

Original Article

# A COMPARATIVE STUDY ON EFFECT OF AMBULATION AND BIRTHING BALL ON MATERNAL AND NEWBORN OUTCOME AMONG PRIMIGRAVIDA MOTHERS IN SELECTED HOSPITALS IN MANGALORE

Albin Mathew<sup>1</sup>, Sabitha Nayak<sup>2</sup> & Vandana K.<sup>3</sup><sup>1</sup> 2<sup>nd</sup> year M.Sc. Nursing student, <sup>2</sup> Vice-Principal, <sup>3</sup> Statistician, Nitte Usha Institute of Nursing Sciences, Nitte University, Mangalore - 575 018, India

Correspondence :

Sabitha Nayak,

Nitte Usha Institute of Nursing Sciences, Nitte University, Mangalore - 575 018, India

**Abstract :**

The study was conducted to assess the effect of ambulation and birthing ball on the maternal and newborn outcome from 01.08.2011 to 31.10.2011. This randomized control study was conducted on 60 primigravida mothers. Purposive sampling technique was used for the selection of samples followed by random allocation of 20 samples each to the three groups namely, ambulation, birthing ball and control group respectively using lottery method. Ambulation and birthing ball therapy were given to the respective samples between cervical dilatation of 1-3cm during first stage of labour, whereas the control group was not given any intervention. Here maternal outcome includes 1<sup>st</sup> stage duration (Area1), 2<sup>nd</sup> stage duration (Area2), cervical dilatation rate (Area3), and type of delivery (Area4) and newborn outcome includes heart rate, respiratory rate, colour, reflex and muscle tone. Since the t calculated value in Area 1 (5.257), Area 2 (2.781), Area 3(5.438) is greater than t table value (2.042) and in Area 4, 75% of ambulation group underwent normal vaginal delivery, it shows that there is significant improvement in maternal outcome after the use of ambulation. The t calculated value in Area 1(7.223), Area 2 (5.556), Area 3(6.178) is greater than t table value (2.030) and in Area 4, 95% of birthing ball group underwent normal vaginal delivery. It shows that there is significant improvement in maternal outcome after the use of birthing ball therapy. Comparison of ambulation and birthing ball therapy on maternal outcome showed that, there is significant difference in second stage duration ( $t_{tab} 2.031(df=36) < t_{cal} 2.231 = S$ ) and type of delivery. In this study ambulation and birthing ball were found to be effective to improve maternal outcome and there was no harm to the baby. Both the experimental group mothers expressed that they were satisfied and comfortable.

**Keywords :** Ambulation, Birthing ball, Maternal outcome, Newborn outcome.

**Introduction :**

Pregnancy is a unique, exciting and often joyous time in a woman's life, as it highlights the amazing creative and nurturing powers while providing a bridge to the future. Pregnancy and birth are tremendously powerful stages of development that bring a woman to motherhood, a couple, to family and a beautiful child into the world. Labour process may be viewed as a test of womanhood, a test of personal competence, a peak of experience, and the first act of motherhood. Labour process starts with the onset of regular uterine activity associated with effacement and dilatation of the cervix and descent of the presenting part through the cervix<sup>(1)</sup>.

Discomfort is one of the biggest obstacles of labour and delivery. Pregnant women don't want to experience the

fierce labour that has been in store for them. So they demand for healthier labour, with less discomfort. Women in the developing countries with meagre health facilities usually lie in bed during the first stage of labour. Lying on the back (supine) puts the weight of the pregnant uterus on abdominal blood vessels and contractions may be less strong than when upright. Effective contractions help cervical dilatation and the descent of the baby<sup>(1)</sup>.

Being upright will make contractions stronger and more efficient. It will allow gravity to keep the baby's head pressed down, which will help the cervix to dilate faster so that labour is speeded up.<sup>(2)</sup> Birthing ball helps the mother to be in an upright position and also it opens pelvis, encouraging baby to move down. Changing positions during labour can change the shape and size of the pelvis,

which can help the baby's head move to the optimal position during first stage labour, and helps the baby with rotation and descent during the second stage. Swaying motions such as walking, climbing stairs, and swaying back and forth are especially helpful with this.<sup>(3)</sup>

In the first stage of labour, the cervix will dilate to 10 cms in diameter. In mothers having their first child, this stage usually lasts 12 to 16 hours. Discomfort can often be helped by body positions that allow gravity to speed dilation, such as walking, squatting, kneeling forward on a chair or sitting on the birthing ball. This will help the baby move down in the pelvis faster and less painfully.<sup>(4)</sup>

