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Research Article

# Mobility is An Adjuvant Approach for Intrapartum Care - A Clinical Randomized Interventional Study

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**ABSTRACT**

In this highly technological medical scenario immobility during intrapartum period has become common issue associated with child birth. Though the benefits of movements and position changes to facilitate labour process have been discussed in literature for decades, controversial opinions, on movements and positions during labour still exits. Additionally lack of resources and accurate information to these issues depicts that need for an hour to be discussed and analyzed to find evidenced based practice intervention and to maintain sense of normality and make birth "as nature intended". To evaluate the effectiveness of mobility during labour on birth outcome among primi parturient mothers. Additionally this study also tested the maternal satisfaction a with child birth. 240 low risk primi parturient mothers who were in active stage of labour with uncomplicated pregnancy recruited and were allocated by Simple random sampling technique into the two arms of the study, but only 106 in study and 105 in control group participants completed the trial. Movements like walking, rocking, swaying were provided to experimental and not to control group. Both the groups were received hospital routine care. In active stage of labour (3-6 cm of cervical dilatation) the women completed the demographic and obstetrical information and pain was measured by 0- 10 numerical rating scale and labour process and outcome are assessed by using partograph. Maternal satisfaction was assessed by rating scale. This study revealed that pain and other labour process parameters are significant at p=0.05 level between study and control group. Mothers in study group had less number of fetal distress and caesarian section, shorter duration of first stage , less need for augmentation and pain medication and higher satisfaction than control group at p=0.001 level of significance.

**Key words:** Intra partum period, Movements and position, primi parturient mothers, child birth satisfaction.

## INTRODUCTION

Child birth is an unique boon given to women folk and every women experiences immeasurable bliss and bless while carries a baby in her womb. The World health organization defines normal birth as "spontaneous in onset, low risk at the start of labour and remaining through throughout the labour. Child birth while primarily a joyful event , also exposes the mother one of the severest form of pain reported[1,2]. Globally almost all the women perceived child birth as a painful experience in their life time. The perception of labour pain varies from women to women and influenced by fear and anxiety levels, experience with prior childbirth, cultural ideas of childbirth and pain is one of the important factor determines the women's experience with child birth[3,4] .

Studies have shown that over the past few decades childbirth is increasingly influenced by medical technology. Today in modern obstetrics most of the child birth is managed by the 'Active Management of Labour' with induction of labour, epidurals , electronic fetal monitoring and intravenous therapy most of these whole cascade of interventions leads to complicated birth and restrict the labouring women confined to bed. National survey of child bearing experiences in united states conducted between 2000-2002 shows that 71% of women said not walk around and most reason they gave was they were connected to things (67 %), due to pain medication(32%) and told not to walk(28%) [5] .

Naturally, during confinement and laboring period women always wants to move, and change positions spontaneously to make themselves more comfortable. A pilot study was recently conducted at two Canadian hospitals suggested that women assigned to ambient room which had additional equipment for mobility such as birth balls and calm atmosphere had positive birth experience and they spend 50%or less time in laboring and reduced need for oxytocic infusion[6].

The WHO estimates that about 536,000 women of reproductive age die each year due to pregnancy related complications, nearly 99% of these deaths occur in the developing countries and the rate of caesarean sections at between 10% and 15% of all births in developed countries (WHO, 2005)[7].The World Health Statistics (WHS), 2012, said 9% of all births in India were by Caesarean section and nearly one in 10 women in India, who gave birth between 2005 and 2010, had gone under the surgical knife [8] and studies shows that women who had multiple Caesarean sections were more likely to have problems with later subsequent pregnancies, and it

