



INSIGHT INTO NEW PERCEPTION OF DURATION OF ACTIVE PHASE OF LABOUR.

Obstetrics & Gynaecology

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ABSTRACT

Background: Numerous recent research into primordial process of labour have recommended change in cutoff for beginning of active phase of labour from 4cms to 6cms. Objective of our work was to study duration of active phase of labour in low-risk pregnant women using 4cms and 6cms as beginning of active phase of labour. **Methodology:** It was a prospective observational study. It was conducted in 100 singleton pregnant women delivering at institute of Sri Venkat Sai medical college hospital, Mahabubnagar. Duration of active phase of labour was calculated in hours and in percentiles. The rate of cervical dilatation and duration of progress from 4-6cms, 6-8cms, 8-10cms was calculated using interval censored regression. **Results:** Duration of active phase was shorter when cutoff of 6cms was taken. In primigravida, to progress from 4 to 6 cms, slowest rate of cervical dilatation was 0.25 cms/hour and maximum duration was 8hrs and in multigravida the slowest rate was 0.33 cms/hour and maximum duration was 6hrs. **Conclusion:** There is slower progress of labour which is new normal both in primigravida and multigravida. Labor can be very slow to very fast, so mean value of labor progress cannot be applied for all parturient. Individualised care will reduce overdiagnosis of abnormal labours and its consequences.

KEYWORDS

Labour, active phase, labour duration, nullipara, multipara.

INTRODUCTION:

Dr. Emmanuel Friedman was the creator of Friedman's curve in 1950's which depicted for the first-time rate of cervical dilatation and duration of labour in parturient¹. This curve was the foundation of management of labour till beginning of this millennium. After 2000 many scientists have newer evidence to recommend change in duration of labour and rate of progression of labour, which is believed to be much slower than traditional thought of 1cm/hr²⁻⁴. Appreciating this understanding of normal labour will prevent overdiagnosis of abnormal labour and their interventions, thus nip in the bud of ever rising caesarean section rates. Our study was planned to observe duration of active phase of labour in low-risk pregnancies when cutoff for active phase was taken as 4cms and 6cms.

METHODOLOGY:

It was a prospective observational study. It was conducted in 100 singleton pregnant women delivering at institute of Sri Venkat Sai medical college hospital, Mahabubnagar, after obtaining informed consent. Inclusion criteria were age group 18–35year, singleton pregnancies with cephalic presentation, primigravida and multigravida, spontaneous onset of labour, term gestation, low risk cases. Exclusion criteria were multiple pregnancy, previous caesarean, pre-term delivery, antepartum haemorrhage, high risk pregnancies, fetal growth restriction. The participants were interviewed and predesigned proforma was filled with details regarding socio demographic factors, obstetric history and examination. WHO partogram was plotted prospectively starting from 4cms and after delivery retrospectively partogram was plotted starting from 6cms. Statistical analysis: Interval censored regression was used to estimate median duration of active phase of labour from 4-10cms and 6-10cms. We also calculated rate of cervical dilatation and duration from 4-6, 6-8, 8-10cms dilatation of cervix.

RESULTS:

The mean age in study group was Mean $\pm$ SD: 23.46 $\pm$ 3.18. 45% were primigravida and 55% were multigravidas. When considering beginning of active phase at 4cms, in primigravida, the minimum duration of active phase was 1.05 hours and the maximum duration was 10.30 hours. In multigravida, the minimum duration of active phase was 0.35 hours and the maximum duration was 9.45 hours. P value was <0.001, both in nullipara and multipara it was statistically significant. When considering the beginning of active phase of labor at 6cms, in primigravida, the minimum duration of active phase was 0.2 hours and the maximum duration was 4.15 hours. In multigravida, the minimum duration of active phase was 0.15 hours, and the maximum

duration was 4.75 hours. P value was <0.001, both in nulligravida and multigravida it was statistically significant.

In primigravida, the 95th percentile from 4 to 10cms was 8.27 hours and from 6 to 10cms was 3.89 hours. In multi gravida, the 95th percentile from 4 to 10cms was 7.23 hours and from 6 to 10cms was 3.34 hours.

Table 1: Duration of active phase of labour from 4-10cms and 6-10cms in primigravida and multigravida.

