

Effect of Prolonged Upright Position during First Stage of Labour on Labour Outcome in Low Risk Term Nulliparous Women

Deepti Pachauri¹, Anjali Dabral², Rekha Bharti³, Archana Kumari⁴, Anugeet Sethi¹, Megha Gupta¹

¹Senior Resident, ²Head of Department, CMO SAG & Associate Professor, ³Associate Professor, Department of Obstetrics & Gynaecology, Vardhman Mahavir Medical College & Safdarjung Hospital, New Delhi, India,

⁴Assistant Professor, All India Institute of Medical Sciences, Delhi, India

Abstract

Background: For positive childbirth experience, WHO recommends that women with low risk pregnancy should be encouraged to be ambulatory and assume upright position during labour. The aim of present study was to compare the effect of prolonged upright position during active first stage of labour with ambulation as per choice of the women, on the labour outcome. **Methods:** This was an interventional study conducted on 60 low risk nulliparous women. 30 women were assigned to upright position and motivated to remain in sitting, standing or walking position for atleast 60% of the duration of active first stage of labour and women in the control group were allowed to assume the position of their choice. Duration of labour, need for augmentation and mode of delivery in both groups were compared. **Conclusion:** In low risk nulliparous women, upright position during active first stage of labour is associated with frequent and stronger contractions in first 3 hours of active labour but does not have any significant impact on duration of labour, need for augmentation and mode of delivery. Therefore, nulliparous women during active first stage of labour can be allowed to be in position of their choice rather than imposing prolonged upright position.

Keywords: apgar score, duration of labour, first stage of labour, mode of delivery, position during labour, upright position

Introduction

The ideal maternal position during labour and child birth is debatable. In the past, women were encouraged to adopt various erect positions in labour to expedite the labour process. Since the twentieth century, and with western influence on our training, delivery and labour in the supine position have become the norm in hospital and domestic settings. Supine position helps the caregivers to exercise better control and improves monitoring of the labour process, administration of anaesthesia and

intravenous fluids. However in this position prolonged aortocaval compression by the term pregnant uterus leads to around one fourth decline in cardiac output that may cause a decrease in the utero-placental perfusion and foetal distress.¹⁻³

It is also proposed that in contrast with supine position, delivery in the upright and mobile posture uses gravity to aid descent of the fetal head into the pelvis. The rate of descent of fetal head therefore is faster with upright position due to improved alignment and gravitational pull, leading ultimately to shorter duration of labour.^{1,2,4,5} As the head is directly and evenly applied on to the cervix during this position, uterine contractions intensify in strength, regularity and frequency, and are less painful.^{6,7} Also there is lower incidence of non reassuring fetal heart rate due to decreased aortocaval

Corresponding Author

Dr Anjali Dabral

Head of the Department, Department of Obstetrics & Gynaecology, Vardhman Mahavir Medical College & Safdarjung Hospital, New Delhi, India

compression in the upright position.^{8,9}

A 2013 Cochrane review studying effect of positions on labour found a significant decrease in the length of first stage of labour by one hour and twenty two minutes, reduction in operative vaginal delivery rate, and decrease in caesarean rate in upright position versus supine position in the first stage of labour.¹⁰ Therefore, all the recent guidelines, and those for the low middle income countries favour any position in labour that the patient is comfortable with to be adopted during labour.¹⁰ World Health Organisation 2018 guidelines on “Intrapartum care for a positive childbirth experience”, recommend that women with low risk pregnancy should be encouraged to remain mobile and assume an upright position during labour.¹¹ Despite these recommendations most of the women delivering at labour wards of the hospitals in India spend most of the time during labour in the supine position. Also there is paucity of literature on the duration for which upright position should be assumed for it to have greater impact on the labour outcome. Keeping these in mind, the present study was conceived to compare the effect of upright position for more than 60% of the first stage duration with position of women's choice on the duration of first and second stage of labour, mode of delivery and need for labour augmentation.

Materials and Methods

This was an interventional study conducted in the labour ward of a tertiary care centre of North India over a period of 18 months. Low risk term nulliparous women with cephalic presentation admitted in early labour were informed and counselled about the study protocol. Those who consented to participate in the study and were willing to follow the methodology were recruited in the study. Ethical clearance was taken from the institutional ethical committee. Women with obstetric and medical

complications were excluded from the study.