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Table 1: Comparison of third post interventional level of labour process among primi parturient mothers of study and control group. N=211

| Labour process | | Group | | | | Chi square test |
|---|---|---|---|---|---|---|
| | | Study group(106) | | Control group(105) | | |
| | | n | % | N | % | |
| Pulse | Abnormal | 1 | 0.9% | 2 | 1.9% | $\chi^2$=2.40 P=0.12 DF=1 |
| | Normal | 105 | 99.1% | 103 | 98.1% | |
| Respiration | Abnormal | 1 | 0.9% | 4 | 3.8% | $\chi^2$=1.87 P=0.17 DF=1 |
| | Normal | 105 | 99.1% | 101 | 96.2% | |
| Blood pressure | Abnormal | 1 | 0.9% | 4 | 3.8% | $\chi^2$=1.87 P=0.17 DF=1 |
| | Normal | 105 | 99.1% | 101 | 96.2% | |
| Contraction pattern | Ineffective | 18 | 17.0% | 34 | 32.4% | $\chi^2$=11.46 P=0.003** DF=2 |
| | Moderately effective | 47 | 44.3% | 50 | 47.6% | |
| | Effective | 41 | 38.7% | 21 | 20.0% | |
| Cervical dilatation | Abnormal | 7 | 6.6% | 16 | 15.2% | $\chi^2$=4.04 P=0.04* DF=1 |
| | Normal | 99 | 93.4% | 89 | 84.4% | |
| Cervical effacement | Abnormal | 6 | 5.7% | 8 | 7.6% | $\chi^2$=0.32 P=0.56 DF=1 |
| | Normal | 100 | 94.3% | 97 | 92.4% | |
| Station | Abnormal | 7 | 6.6% | 16 | 15.2% | $\chi^2$=4.04 P=0.04* DF=1 |
| | Normal | 99 | 93.4% | 89 | 84.4% | |
| Pain | Severe | 12 | 14.0% | 25 | 24.0% | $\chi^2$=8.69 P=0.01** DF=2 |
| | Moderate | 53 | 52.0% | 55 | 56.0% | |
| | Mild | 35 | 34.0% | 20 | 20.0% | |
| Discomfort | Severe | 11 | 10.4% | 20 | 19.0% | $\chi^2$=9.72 P=0.01** DF=2 |
| | Moderate | 52 | 49.1% | 59 | 56.2% | |
| | Mild | 43 | 40.6% | 22 | 21.0% | |
| Fetal Heart Rate | Abnormal | 1 | 0.9% | 2 | 1.9% | $\chi^2$=0.34 P=0.55 DF=1 |
| | Normal | 105 | 99.1% | 103 | 98.1% | |

*** highly significant at P≤0.01 *** very high significance atP≤0.001*

increased risks the for malpresentation, placenta previa and accreta, ante partum hemorrhage, prolonged labor, uterine rupture, preterm birth, low birth weight, and stillbirth in their second deliveries[9]. and it also increases the risk of pulmonary embolism [10] And deep vein thrombosis was 4-fold compared to vaginal delivery[11] **.** In addition to this, the psychological risks of Cesarean section mothers can experience increased incidence of postnatal depression, psychological birth trauma and ongoing birth-related post-traumatic stress disorder [12,13]. It also produces risks for the newborn babies are nearly 4-fold risk of dying before discharge compared with those delivered vaginally [14] and the incidence of Transient Tracheponea of the newborn is about 3 times more common after elective cesarean delivery than after vaginal delivery[15]..

Next to caesarean section induction of labour has a large impact on the health of women and their babies and so needs to be clearly clinically justified. Mothers who deliver under epidurals have less frequent contrations and have a higher incidence of oxytocin infusion than the mothers having non – medicated deliveries[16]. A recent study of a U.S. healthcare system showed that babies born by induction more likely to need a ventilator at birth and babies born too soon experienced serious complications, including fetal distress, fever, infection, respiratory distress syndrome , and transient tachypnea of the newborn[17,18]. Yet , at present scenario epidural analgesia is a commonly employed technique of providing pain relief during labor to the parturient mothers. This complication is reduced by Women, who use movements during labour, reported that it is an effective method of pain relief. And shorten the duration of first stage of labour [19]

A literature with regard to movements and position changes during labour reviewed by Cochrane evidenced based review (APRIL 2003) meta-analysed 21 studies ,examining 3,706 births stated that women who walk and move around during active stage of labour shorten the duration of labour about an hour, 17% less likely to seek pain relief, facilitate foetal descend, there by stimulate dilation, reduces oxytocic infusions and caesarean deliveries[20] . To facilitate mobility during labour,"Birth ball" has been introduced to the obstetric setting and nowadays birth ball has become more popular in many hospitals and birth centers. Sitting and Swaying

