

Effect of Upright Versus Recumbent Positions During First Stage of Labour on Labour Outcomes

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Abstract:

Background: Shifting from the supine to the upright position is a great challenge to both women in labour and health workers in practice. **Aim:** This study was conducted to determine the effect of upright versus recumbent positions during first stage of labour on labour outcomes.

Subjects: Sixty women between 37-41 weeks gestational ages in active phase of first stage of labour participated in this study. They were selected randomly from Benha University Hospital.

Their ages ranged from 18-35 years old and their BMI were not more than 35kg/m². They were with single live fetus and their fetus was in cephalic presentation. They were without any pregnancy or medical complications. Women were randomly assigned into equal groups: Group A (Upright group) consisted of thirty women who adopted the upright positions. Group B (Recumbent group) consisted of thirty women who remained in bed (supine or sidelying positions).

Methods: Duration of stages of labour was assessed using stop watch. Diastolic blood pressure was assessed by using sphygmomanometer at the beginning and after 2, 4, 6, 8 hours of first stage of labour for both groups A and B. **Results:** revealed that duration of first, second and third stage of labour of upright group decreased significantly than recumbent group. Diastolic blood pressure was decreased significantly in (recumbent) group B than (upright) group A. All women in both groups A and B delivered normal labour with episiotomy (100%) and none of them delivered instrumental or caesarean deliveries (0%). **Conclusion:** Upright positions had positive effect on progress of labor and decreased duration of the three stages of labour.

Keywords: Upright positions, Recumbent positions, Labour, Labour outcomes.

Introduction:

In the past, throughout the ages and across human cultures women have preferred to give birth with their bodies vertical in sitting or squatting positions by grasping a tree, ropes or knotted piece of cloth and they generally avoided lying flat on their back positions. In today's standards laboring women are confined to supine-lithotomy position, for the convenience of the health personnel, whereas it is ideal for the birthing mother to push the baby with the gravity [1].

The vertical positions may benefit from "gravity effect" potentially able to reduce aortocaval compression, to make uterine contractions effective and to favour a better fetus alignment in the birth canal and to increase pelvic outlet diameters, reducing intrapartummaternal and neonatal complications [2, 3, 4, 5].

Maintaining upright positions and mobility in first stage of labour increases the uterine contractions and decrease the duration of first stage of labour and is the safest method [6]. No maternal and fetal complications were reported, after adopting standing position during first stage of labour [7]. Benefits of upright positions such as reduced duration of second stage of labor, reduced rates of assisted birth, fewer episiotomies, and fewer abnormal fetal heart rate patterns were noted [8]. Women who were upright were also less likely to have cesarean surgery [9].

Recumbent (lying down) positions in the first stage of labour can have practical advantages for the care provider; potentially making it easier to palpate the mother's abdomen to monitor contractions, perform vaginal examinations, check the baby's position, and listen to the baby's heart[10, 11]. Numerous studies have shown that a supine position in labour may have adverse physiological effects on the condition of the woman and her baby and on the progression of labour [10].

The pelvis is tilted anteriorly in the supine position; the presenting part is forced to travel posteriorly to the curve of the sacrum and then moves again upward in an S-shaped curve, thereby complicating fetal descent [12]. Recumbent position seems associated with less perineal muscle relaxation, high rate of analgesia request, long labour length, more operative deliveries, severe pain, abnormal fetal heart rate and greater episiotomy rate [11]. Also, recumbent position causes dropping in baseline blood pressure because of uterus compressing major abdominal blood vessels resulting in supine hypotension [1].