All women received information regarding the possible benefits of erect position and were divided into study group and control group of 30 each by closed envelope method. The instructions to women regarding the position in first stage of labour were given by the same investigator. The women were given short and easy to understand instructions for assuming erect position (walking, standing or sitting) during the active first stage of labour for at least 20 minutes at a stretch. It was ensured that patients were adopting a sitting position on bed or stool or were walking for at least 60% of the first stage of labour. This arbitrary duration of 60% was taken as monitoring of women, assessment of uterine contractions and foetal heart monitoring was done over a period of 10 minutes every 30 minutes. Women in the control group were free to move around during labour as per their wishes. At 30 minutes interval the investigator recorded the time spent by the women in erect position by recall method, in both the groups.

The demographic profile and detailed history of the women was recorded in a pre-designed Performa. General physical and obstetric examination was done and labour was managed according to the institutional protocols. The duration of first and second stage of labour, need for oxytocin augmentation and mode of delivery was recorded.

Statistical Analysis

Statistical analysis was done using SPSS version 20.0. Data was represented as Mean and standard deviation. Numerical data was compared using t-test, non-parametric numerical data was compared using mann whitney test and nominal data was compared using chi square analysis. The p-value<0.05 is taken as significant.

Table 1: Demographic Profile of Women in Study and Control Group

Parameters	Study Group (N=30)	Control Group (N=30)	p Value
Mean age (years)	22.83	23.37	0.450
Booked	25	20	0.136
Employed	13	11	0.598
Rural residence	17	15	0.603
Mean period of gestation (weeks)	38.73	38.70	0.898
Time spent in erect position (minutes)	141.90	46.67	<0.001

Table 2: Frequency and Intensity of Uterine Contractions in Study and Control Group

Parameters		Study Group	Control Group	p Value
Number of contraction per 10 minutes during active labour (mean)				
1st hour		2.87	1.57	<0.001
2nd hour		3.81	3.21	0.424
3rd hour		4.52	3.64	<0.001
Intensity of uterine contraction during active labour				
1st hour	Mild	14 (46.66 %)	24 (80.00 %)	0.022
	Moderate	13 (43.33 %)	4 (13.33 %)	0.022
	Strong	3 (10.00 %)	2 (6.00 %)	0.022
2nd hour	Mild	0	9 (32.14 %)	0.002
	Moderate	18 (66.66 %)	16 (57.14 %)	0.002
	Strong	9 (33.33 %)	3 (10.71 %)	0.002
3rd hour	Mild	0	2 (8.00 %)	0.285
	Moderate	11 (52.38 %)	15 (60.00 %)	0.285
	Strong	10 (47.61 %)	8 (32.00 %)	0.285

Table 3: Comparison of Labour Characteristics in Study and Control Group

Parameters	Study Group (N=30)	Control Group (N=30)	p value
Mean duration of 1st stage of Labour (minutes)	221.60	273.67	0.144
Mean duration of 2nd stage of Labour (minutes)	41.79	48.70	0.291
Need of oxytocin for Labour augmentation (N)	3	7	0.166

Table 4: Mode of delivery in Study and Control Group

Mode of Delivery	Study Group (N=30)	Control Group (N=30)	p value
Normal Vaginal Delivery	27	26	0.839
Instrument Vaginal Delivery	2	2	
Caesarean Delivery	1	2	

Table 5: Foetal Outcome in Study and Control Group

Foetal Outcome	Study Group (N=30)	Control Group (N=30)	p value
Non reassuring foetal heart rate Number (%)	3 (10%)	4 (13%)	0.688
Meconium stained Liquor Number (%)	2 (6.66%)	3 (1%)	0.618
APGAR Score <7 at 5 minutes Number (%)	1 (3.33%)	6 (2%)	0.044
Mean weight (Kgs)	2.95	2.83	0.108

Discussion

In India traditional practice of ambulation in the first stage of labour is gradually declining due to shift towards institutional deliveries. The practice of institutional delivery significantly reduces the maternal and foetal morbidity and mortality. However, this improvement in maternal and fetal health is associated with increase in interventions during labour that are in the form of need for augmentation of labour and increased operative

deliveries.¹²⁻¹⁴ One factor that has been associated with more interventions required in low risk women is the position adopted during labour. Although women prefer adopting comfortable position during labour, it interferes with the monitoring of woman and the baby.