Table 2: Comparison of mean and standard deviation of labour process score between study & control group of primi parturient mothers N=211

| | Labour process | | Student's Independent t-test |
|---|---|---|---|
| | Mean | SD | |
| Study group | 21.56 | 1.37 | t=20.71 P=0.001*** DF=98 |
| Control group | 17.28 | 1.56 | |

Table 3: Comparison of post interventional level of labour outcome among study and control group of primi parturient mothers

| | | Group | | | | Chi square test |
|---|---|---|---|---|---|---|
| | | Study | | Control | | |
| | | n | % | n | % | |
| Presence of fetal distress | Severe | 12 | 11.3 | 22 | 21.0 | $\chi^2$=21.87 P=0.001*** |
| | Moderate | 8 | 7.5 | 11 | 10.5 | DF=3 |
| | Mild | 20 | 18.9 | 40 | 33.8 | |
| | Not present | 66 | 62.3 | 32 | 30.5 | |
| Type of delivery | Caesarisn delivery | 14 | 13.3% | 21 | 21.20 | $\chi^2$=3..601 P=0.01** |
| | Forceps/ vaccum | 3 | 2.9% | 6 | 5.71 | DF=2 |
| | Normal delivery | 93 | 87.73% | 78 | 74.2 | |
| Duration of labour | >14 hours | 32 | 30.2% | 52 | 49.5% | $\chi^2$=16.95 P=0.001*** |
| | 12-14 hours | 21 | 19.8% | 29 | 27.6% | DF=2 |
| | < 12 hours | 53 | 50.0% | 24 | 22.9% | |
| Use of analgesics | Need after 7 cm dilatation | 28 | 26.4% | 37 | 35.2% | $\chi^2$=17.02 P=0.001*** |
| | Need during second stage | 10 | 9.4% | 28 | 26.7% | DF=2 |
| | Nil | 68 | 64.2% | 40 | 38.1% | |
| Augmentation with oxytocin | Need after 7 cm dilatation | 32 | 30.2% | 48 | 45.7% | $\chi^2$=14.51 P=0.001*** |
| | Need during second stage | 22 | 20.8% | 32 | 30.5% | DF=2 |
| | Nil | 52 | 49.1% | 25 | 23.8% | |
| | Above 500 ml | 1 | .9% | 2 | 1.9% | |
| | Below 500 ml | 105 | 99.1% | 103 | 97.16% | |

movements on the ball, similar to a squat, opens the pelvis, helping to speed up labour and gently moving on the ball greatly reduces the pain of contractions .[21] With the ball on the floor or bed, the mother can kneel and lean over the ball, encouraging pelvic motion which can aid a posterior baby in turning to the correct position, thus allowing labour to progress more quickly and this position is wonderful for a mother who is having back labour caused by a posterior position[22].

Among the numerous practices available to enhance women's satisfaction with childbirth the mobility during labour received special attention as it is simple, inexpensive and harmless intervention. Although various position and movements adopted during labour, controversy still exit to choose the best. Additionally, in developed countries many hospitals today provide amenities like birth ball, rocking chair, beanbags, tubs or showers, in birth suite in order to make women stay out of bed and enhance the sense satisfaction. But in developing countries like India these options are lacking in birth centers. These issues can be rectified by adopting 'Active Birth' generated with movement considered as a very effective adjuvant approach to enhance the birth process and outcome since it does not causes side effects and complications.

**METHODS AND METRIALS**

This was a randomized clinical interventional study. The study was conducted in Government general hospital, Thambaram in Chennai, Tamilnadu, India with 3000-3500 annual births. 240 low risk primi parturient mothers were recruited and were allocated by Simple random sampling technique into the two arms of the study. Out of 240 primi parturient mothers, 120 of them were allotted to study group and 120 of them to control group. The inclusion criteria for sample selection which includes, primi parturient mothers at gestational age 37 to 40 weeks with initial cervical dilation 2- 3cm with single fetes with cephalic presentation and who had normal vitality. parturient mothers who were receiving analgesics, induced by medical or surgical method, had rupture of membrane, had history of pregnancy and labour complications, those who have medical complications like Diabetes mellitus, Asthma and Hypertension are excluded from the study. Ethical committee approval (clearance number 65/ IEC/2010) was obtained from the Institutional review board and formal setting permission was also obtained to conduct the present study. Both written and verbal consent was obtained.