Subjects, Materials and Methods:

I- Subjects:

Sixty primigravida and multigravida women in active phase of first stage of labour (begins at about 3-4 cm of cervical dilation) diagnosed by obstetrician participated in this study. They were selected randomly from Benha University Hospital. Their ages were ranged from 18 to 35 years old. Their body mass index was not more than 35kg/m². Their gestational ages were from 37 to 41 weeks. They were in active phase of first stage of labour. They were with single live fetus. The fetus was in cephalic presentation. They were without any pregnancy or medical complications. Women with history of previous abortion, preeclampsia or eclampsia, gestational diabetes mellitus, BMI over 35kg/m², antepartum haemorrhage, premature rupture of membranes and malpresentation or malposition are excluded from the study. This study was conducted from March 2017 to November 2018.

They were randomly assigned into equal groups:

Group A (Upright group) consisted of thirty women who adopted the upright positions. These positions were given alternatively for 15 minutes for each position starting by walking around, then standing, then squatting and lastly kneeling position. In between each upright position, all women were permitted to assume sitting or semi-sitting positions as resting positions for 5 minutes and repeated these upright positions till full cervical dilatation.

Group B (Recumbent group) consisted of thirty women who remained in bed (supine or sidelying positions) for 45 minutes and then asked them to get out from bed and to walk around bed in between uterine contractions for 5 minutes and repeated these recumbent positions till full cervical dilatation.

Design of the study: Pre and Post experimental design.

II- Procedures:

All women in both groups (A & B) were given a full explanation of the protocol of the study to increase her interest and motivation as well as, to obtain her confidence and cooperation. Consent form was signed from each woman in both groups (A & B) before participation in the study.

All women were examined by an obstetrician before the study. The examination included general examination (pulse, blood pressure, temperature, level of consciousness, skin color), abdominal examination (frequency, intensity and duration of uterine contractions, presentation and position of fetus, engagement of the presenting part and fetal heart sound) and vaginal examination (cervical dilatation, rupture of membranes, fetal presenting part and capacity of pelvis). Obstetrician performed vaginal examination every one hour.

Each woman in both groups (A & B) was asked to evacuate her bladder every 2 hours to be more relaxed.

A) Evaluative procedures:

1-BMI:

It was assessed for each woman by using weight and height scale before treatment procedures for both groups A and B.

2-Duration of active phase of first stage, second stage and third stage of labour:

They were assessed by using stop watch for both groups A and B.

3- Blood Pressure:

It was assessed by using Sphygmomanometer (Model: 7502001980112, Mercury, Japan). Blood pressure (diastole) was assessed at the beginning of active phase of first stage of labour and after 2, 4, 6, 8 hours for both groups A and B.

4-Incidence of episiotomy, rate of instrumental and cesarean deliveries.

B) Treatment procedures:

Therapeutic intervention for the study was started at the same time for all women of the study as following:

I- Uprighting positions for group A:

These positions were given alternatively for 15 minutes for each position starting by walking around, then standing, then squatting and lastly kneeling position. In between each upright position, all women were permitted to assume sitting or semi-sitting positions as resting positions for 5 minutes and repeated these upright positions till full cervical dilatation.

II- Recumbent positions for group B:

All women remained in bed (supine or sidelying positions) for 45 minutes and then asked them to get out from bed and to walk around bed in between uterine contractions for 5 minutes and repeated these recumbent positions till full cervical dilatation.

Statistical analysis:

- Descriptive statistics:

In this study, the descriptive statistics inform of mean and standard deviation was calculated for all women of the study to determine the homogeneity and central deviation.

- Analytic statistics:

In this study, the mean, standard deviation and standard error were calculated for all variables in both groups. Independent "t" test was used also to compare between pretest and posttest in each group. Comparison was applied by student T test to compare between the independent means. A value of $p < 0.05$ was considered statistically significant.

Results:

I) Demographic data for both groups:

There is no statistical significant difference between the mean value of age, weight, height and BMI of group A and B with P value (0.827, 0.723, 0.617 and 0.453 respectively) and T value (0.22, 0.36, 0.5 and 0.76) (table 1).

Table (1): Age, Weight, Height and BMI for two groups.