The present study was done at a tertiary care centre of North India to assess the effect of prolonged upright position (more than 60% of active first stage of labour) on labour outcome. Age, socioeconomic

status and employment status of women in both the groups was comparable, $p > 0.05$. The mean period of gestation of women in study and the control group was also comparable, 38.73 ± 0.980 and 38.70 ± 1.022 weeks respectively. The patients in study group adopted erect position for significantly longer duration of time in first stage of labour than the control group, 141.90 versus 46.67 minutes, $p < 0.001$, Table 1.

Significantly increased frequency of uterine contractions was observed in the study group during first 3 hours of active first stage of labour. In first 2 hours of active labour, the intensity of the contractions was significantly more in study group compared to the control group, $p = 0.022$. During third hour of active labour both groups had similar intensity of labour pains, Table 2. The first stage of labour was 52.07 minutes shorter in erect position as compared to supine position but this difference was not statistically significant ($p = 0.144$). The difference in mean duration of second stage of labour was also not statistically significant ($p = 0.291$), Table 3. Mode of delivery was comparable in both groups, $p = 0.839$, Table 4.

There was no statistically significant difference in incidence of meconium stained liquor and non reassuring foetal heart between both the groups, $p = 0.618$ and $p = 0.688$, respectively. A statistically significant difference in apgar score > 7 at 5 minutes was observed in the study group, $p = 0.044$, Table 5.

Upright position during first stage of labour has been reported to be associated with shorter duration of both first and second stage of labour.^{9,14-18} A systemic Cochrane review also reported shorter duration of the first stage of labour by one hour twenty-two minutes in women assuming upright posture during the first stage of labour as compared to recumbent position.¹⁰ Kumud Rana et al observed significant reduction in first stage of labour by 123.6 minutes in the erect position.¹³ However, our study did not report any significant difference in the duration of first stage of labour in women who assumed erect posture for an average 141.90 minutes in active first stage of labour as compared to 46.90 minutes in the control group. This difference could be attributed to the fact that women in the control group in our study were also allowed to ambulate as per their choice and most of the women assumed sitting position during contraction

and were lying in between contractions.

Previous studies reported that parturient who assumed upright positions had increased strength of uterine contractions compared to those assuming supine position in first stage of labour.^{5,10,13,19} We also found better intensity and frequency of uterine contractions in women who were in the erect position for longer duration during first stage of labour as compared to women in the control group.

More women in the control group required augmentation of labour with oxytocin but the difference was not statistically significant, $p = 0.166$, Table 3. Kumud, Bundsen and Chen also reported that majority of the women with upright position during first stage of labour did not require acceleration of labour as compared to the women in supine position group.^{13,20,21}

In Our study there was no significant difference in mode of delivery between the two groups. Most of the women had normal vaginal delivery. However, we expected a higher normal vaginal delivery rate in the study group as labour was hypothesised to be shorter with lesser incidence of exhausted women and instrumental deliveries. This could be explained by difference in the control group as women in our control group were also allowed to assume position of their choice rather than assume recumbent position. These findings are in contrast to Gizzo et al who observed normal vaginal delivery, operative vaginal delivery and caesarean delivery in 47.8% Vs 87.1%, 26.1% Vs 7.1% and 26.1% Vs 5.8% women in the recumbent group and group with sitting upright or squatting position, respectively.⁹ Kumud et al also found that 100% of women with upright position in the first stage of labour had normal vaginal delivery while in the supine position 26.7% women had instrumental delivery.¹³ However Cochrane review 2013, Mc Manus et al, Bloom et al and Savitha et al reported no difference in the mode of delivery with change of position in first stage of labour.^{10,22-24}

Present study found statistically significant ($p < 0.005$) number of babies with 5 minutes apgar score more than 7 in the study group as compared to the control group. Emam et al also reported improvement in Apgar score with upright posture in first stage of labour.¹⁴ However, Gizzo S et al and Lawrence et al found no significant difference in the Apgar score of neonates in

erect position.^{9,10}

Conclusion

The frequency and intensity of the uterine contractions in low risk term nulliparous women is significantly more if upright position was assumed for more than 60% duration of the first stage of labour without any impact on duration of first and second stage of labour and need for labour augmentation. There was significant improvement in the Agar score at 5 minutes if mother spent more than 60% time in erect position during first stage of labour.