Section I: Demographic Information was collected through personal interview using a structured questionnaire

Section II : Assessment of birth outcome includes labour process and labour outcome.

Assessment of labour process: The tool for assessing labour process is a structured tool which comprises of 10 items which includes maternal pulse , respiration, B.P, pain, discomfort level, contraction pattern, cervical dilatation, cervical effacement, station and fetal heart rate.

Table 4: Comparison the overall level of maternal satisfaction score between study & control group of primi parturient mothers N=211

| Level of satisfaction | Study Group (106) | | Control Group (105) | | Significance |
|---|---|---|---|---|---|
| | n | % | N | % | |
| Poor satisfaction | 0 | 0.0% | 12 | 11.4% | $\chi 2=13.91$ P=0.01** |
| Moderate satisfaction | 25 | 23.6% | 28 | 26.7% | |
| Good satisfaction | 81 | 76.4% | 65 | 61.9% | |

*** highly significant at P≤0.01*

Maternal pulse, respiration- are measured manually by palpating radial artery and counting radial pulse and respiration per minute and inferred as per American Heart Association

B.P- is measured by standard, certified and regularly calibrated mercury sphygmomanometer and inferred as per American Heart Association

Contraction pattern- Manual abdominal palpation and inferred using as per partograph (WHO) guidelines

Cervical dilatations, effacement, station of the fetal head- were assessed by performing per vaginal examination and inferred using as per partograph (WHO) guidelines

Pain- Measured by numerical pain rating scale(0-10) (American pain society)

Discomfort- Measured by discomfort evaluation observational checklist

Fetal heart rate- was measured by auscultation with the use of foeto scope inferred with American college of nursing practice bulletin number 106.

This is was assessed after the first set of intervention was completed that is considered as "first level" and after the second set of intervention was completed that is considered "second level" and once the third set of intervention was completed the post test level of labour process

Assessment of labour outcome- which includes presence of fetal distress, type of delivery, duration of labour , use of analgesics, administration of augmentation were assessed by using partograph and estimation of blood loss was assessed by visual method.

Section III: Maternal satisfaction with child birth was assessed by three point rating scale which has reliability of 0.82.It consist of four sub dimensions such as general satisfaction with movements(3 items), satisfaction with personal control (2 items), satisfaction with explanation and information(3 items)and satisfaction with midwifery care(2 items). Reliability was assessed through Pre testing of the tool to check the clarity of the items, feasibility and objectivity of the tool by administering it to 25 mothers. Validity obtained from 12 experts. The alpha coefficient reliability value was r = 0.82

Intervention: The primi parturient mother who belonged to study group was briefed and demonstrated about movements like walking, swaying hip side to side on birth ball, gentle rocking back and forth with rocking chair and semi sitting position .Each movements was given for 10 minutes and 5 minutes rest period during with the mother can assume any comfortable position they wish.

This set of intervention(walking, rocking, swaying on a birthball and semisitting position was given 3 times with 10 minutes interval between each other, starts from 3 cm dilatation. Labour process was assessed between the each set of intervention. Once the 3 set of intervention was completed the investigator stopped the implementing the intervention and progress was monitored and assessed birth outcome. During the intervention if the mother had strong contraction performing movements had stopped and continued once the contraction subsides. During the intervention if the mother had ruptured of membrane, receives pain medication, induced with oxytocin, any labour complication, and uncooperative mothers were excluded from the study .If the mother is able to perform the movements minimum 7 minutes they are included in the study.