	Group (A)	Group (B)	t-value	p-value	S
Age	26.8 ± 4.02	27.3 ± 4.2	0.22	0.827	NS
Weight	82.07 ± 4.18	82.47 ± 4.52	0.36	0.723	NS
Height	161.17 ± 4.27	160.63 ± 3.95	0.5	0.617	NS
BMI	31.63 ± 1.93	31.98 ± 1.72	0.76	0.453	NS

SD: Standard Deviation. **NS:** Non Significant.

T-value: Unpaired t- test value. **P-value:** Probability value.

II) Duration of first stage of labour among groups (A and B):

According to unpaired t-test, there is significant difference between the mean values of duration of first stage of labour of both groups A and B ($p = 0.032$) ($t = 2.2$) (more decrease in group A) (table 2).

Table (2): Mean values of duration labour of first stage (Hours) between the two groups.

	Group (A)	Group (B)
Mean ± SD	9.7 ± 3.29	11.8 ± 4.06
MD	2.1	
t-value	2.2	
p-value	0.032	
S	S	

SD: Standard Deviation. **MD:** Mean Difference.**t-value:** Paired and Un-paired t- test value.

p-value: Probability value.**S:** Significant.

III) Duration of second and third stage of labour (Minutes) among groups (A and B):

According to unpaired t-test, there is significant difference between the mean values of duration of second and third stage of labour of both groups A and B (p= 0.0001, 0.0001 respectively) (t = 9.88, 4.22 respectively) (more decrease in group A) (table 3).

Table (3): Mean values of duration labour of second stage and third stage (Minutes) between the two groups.

	Second stage (Minutes)		Third stage (Minutes)	
	Group (A)	Group (B)	Group (A)	Group (B)
Mean ± SD	47.3 ± 13.3	80.7 ± 12.8	14.77 ± 3.18	18.4 ± 3.48
MD	33.4		3.63	
t-value	9.88		4.22	
p-value	0.0001		0.0001	
S	S		S	

SD: Standard Deviation. **MD:** Mean Difference. **t-value:** Paired and Un-paired t- test value.

p-value: Probability value.**S:** Significant.

IV) Blood Pressure (Diastole) at the beginning, after 2, 4, 6, 8 hours of first stage of labour between the two groups:

According to Mann–Whitney U test as presented in table (4), when comparing the two groups (A and B), there is significant difference between both groups A and B in diastolic blood pressure with p value (0.0001, 0.0001, 0.035, 0.0001 and 0.0001 respectively) and u-value (567, 664.5, 780.5, 664 and 627.5 respectively) (more decrease in group B).

Table (3): Median values of blood pressure (Diastole) at the beginning, after 2, 4, 6, 8 hours of first stage of labour between the two groups.

	At the beginning		After 2 hours		After 4 hours		After 6 hours		After 8 hours	
Groups	A	B	A	B	A	B	A	B	A	B
Median	82	75	80	75	80	77	81	75	80	73
MD	7		5		3		6		7	
u-value	567		664.5		780.5		664		627.5	
p-value	0.0001		0.0001		0.035		0.0001		0.0001	
S	S		S		S		S		S	

MD: Mean Difference. **u-value:** Mann–Whitney U test.

p-value: Probability value. **S:** Significant.

V) Incidence of episiotomy, rate of instrumental and caesarean deliveries:

All women in both groups A and B delivered normal labour with episiotomy (100%) and none of them delivered instrumental or caesarean deliveries (0%).

Discussion:

Labour being the end of the long expectation of pregnancy, marks the beginning of the extrauterine life of the new born [13]. Interest in the effect of the upright position during labor began in the 1970s, when some trials assessed the benefits of this position for the woman and her fetus; however, few studies were published. In the 1980s, concern focused on several obstetrical variables comparing the upright and supine positions with the well-being of the fetus and the newborn. Since the 1990s, due to the need to reduce unnecessary interventions during childbearing, studies tended to evaluate perception of pain, comfort and safety in different positions during labor [14].

