, Breman RB, Bingham D, Storr CL, Zhu S, Johantgen M. Associations among cervical dilatation at admission, intrapartum care, and birth mode in low-risk, nulliparous women. *Birth.* 2019;46(2):253-261.
26. Jackson DJ, Lang JM, Ecker J, Swartz WH, Heeren T. Impact of collaborative management and early admission in labor on method of delivery. *J Obstet Gynecol Neonatal Nurs.* 2003;32(2):147-57.
27. Janna JR, Chowdhury SB. Impact of timing of admission in labour on subsequent outcome. *Community Based Medical Journal.* 2013; 2(1):21-28.
28. Jessica Bruns SN: Differences in inflammation, interventions rates, and birth outcomes in active and pre active labor admission groups. 2011, thesis.

29. Jones M, Larson E. Length of normal labor in women of Hispanic origin. *J Midwifery Womens Health*. 2003;48(1):2–9.
30. Kabiraj SK, Bhowmik J, Nath HD. A prospective study on the relationship between cervical dilatation at initial presentation in labour and subsequent outcome in nulliparous women. *Chattagram Maa-O-Shishu Hospital Medical College Journal* 2014;13(1):39-41.
31. Kauffman E, Souter VL, Katon JG, Sitcov K. Cervical dilation on admission in term spontaneous labour and maternal and neonatal outcomes. *Obstet Gynecol*. 2016;127(3):481-8.
32. Kwast BE, Poovan P, Vera Edita, Kohls E. The modified WHO partograph: do we need a latent phase? *Afr J Midwifery Women's Health* 2008;2(3):143-8.
33. Leitch CR, Walker JJ. The rise in caesarean section rate: the same indications but a lower threshold. *Br J Obstet and Gynaecol*. 1998;105(6):621-6.
34. Malone FD, Geary M, Chelmow D, Stronge J, Boylan P, D'Alton ME. Prolonged labor in nulliparous: lessons from the active management of labor. *Obstet Gynecol*. 1996;88(2):211-5.
35. McNivan PS, Williams JI, Hodnett E, Kaufman K, Hannah ME. An early labor assessment program: A randomized, controlled trial. *Birth*. 1998;25(1):5-10.
36. Melmed H, Evans M. Predictive value of cervical dilatation rate in primipara labor. *Obstet Gynecol*. 1976;47(5):511-515.
37. Mikolajczyk RT, Zhang J, Grewal J, Chan LC, Petersen A, Gross MM. Early versus Late Admission to Labor Affects Labor Progression and Risk of Cesarean Section in Nulliparous Women. *Front Med (Lausanne)*. 2016;3:26.
38. Miller YD, Armanasco AA, McCosker L, Thompson R. Variations in outcomes for women admitted to hospital in early versus active labour: an observational study. *BMC Pregnancy Childbirth*. 2020; 20(1):469.
39. Nachum Z, Garmi G, Kadan Y, Zafran N, Shalev E, Salim R. Comparison between amniotomy, oxytocin or both for augmentation of labour in prolonged latent phase: a randomized controlled trial. *Reprod Biol Endocrinol*. 2010;8:136.
40. Neal JL, Lowe NK, Ahijevych KL, Patrick TE, Cabbage LA, Corwin EJ. "Active labor" duration and dilation rates among low-risk, nulliparous women with spontaneous labor onset: a systematic review. *J Midwifery Womens Health*. 2010;55(4):308-18.
41. Neal JL, Lamp JM, Buck JS, Lowe NK, Gillespie SL, Ryan SL. Outcomes of nulliparous women with spontaneous labour onset admitted to hospitals in preactive versus active labour. *J midwifery Womens Health*. 2014;59(1):28-34.
42. Ness A, Goldberg J, Berghella V: Abnormalities of the first and second stages of labor. *Obstet Gynecol Clin North Am*. 2005;32(2):201-20.
43. Parvin Z. Cervical dilatation of initial presentation in labour and subsequent outcome- a prospective study. [dissertation] *BCPS*. 2003.
44. Patterson DA, Winslow M, Matus CD: Spontaneous vaginal delivery. *Am Fam Physician*. 2008;78(3):336–341.
45. Petersen A, Poetter U, Michelsen C, Gross MM. The sequence of intrapartum interventions: a descriptive approach to the cascade of interventions. *Arch Gynecol Obstet*. 2013;288(2):245–54.
46. Rahnama P, Ziaei S, Faghihzadeh S. Impact of early admission in labor on method of delivery. *Int J Gynecol Obstet*. 2006;92(3):217-20.
47. Rota A, Antolini L, Colciago E, Nespoli A, Borrelli SE, Fumagalli S. Timing of hospital admission in labour: latent versus active phase, mode of birth and intrapartum interventions. A correlational study. *Women and Birth*. 2018;31(4)313-318.

48. Sargunam PN, Bak LLM, Tan PC, Vallikkannu N, Noor Azmi MA, Zaidi SN, Win ST, Omar SZ. Induction of labor compared to expectant management in term nulliparas with a latent phase of labor of more than 8 hours: a randomized trial. *BMC Pregnancy Childbirth*. 2019;19(1):493.
49. Schuchi FA, Lovereen S, Mina MN. Outcome of Mode of Delivery in Nulliparous and Multiparous Women Presenting with Early and Late Cervical Dilatation. *Delta Medical College Journal*. 2019;7(1):16-20.
50. Shah J, Shah S, Chauhan K, Ramachandran A. Management of labour and obstetric outcome of pregnant women in latent phase versus active phase of labour at the time of admission. *International Journal of Science and Research*. 2020;9(3):1056-1058.
51. Sharma R, Bhojwani P, Meena P, Mathur S. Does Admission in Labour Room During Latent Phase of Labour Versus Active Phase Really Matters in Low Risk Women Presenting at Term? A Cross-Sectional Observational Study. *Ann. Int. Med. Den. Res*. 2017;3(1): OG01-OG04.
52. Svärdby K, Nordström L, Sellström E. Primiparas with or without oxytocin augmentation: a prospective descriptive study. *J Clin Nurs*. 2007;16(1):179–84.
53. Tamanna Rahman. A prospective study on the relationship between cervical dilatation at initial presentation in labour and subsequent outcome. [dissertation] *BCPS*. 2007.
54. Tracy SK, Sullivan E, Wang YA, Black D, Tracy M. Birth outcomes associated with interventions in labour amongst low risk women: a population-based study. *Women Birth*. 2007;20(2):41–8.
55. Wuitchik M, Baikol D, Lipshitz J. The clinical significance of pain and cognitive activity in latent labor. *Obstet Gynecol*. 1989;73(1):33-42.
56. Zadeh SN, Shafaie FS, Ghojazadeh M. The effects of early admission of pregnant women during latent phase on pregnant outcomes in Tabriz Taleghani Hospital. *International Journal of Women's Health and Reproduction Sciences*. 2014;2(4):254-259.