Acknowledgement: Nil

Declaration of Interest: Nil

Source of Funding: It was an institutional study and was not funded by any external source.

References

1. Scott DB, Kerr MG. Inferior vena cava compression in late pregnancy. *J Obstet Gynaecol Br Commonwealth* 1963;70:1044-1049.
2. Munro J, Jokinen M, Gutteridge K, Macdonald S, Day-Stirk F. The Royal College of Midwives' Survey of positions used in labour and birth. London: Royal College of Midwives (RCM) 2010.
3. Rees GAD, Willis BA. Resuscitation in late pregnancy. *Anaesthesia* 1988;43:347-349.
4. Caldeyro-Barcia R, Noriegn-Guerra L, Cibils LA, Alvarez H, Poseiro JJ, Pose SV, et al. Effect of position changes on the intensity and frequency of uterine contractions during labor. *Am J Obstet Gynecol* 1960;80: 284-90.
5. Mendez-Bauer C, Arroyo J, Garcia Ramos C, Mendez A, Lavilla M, Izquierdo F, et al. Effects of standing position on spontaneous uterine contractility and other aspects of labor. *J Perinat Med* 1975;3:89-100.
6. Angel Rajakumari G, Sheela R, Soli TK. The effectiveness of selected nursing measures on labor outcome among primigravida mothers. *J Sc* 2015;5:716-719.
7. Chaillat N, Belaid L, Crochetiere C. Non pharmacologic approaches for pain management during labor compared with usual care: A meta-analysis. *Birth* 2014;41:122-37.
8. Flynn AM, Kelly J, Hollins G, Lynch PF. Ambulation in labour. *BMJ* 1978;2:591-3.
9. Gizzo S, Gangi SD, Noventa M, Bacile V, Zambon A, Nardelli GB. Women's Choice of Positions during Labor; Return to the Past or a Modern Way to Give Birth? A Cohort Study in Italy. *BioMed Res Int* 2014;2014:638093.
10. Lawrence A, Lewis L, Hofmeyr GJ, Dowswell T, Styles C. Maternal positions and mobility during first stage labour. *Cochrane Database Syst Rev* 2013;2:CD003934.
11. WHO recommendations: Intrapartum care for a positive childbirth experience. Geneva: World Health Organization 2018. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK513809/>
12. Diaz AG, Schwarcz R, Fescina R, Caldeyro-Barcia R. Vertical position during the first stage of the labour, and neonatal outcome. *Eur J Obstet Gynecol Reprod Biol* 1980;11: 1-7.
13. Kumud K, Rana AK, Chopar S. Effect of Upright Position on the Duration of First Stage of Labour Among Nulliparous Mothers. *Nursing Midwifery Res J* 2013;9:152-156.
14. Emam, AMM, Al-Zahrani, AE. Upright versus recumbent position during first stage of labor among primipara women on labor outcomes. *J Nurs Educ Pract* 2018;8:113-124.
15. Mitre IN. The influence of maternal position on duration and active phase of labour. *Int J Gynecol Obstet* 1974;12:181-3.
16. Stewart P, Calder AA. Posture in labour: patients' choice and its effect upon performance. *BJOG* 1984;91:1091-5.
17. Liu YC. The effects of the upright position during childhood. *Image: J Nurs Scholarsh* 1989;21:14-8.
18. Allahbadia GN, Vaidya PR. Why deliver in the supine position? *Aust N Z J Obstet Gynaecol* 1991;32:104-106.
19. William RM, Thom MH, Studd JWW. A study of the benefits and acceptability of ambulation in spontaneous labour. *BJOG* 1980;87:122-6.
20. Bundsen P, Lundberg J, Peterson LE. Telemetric versus conventional fetal monitoring in labour

- a prospective randomized study [abstract]. Proceedings of 8th European Congress of Perinatal Medicine; 1982 Sept 7-10; Brussels, Belgium. Abstract no: 256.
21. Chen SZ, Aisaka K, Mori H, Kigawa T. Effects of sitting position on uterine activity during labor. *Obstet Gynaecol* 1987;69:67-73.
22. McManus TJ, Calder AA. Upright position and the efficacy of labour. *Lancet* 1978;1:72-4.
23. Bloom SL, McIntire DD, Kelly MA, Beimer HL, Bupo RH, Garcia MA, et al. Lack of effects of walking on labor and delivery. *N Engl J Med* 1998;339:76-9.