Recent researches, and number of trials, suggest that upright posture during labor is associated with shorter duration of labor, reduced reporting of labor pain, fewer instrumental deliveries, operative births, fewer abnormal fetal heart rate patterns and less postpartum depression [1]. Discomfort is one of the biggest obstacles of labour and delivery [13]. A simple elevation of the back of the laboring women with the easily available resources of backrest, pillows could be beneficial to maximize the important benefits of gravity as it is easier for an object to fall

towards the earth's surface, than to slide parallel to it (Newton's Law of Gravity) to enhance the labor process [1].

Shifting from the supine to the upright position is a great challenge to both women in labor and health workers in practice [12]. Maternal and perinatal mortality and morbidity are major public health problems. Perinatal mortality and morbidity also depend on duration of labour. Prolonged labour may lead to increased maternal and neonatal mortality and morbidity due to increased risks of maternal exhaustion, postpartum haemorrhage, sepsis and fetal distress. There are many interventions to increase the uterine contractions and to decrease the duration of first stage of labour like maintaining upright positions and mobility which includes walking, sitting, standing, kneeling and squatting [15].

This study was conducted to determine the effect of upright versus recumbent positions during first stage of labour on labour outcomes. Sixty women between 37-41 weeks gestational ages in active phase of first stage of labour participated in this study. They were selected randomly from Benha University Hospital in Benha, Benha University. Their ages ranged from 18-35 years old and their BMI were not more than 35 kg/m². They were with single live fetus and their fetus was in cephalic presentation. They were without any pregnancy or medical complications. Women were randomly assigned into equal groups: Group A (Upright group) consisted of thirty women who adopted the upright positions. These positions were given alternatively for 15 minutes for each position starting by walking around, then standing, then squatting and lastly kneeling position. In between each upright position, all women were permitted to assume sitting or semi-sitting positions as resting positions for 5 minutes and repeated these upright positions till full cervical dilatation. Group B (Recumbent group) consisted of thirty women who remained in bed (supine or sidelying positions) for 45 minutes and then asked them to get out from bed and to walk around bed in between uterine contractions for 5 minutes and repeated these recumbent positions till full cervical dilatation. Body mass index was assessed by weight-height scale. Duration of stages of labour was assessed using stop watch. Blood pressure was assessed by using sphygmomanometer at the beginning and after 2, 4, 6, 8 hours of first stage of labour for both groups A and B. Results of this study revealed that duration of first, second and third stage of labour of upright group decreased significantly than recumbent group. Diastolic blood pressure was decreased significantly in (recumbent) group B than (upright) group A. All women

in both groups A and B delivered normal labour with episiotomy (100%) and none of them delivered instrumental or caesarean deliveries (0%).

Regarding to duration of first, second and third stage of labour, the results of this study revealed that duration of first stage, second stage and third stage of labour of upright group indicated significant decrease than recumbent group. These findings may be due to that during the first stage of labor, upright positions such as standing, kneeling and sitting allow the abdominal wall to relax and influence gravity causes the uterine funds to fall forward. This directs the fetal head into the pelvic inlet in an anterior position and applies direct pressure to the cervix which helps to stimulate and stretch the cervix. An upright position during the second stage of labor has been associated with a decreased caesarean birth, instrumental delivery and reduction in labor duration [16].

The results of this study agreed with **Zhang, [12]** who found that the upright position is a simple and low-cost intervention that increases the probability of normal vaginal birth.

Upright positions (including standing, sitting, Knealing and walking) during childbirth can benefit women by allowing spontaneous pushing, efficient contractions, short first, second and third stage of labor, less intervention, and high woman tolerance to labor pain. The upright position results in a wide pelvic diameter and easy fetal passage, which facilitates the descent and rotation of the fetal head [12].