A pilot study conducted at two Canadian hospitals where women in labour were randomly assigned to a regular labour room or to an "ambient room." In the ambient room, the standard hospital labour bed was removed, and additional equipment was added to promote relaxation, mobility, and a calm atmosphere. The evaluations from women assigned to the ambient room were positive; they spent 50% or less time labouring in bed and reduced the need for artificial oxytocic infusions.<sup>(5)</sup>

Birthing ball helps to shorten the first stage of labour. As one sits on the ball, they should move the hips in a circular motion. This allows the baby's head to press against the cervix, which promotes dilation.<sup>(6)</sup>

A randomised and quasi-randomised trial review was conducted to determine the effect of encouraging women to assume different upright positions (including walking, sitting, standing and kneeling) versus recumbent positions (supine, semi-recumbent and lateral) in the first stage of labour on 3706 women. Result of this review revealed that the first stage of labour was approximately one hour shorter for women randomised to upright as opposed to recumbent positions (MD -0.99, 95% CI -1.60 to -0.39). Women randomised to upright positions were less likely to have epidural analgesia (RR 0.83 95% CI 0.72 to 0.96). Walking and upright positions in the first stage of labour reduce the length of labour and do not have any negative effects on mothers and babies wellbeing.<sup>(7)</sup>

Research evidences have shown that ambulation and birthing ball tend to reduce the duration of first stage of labour. Thus the investigator felt the need to utilise this finding in her setting so as to reduce discomfort and duration during the first stage of labour.

Methods :

The study design adopted was a randomized control trial approach with post test control group design. Population comprised of primigravida mothers in the first stage of labour in selected hospitals at Mangalore. Purposive sampling technique was used for selection of samples 60 samples, and random allocation of the samples using lottery method, was done to assign 20 samples to the ambulation, birthing ball and control groups.

Ambulation and birthing ball therapy were given to the respective samples in ambulation and birthing ball group in between cervical dilatation 1-3 cms, whereas the control group was not given any intervention. Then maternal and newborn outcome was analysed by cervicograph, and Apgar score respectively. Here maternal outcome includes 1<sup>st</sup> stage duration (Area1), 2<sup>nd</sup> stage duration (Area2), cervical dilatation rate (Area3), and type of delivery (Area4) and newborn outcome includes heart rate, respiratory rate, colour, reflex and muscle tone. Data obtained in these areas were analysed by independent t-test expect in Area 4 which was analysed by frequency percentage.

Results :

Main findings are discussed under the following headings

#### 1. EFFECT OF AMBULATION ON MATERNAL OUTCOME

Since the t calculated value in Area 1( 5.257), Area 2 (2.781), Area 3(5.438) is greater than t table value (2.042) at 0.05 level of significance ( $p < 0.05$ ) (Table 1) and in Area 4, 75% of ambulation group underwent normal vaginal delivery (Table 2), it shows that there is significant improvement in maternal outcome after the use of ambulation.

Table1:

Groups	n	mean	t-value	SD	df	LOS
(Area 1: 1 <sup>st</sup> stage duration)						
Ambulation group	18	531	5.257	108.10950	32	0.000
Control group	16	763		148.18591		HS
(Area 2: 2 <sup>nd</sup> stage duration)						
Ambulation group	18	32.7222	2.781	15.32321	32	0.009
Control group	16	49.9375		16.58300		HS
Area 3: cervical dilation rate)						
Ambulation group	18	0.0196	5.438	0.003712	32	0.000
Control group	16	0.0135		0.002683		HS

$t_{tab}(32)=2.042$  HS= Highly significant

Table2: (Area 4: type of delivery)

Type of delivery	Ambulation group		Control group
	Frequency	Percentage	Frequency
Normal vaginal delivery	15	75%	13
LSCS			
Instrumental delivery	2	10%	4
	3	15%	3

## 2. EFFECT OF BIRTHING BALL ON MATERNAL OUTCOME

The t calculated value in Area 1(7.223), Area 2 (5.556), Area 3(6.178) is greater than t table value (2.030) at 0.05 level of significance ( $p < 0.05$ )(Table 3) and in Area4, 95% of birthing ball group underwent normal vaginal delivery(Table 4). It shows that there is significant improvement in maternal outcome after the use of birthing ball therapy.