Duration in hrs. min	Primigravida			Multigravida		
	Min.	Max.	Mean $\pm$ SD	Min.	Max.	Mean $\pm$ SD
Active Phase (4-10cms)	1.05	10.30	4.39 $\pm$ 2.24	0.35	9.45	3.77 $\pm$ 1.97
Active Phase (6-10cms)	0.20	4.15	1.49 $\pm$ 1.09	0.15	4.05	1.29 $\pm$ 1.06

Table 2: Duration of active phase of labour in percentiles in primigravida and multigravida:

	Primigravida		Multigravida	
	4-10 cms	6 to 10 cms	4 to 10 cms	6 to 10 cms
Mean	4.39	1.49	3.77	1.29
Median	4.15	1.25	3.45	1.15
Standard deviation	2.24	1.09	1.97	1.06
5th percentile	1.26	0.25	1.15	0.20
50th percentile	4.15	1.25	3.45	1.15
95th percentile	8.27	3.89	7.23	3.34

In primigravida, to progress from 4 to 6cms, slowest rate was 0.25 cms/hour, and from 6 to 8 cms, the slowest rate was 0.66cms/hour, and from 8 to 10cms, the slowest rate was 1.5 cms/hour. In multipara, to progress from 4 to 6cms, the slowest rate was 0.33 cms/hour, from 6 to 8cms, the slowest rate was 0.5 cms/hour, and from 8 to 10cms, the slowest rate was 1.14 cms/hour. P value was < 0.001 in both primigravida and multigravida it was statistically significant. Details are described in Table 3.

Table 3: Rate of cervical dilatation from 4-10cms and 6-10cms in primigravida and multigravida:

Cervical dilatation	Primigravida			Multigravida		
	Slowest/ max Cm/hour	Fastest/ minimum Cm/hour	Mean rate	Slowest/ max Cm/hour	Fastest/ min	Mean rate Cm/hour
4-10	0.58	5.7	1.36	0.63	17.14	1.59
6-10	0.96	20	2.68	0.73	26.6	3.10
4-6	0.25	3	0.66	0.33	8	0.8

6-8	0.66	8	1.72	0.5	12.5	1.9
8-10	1.5	25	4.4	1.14	25	6.06

Table 4: Duration of cervical dilatation from 4-6cms, 6-8cms, 8-10cms in Primigravida and multigravida.

Dilatation	PRIMI			MULTI		
	Max. Duration (minutes)	Min. Duration (minutes)	Mean $\pm$ SD (minutes)	Max. duration	Min. duration	Mean $\pm$ SD (minutes)
4-6 cm	480(8h)	40	185.77 $\pm$ 103.55	360(6h)	15	150.36 $\pm$ 73.98
6-8 cm	180(3h)	15	70.33 $\pm$ 45.73	210(3.5 h)	10	63.16 $\pm$ 46.01
8-10 cm	80(1h20m)	5	27.22 $\pm$ 19.20	105(1.7 5h)	5	20.10 $\pm$ 19.74

In primigravida, the maximum time taken to progress from 4-6cms was 480 minutes (8 hours), from 6-8cms, it was 180 minutes (3 hours) and from 8-10cms, it was 80 minutes (1.33 hours). In multipara, to progress from 4-6 cms, the maximum time taken was 360 minutes (6 hours), from 6 to 8cms it was 210 minutes (3.5 hours) and from 8 to 10cms it was 105 minutes (1.75 hours). P value was < 0.001 in both primigravida and multigravida, it was statistically significant.

DISCUSSION:

The partograph has been established as the "gold standard" labor monitoring tool universally. Dr. Emanuel Friedman⁵ in 1954 introduced partograph and graphically plotted cervical dilatation against time and the curve obtained was sigmoid. He stated that the active phase began at 3 cm of dilatation and proposed the 1cm/hr measure of cervical dilatation¹⁵. Later in 2000, WHO considered 4cm as the beginning of active phase of labor to avoid unnecessary interventions done in prolonged latent phase. Zhang et al² in 2002 suggested that the labor progression differed from that of Friedman curve as the 5th centiles were all <1 cm/hr⁶. There is a growing concern that 6cms to be considered as the beginning of the active phase of labor instead of 4 cms, especially in nullipara^{16,7}. So, we have conducted a study on low-risk women with spontaneous onset of labor to calculate the duration of active phase by considering 4cm as the beginning of active phase by following the modified WHO partograph. After the delivery of the woman, retrospectively we have calculated the duration of active phase of labour by considering 6cm as the beginning of the active phase. When the study was started, there was no WHO labor care guide. Later, WHO has revised the partograph and designed the labor care guide and recommended 5cm as the beginning of the active phase and also stated that the 1cm/hr is not the threshold in the active stage of labour. As we had already started our study, we continued it.