The results of this study also agreed with **Gizzo, [11]** who found that a significant reduction in length of both first, second and third labour stages was found in women assuming upright positions and confirming a possible favouring effect of gravity in effective uterine contractions and fetal alignment to the birth canal.

The results of this study disagreed with **Miquelutti, [14]** who reported that there was no difference between the groups in the duration of first, second and third stages of labour.

Regarding to blood pressure, the results in this study revealed that there was significant decrease in diastolic blood pressure in upright group than recumbent group. This result come in consistent with **Thilagavathy, [1]** who found that all women in the upright group had maintained normal baseline blood pressure throughout, while the women in the recumbent group had a drop in their baseline blood pressure, because the women were lying flat on their back in recumbent position and the pressure of gravid uterus compressing major abdominal blood vessels resulting in supine hypotension.

These results of this study also disagreed with **Lawrence, [10]** who reported that there were no statistically significant differences between upright and recumbent groups in terms of women experiencing hypotension.

Conclusion:

Accordingly, it can be concluded that Maintained upright positions during first stage of labour had more benefits to facilitate labour, decrease maternal complications and allow women to get out from labour with minimal complications than maintained recumbent positions.

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تأثير الأوضاع القائمة مقابل الأوضاع الممددة خلال المرحلة الأولى من الولادة على مخرجات الولادة

أجريت هذه الدراسة لمعرفة تأثير الأوضاع القائمة مقابل الأوضاع الممددة خلال الفترة النشطة من المرحلة الأولى من الولادة بين السيدات على مخرجات الولادة.

الأشخاص: شارك في هذه الدراسة ستون سيدة في المرحلة الأولى من الولادة تم إختيارهن عشوائيا من مستشفى بنها الجامعي بينها جامعة بنها. تراوحت أعمارهن بين ٨ و ٣٥ عاما ومؤشر كتلة أجسامهن لم يتعدى ٣٥ كيلو/م^٢. كان لديهن جنين واحد في وضعية النزول بالرأس، ولم يكن لديهن أى مشاكل طبية أو مشاكل خاصة بالحمل. تم تقسيمهن عشوائيا إلى مجموعتين متساويتين في العدد: المجموعة (أ) (مجموعة الأوضاع القائمة) تكونت من ثلاثين سيدة اللاتي إستعملت الأوضاع القائمة. المجموعة (ب) (مجموعة الأوضاع الممددة) تكونت من ثلاثين سيدة اللاتي إستعملت الأوضاع الممددة.

الطرق: تم تقييم مؤشر كتلة الجسم بواسطة مقياس الطول والوزن. تم تقييم مدة مراحل الولادة باستخدام ساعة إيقاف. تم قياس ضغط الدم الأنبساطي باستخدام جهاز ضغط الدم الزئبقي في بداية المرحلة الأولى من الولادة وبعد ٢، ٤، ٦، ٨ ساعة من المرحلة الأولى للولادة للمجموعتين أ، ب.

النتائج: أوضحت نتائج هذه الدراسة وجود نقصان ذو دلالة إحصائية في مدد مراحل الولادة الأولى والثانية والثالثة في مجموعة الأوضاع القائمة عن مجموعة الأوضاع الممددة. أوضحت النتائج أيضا نقصان ذو دلالة إحصائية في ضغط الدم الأنبساطي في مجموعة الأوضاع الممددة عن مجموعة الأوضاع القائمة. أوضحت النتائج أيضا أن جميع السيدات في المجموعتين أ و ب تم ولادتهن ولادة طبيعية مع شق العجان ولم تستعمل أى منهن أى وسائل مساعدة ولم تلد أى منهن ولادة قيصرية.

الخلاصة: إستعمال الأوضاع القائمة أثناء الولادة له أثار إيجابية على تقدم الولادة حيث أنه يقلل من مدة مراحل الولادة.

الكلمات الدالة: الأوضاع القائمة، الأوضاع الممددة، الولادة، مخرجات الولادة.