**RESULTS**

During the study period of one year, a total of 240 primiparturient mothers were selected by the Out of those 211 mothers , 106 in study group and 105 in control group were completed the trial. Dropout of the study group were 14 and in control group were 15 due to fetal distress, ruptured membrane, uncooperative, and need augmentation and analgesics before 7 cm dilatation

- The baseline values were not significantly different between study and control groups for all the demographic variables including age (p=1.00),religion (p=0.87), Education(p=0.49), Occupation (p=0.57),Type of work (p=1.00), Residence (p=0.38),support system (p=0.37) , Type of family (p=0.43),information on birth ball usage (p=0.34), Source of information (p=0.18), Body mass index(p=0.84) and gestational age(p=0.58).
- After the first set of intervention, there was no statistically significant difference found in any parameters at P≤0.05 level of significance but in the second level post test comparison found that there was a significant difference found in Contraction pattern, pain and discomfort at P≤0.05 level between study and control group mothers**.**
- Comparison of third post interventional level of labour process among primi parturient mothers shows that there was highly statistical significant difference found in contraction pattern($\chi 2=11.46$), pain($\chi 2=8.69$), discomfort($\chi 2=9.72$) at P≤0.01level of significance and cervical dilatation and station($\chi 2=4.04$) are significant at P≤0.05 level. These results were summarized in table 1.
- In post intervention the mean and standard deviation value of labour process among study group was 21.56(SD=1.37). But in control group it was improved only 17.28(SD=1.56) and the difference found between study and control group was 4.28 . This is due to the effectiveness of mobility during labour .The 't' value

was 20. 71 at P=0.001 level significant. This information was briefed in table 2.

- As shown in table 3, there was high statistical significant in labour outcome such as Presence of fetal distress, duration of labour, use of analgesics and augmentation with 0xytocin at p=0.00l level of significance. This result clearly depicts that mobility during labour enhanced the labour process among the study group.
- Study group mothers who were practised mobility during labour had high level of satisfaction compared to control group mothers which was proved by none of the mother showed poor satisfaction where as in control group 11.7% of mothers had poor satisfaction. 25 (23.6%) and 28(26.7%) of women had moderate satisfaction in study and control group respectively 81(76.4%) of study group mothers had good satisfaction whereas only 65( 61.9%) of control group mothers had good satisfaction. There was highly statistical deference (p=0.01) found in level of maternal satisfaction between study and control group.This information was presented in table 4.
- Among study group there was a significant association found on level of labour process with age ($\chi 2=7.77$) at p=0.05 level and BMI ($\chi 2=6.67$) at p=0.03 level. Mothers who are in age group of 23-27 and normal weight mothers had good process than others. There was a significant association found on labour outcome with age ($\chi 2=10.92$ ) at p=0.0l level ,type of work ($\chi 2=6.98$) at p=0.03 level, gestational age ($\chi 2=7.76$) at p=0.05 level among the control group of mothers. Middle Age, moderate workers and 39 weeks completed weeks of gestational age mother had good outcome than others and these association are statistically significant at p=0.05 level

**DISCUSSION**

Childbirth is a universally celebrated natural event; yet for many thousands of women in India, it is becoming a matter of concern due to the over-medicalisation . However, few health institutes have initiated clinical practice of movements during labour. But limited documentation of its success has been published till date. This study aims to evaluate the effectiveness mobility during labour on perception of pain, on labour process and outcome and satisfaction with child birth among primi parturient mothers.

The choice of movements and position changes play a key role in determining the perception of labour pain during birth. The study done by De-jong et.al found that the ability to move and change position during labour experienced less pain and more comfortable and required less pain medication[23].This present study result also reveal that 34%(n=35)mothers in study group perceived mild pain where as in control group only 20% (n=21) had mild pain . In contrast only 14%( n=12) mothers in study group 24% (n=25) mothers in control group experienced severe pain during labour.

The Center of Disease Control and prevention in 2005 (CDC)[24] reported that the most common diagnostic reason or indication for 50% or more caesarian is 'Failure to progress which can be caused by contractions aren't vigorous enough to dilate the cervix enough for the baby move through the vagina. Pondering to this aspect, walk and move around during labour makes the uterus muscle works more effectively[25]. This study revealed that nearly 40%(n=41) study group mothers who were engaged in various movements had effective uterine contraction whereas the number was reduced in to half. among control group .Regarding labour process 94% (n=99)in study group and 85%(89) in control group had normal cervical dilatation and decend of their babies head to the birth canal .and there was a significant difference found at P≤0.05 level of significance. This result was supported by a study done by Simkin P, & Ancheta R.(2005)[26] Changing position frequently moves the bones of the pelvis to help the baby to best fit , while upright positions use gravity to help the baby decend to the birth canal and increases the diameter of the pelvic inlet and outlet.