In our study when considering beginning of active phase at 4cms, in primigravida, the minimum duration was 1.05 hours and maximum duration was 10.30 hours. In multigravida, the minimum duration of active phase was 0.35 hours and the maximum duration was 9.45 hours. Friedman⁵ study showed active phase duration for nulliparous women as 11.7 hours and means ranged between 4.4 and 4.9 hours in their studies. Studies by Zhang et al⁶, Oladapo et al⁸, Laughon et al³, Lundborg et al⁹ have reported the 95th percentile in nulliparous women in their studies ranging from 14h to 24h. Obviously the longest duration of active phase of labour in all these studies were way longer than described by Friedman. Similarly in multiparous women as well the 95th centiles of Zhang et al⁶, Oladapo et al⁸, Lundborg et al⁹ range from 9.44 to 14h again longer than Friedman's illustration of labour

In our study, when we considered the beginning of active phase of labour at 6 cms, in primigravida, the minimum duration of active phase from 6-10 cms was 0.2 hours and the maximum duration was 4.15 hours and the 95th centile was 3.27 hours. In multigravida, the minimum duration of active phase was 0.15 hours, and the maximum duration was 4.75 hours and the 95th centile was 3.34 hours. In studies of Oladapo et al⁸, Lundborg et al⁹, Laughon et al³ when beginning of active phase of labour was taken as 6cms, they had 95th centile in nulliparous women ranging from 9.3 to 10.7h and in multiparous women 95th centile ranged from 5.9 to 7.5h. The active phase of labor is shorter when 6cms is considered as the beginning of the active phase. The median duration of our study is similar to some of the above studies but the duration at 95th centile varies widely from 3 hours to 15 hours and our study has shorter 95th centile duration.

In present study in primigravida, the minimum time taken to progress

from 4-6 cms was 40 minutes (0.66 hours) and the maximum time was 480 minutes (8 hours). In multipara, to progress from 4-6cms, the minimum time taken was 15 minutes and the maximum time taken was 360 minutes (6 hours). Zhang et al^{6,10} reported that labour may take over 6 hours to progress from 4 to 5 cm and over 3 hours to progress from 5 to 6 cm of dilatation and concluded that both nulliparas and multiparas progress at a similar slow pace before 6 cm and accelerate much faster after 6cms, also suggested that active phase begins at 6cms rather than 4cms. Oladapo et al⁸ in his study reported that to progress from 4-5 cms, mean duration was 1.72 hours and 95th centile 7.83 hours. To progress from 5-6 cms, mean duration was 1.19 hours and 95th centile being 6.17 hours. Lundborg et al⁹ also reported duration to progress from 4 to 6 cm, in nullipara the 95th centile as 8.32 hours and in multipara 95th centile as >9 hours.

In our study, in primigravida, to progress from 4 to 6 cms, slowest rate of cervical dilatation was 0.25 cms/hour, the fastest rate of cervical dilatation was 3 cms/hour. Present study and above-mentioned studies reveal that rate of progress of labour is much slower between 4-6 cms cervical dilatation than traditionally believed rate of 1cm/hr.

Comparison of studies in nullipara.

	Beginning of active phase	Minimum	Maximum	Mean	5th centile	95th centile	Median
Friedman	3cm	-	-	4.4-4.9 h	-	11-	-
Laughon	5cm	-	-	-	-	15.1h	3.6h
	6cm	-	-	-	-	10h	2.2h
Lundborg	6cm	-	-	2.67h	0.67h	10.7h	-
Oladapo	5cm	-	-	-	1.6h	11.3h	4.3h
	6cm	-	-	-	0.9h	9.3h	2.9h
Zhang	4-4.5cm	-	-	-	-	16.4h	5.3h
Present study	6cm	0.2h	4.15h	1.49h	0.25h	3.26h	1.25h

WHO labour care guide¹¹ is the latest partogram which is to be plotted from 5cms onwards, thus active phase is recommended to be started at 5 cms cervical dilatation. For labour progression from 5-6 cm, 6hrs time limit is designated and from 6-7 cms dilatation another 5hrs time is specified as upper limit of normal progress of labour. At present time WHO has endorsed that slow progress in labour is the new normal and interventions during labour should also be according to revised guidelines.

Labor and delivery are existing from the beginning of the human race but there are many lacunae in our understanding of this primordial process. As we keep accumulating more knowledge regarding this process of parturition, our understanding improves and so, our guidelines are bound to change and care for labouring women and their new born will continue to improve.

CONCLUSION:

- New perception of labour shows slow progress of labor in both primigravida and multigravida.
- Because of this slow progress, there is a need to change the beginning of the active phase.
- The duration of active phase is shorter when beginning of active phase is taken as 6cm rather than 4 cm but the duration between 4 to 6 cm is longer than it was thought earlier.
- Labor can be very slow to very fast. So mean value of labor progress cannot be applied to whole population.
- This knowledge of slow labour should be used for individualized obstetric care in reducing unnecessary interventions and reducing maternal morbidity.

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