Table 3:

Groups	n	mean	t-value	SD	df	LOS
(Area 1: 1 <sup>st</sup> stage duration)						
Birthing ball group	20	471		92.97849		0.000
Control group	16	763	7.223		34	$P < 0.05$
(Area 2: 2 <sup>nd</sup> stage duration)						
Birthing ball group	20	23.9000		8.40363		0.000
Control group	16	49.8125	5.556		34	$P < 0.05$
Area 3: cervical dilation rate)						
Birthing ball group	20	0.02230	6.178	0.005048	34	0.000
Control group	16	0.01363		0.002729		$P < 0.05$

$t_{tab}(34)=2.030$  HS= Highly significant

Table 4: (Area 4: type of delivery)

Type of delivery	Ambulation group		Control group
	Frequency	Percentage	Frequency
Normal vaginal delivery	19	95%	13
LSCS			
Instrumental delivery	0	0	4
	1	5%	3

## 3. COMPARING THE SIGNIFICANT DIFFERENCE OF AMBULATION AND BIRTHING BALL ON MATERNAL OUTCOME

Comparison of ambulation and birthing ball therapy on maternal outcome showed that, there is significant difference in second stage duration ( $t_{tab}(36) < t_{cal} = S$ ), (Table 5) and type of delivery(Table 6) whereas no significant difference in first stage duration ( $t_{tab}(32) > t_{cal} = NS$ ) and cervical dilatation rate ( $t_{tab}(36) > t_{cal} = NS$ ).

There were no significant improvement found on newborn outcome after the use of ambulation and birthing ball therapy and also no significant association was found between maternal and newborn outcome and the selected demographic variables.

 Table5: (Area 2: 2<sup>nd</sup> stage duration)

Table1:

Groups	n	mean	t-value	SD	df	LOS
Ambulation group	18	32.7222	2.231	15.32321	36	.032
Birthing ball group	20	23.9000		8.40363		S

$\sqrt{t_{tab}(36)}=2.030$

S= Significant

Table 6: (Area 4: type of delivery)

### Ambulation group

Type of delivery	Ambulation group		Control group
	Frequency	Percentage	Frequency
Normal vaginal delivery	19	75%	19
LSCS	2	10%	0
Instrumental delivery	3	15%	1

## 4. DESCRIPTION OF THE PARTICIPANTS OPINION ON THE USEFULNESS OF AMBULATION AND BIRTHING BALL THERAPY

ã In ambulation group, 100% mothers were comfortable while walking whereas in birthing ball group only 95% were comfortable.

ã 95% mothers were satisfied with ambulation and birthing ball respectively.

ã 85% of mothers from ambulation group and 95% of mothers from birthing ball group, would like to recommend its use to others.

ã With regard to family support 65% from ambulation group & 55% from birthing ball group felt the need of family members.

#### Discussion :

The effect of ambulation was supported by the findings in a similar study which was conducted in which two hundred mothers were randomly assigned to one of two groups: first group (100 parturients) authorized to ambulate and second group (100 parturients) confined to bed in dorsal or lateral recumbence. The results of the study showed that ambulation reduces (for about 34%) the duration of the first stage of labour significantly ( $P < 0.0001$ ).<sup>(7)</sup>

In another study conducted in two hundred and twenty-one women with uncomplicated pregnancies, were randomly divided into two groups, ambulatory and non-ambulatory. The result of the study showed that there was significant difference in labour duration (2.89+/-1.83hr vs. 3.94+/-2.17hr ;  $P = 0.001$ ). This study concluded that walking shortens the labour duration.<sup>(9)</sup>

The effect of birthing ball was supported by the findings in a study which was conducted on effects of birth ball exercise

on pain and self-efficacy during childbirth. Results revealed that birth ball exercises provided statistically significant improvements in childbirth self-efficacy and pain. And also mothers in the experimental group had shorter first-stage labour duration, less epidural analgesia, and fewer caesarean deliveries than the control group.<sup>(10)</sup>

In another study conducted on effect of birthing ball in reduction of labour pain among primigravida mothers it was noticed that birthing ball had an effect on reducing the duration of labour even though it was not statistically proved. No adverse effect on maternal or fetal wellbeing was observed as evidenced by normal FHR and maternal physiological responses like increased rate of cervical dilatation and reduction in the duration of labour.<sup>(11)</sup>

#### Conclusion :

Labour being the end of the long expectation of pregnancy, marks the beginning of the extrauterine life of the new born. To mark a good beginning, the process and experience of labour should not be a misery for the mother. There are a variety of discomforts that a woman will experience during labour. Reducing these discomforts is an important part of good nursing care. Non-pharmacologic methods like walking and birthing ball helps to decrease these discomforts as it reduces the duration of labour.

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