According to CDC, another main reason for caesarian deliveries is 'fetal distress' due to poor oxygen supply which is mainly caused by recumbent positions. Lying on flat lying flat on one's back during labor can increases pressure on the blood vessels in the abdomen which reduces with circulation and lowers maternal blood pressure, which ultimately lower fetal transcutaneous oxygen saturation as much as 91% and decreases fetal heart rate or contribute to fetal distress.[27] This study result reveal that among 63%(n=66) of study group mothers not had fetal distress whereas this number was drastically reduced less than half of the percentage about 30% in control group mothers. Nearly 22%(n=22) in control group and 13%(n=14) in study group had caesarian delivery due to fetal distress and failure to progress.

In this study, nearly half of the mothers 50%(n=53) who were mobile during labour had less than 12 hours of first stage , but only one third of the mothers 23%(n=24) in control group mothers had 12 hours of first stage . Interestingly similar result was also found in augmentation with oxytocin during labour among both the groups. Nearly 64%(n=68) of mothers who were engaged in movements had less pain results in not used any form of analgesics during labour. In contrast, in control group about 60%(n=65) mother needed analgesics during labour. These findings are supported by a study on influence of maternal mobility on duration of active phase of labour which was done by Bio.Eliane, Bitter. Roberto Eduardo[28] shows that the good performance of maternal mobility has positive influences on labour process; it increases tolerance to pain, avoids the use of analgesics drugs during labour, and improves the evolution of dilatation and reduces the duration of the active phase.

With regards to Maternal satisfaction with child birth there was statistical significance found in maternal satisfaction between study and control group at p=0.01 level between these groups which shows that mobility during labour enhances positive child birth experience among the parturient mothers. This result was supported

by a qualitative study on 'characteristics of a positive experience for women who have non medicated childbirth' found that Seventeen women were interviewed and themes were identified. Being able to move and change positions freely were both key factors in determining a positive birth experience[29]. A woman's sense of satisfaction with her childbearing experience changes over time; A systematic review of the literature by Hodnett[30] on the relationship between the use of labor analgesia and maternal satisfaction concluded that pain relief does not play a major role in overall maternal satisfaction with the childbirth experience. Three randomized controlled trials (RCTs) included in the review did not demonstrate improved satisfaction with increased pain relief.

On the whole, studies reported that women who use movements in labour , it is effective method of relieving pain and restricting women's movements during labour may result in worst birth outcome and decreases women's satisfaction with their birth experience[31] and no clinical trial reported that harmful effects of movements and adopting upright positions during labour and women should be encouraged to perform this if they wish[32.] This study findings were also depicts the same result.

A possible limitation of randomized controlled trials on women's position during labour may be that women in the control group cannot be prevented from adopting an upright position any time during labour if they wish to do so. The opposite is also true in the case of women who are allocated to the study group during labour. It would be neither ethical nor humane to prevent them from assuming the position they wish to be in for any length of time if they wanted to. Of course, the design of, and facilities in, labour wards is a challenge in many settings in both developed and developing countries, because many facilities may not be to conducive to women to perform various movements and positions during labour. However, it is necessary to continue to evaluate the effect of different movements and positions on obstetrical variables, comfort and general well-being of labouring women and other potential predictors of maternal satisfaction with child birth. Comparing to previous studies related to movements and positions, the present study is randomized and controlled and has a bigger sample. However, both the groups are under regular labour treatment and management, which could be a study limitation. We suggest that further research is necessary to compare the effect of mobility on birth outcome between medicated and non medicated child birth in those without treatment.

## CONCLUSION

Thus, the present study has shown that, engaging in mobility during labour decreased the perception of labour pain , enhances labour process, improve the favorable labour outcome improves the maternal satisfaction with childbirth among the parturient mothers. Hence mobility during labour is an effective, simple and cost effective adjuvant approach and it could be used as an effective intra partum period management.

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