



Effectiveness of Labor Supportive Measures on Selected Maternal Physiological Parameters, Labour Pain and Maternal Satisfaction A Review

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ABSTRACT

Childbirth is a natural occurrence. Pain, discomfort, and fear are issues for mothers during labor. It is important to pay attention to managing pain in the first stage of labor since it is severe and is more prolonged during the initial stage of active labor. This review article aims to assess the effectiveness of labor supportive measures on selected maternal physiological parameters, labor pain and maternal satisfaction. Birth balls can help prevent maternal exhaustion caused by prolonged labor. In pregnant women, effleurage, counter-pressure massage, and breathing techniques are used to alleviate maternal pain during childbirth. The purpose of this article was to provide an overview of the effect of maternal physiological parameters, maternal pain level and maternal satisfaction between mothers adopting labour supportive measures of Birth Ball, Birth Bar, Effleurage, Counter Massage, Breathing Patterns.

Keywords: *Birth ball, Labor pain, Effleurage, Counter Massage, Breathing Patterns*

INTRODUCTION

Painful experiences during childbirth are common. Labor pain is a complicated experience with sensory, emotional, and perceptual components. Labor discomfort is not merely a reflection of the physiological processes involved in giving birth. Instead, a woman's unique perception of labor signals is what causes women to experience pain during childbirth. The World Health Organization (WHO) stated that "Evidence-based Practice" and "Complementary and Alternative Medicine" are the two most important factors in ensuring a safe and successful labor and delivery.

Because complementary therapies have fewer negative effects than pharmaceutical medications, many women prefer to utilize them as labor support during pregnancy, labor, and delivery.

Birth ball reduces anxiety, lessens pain, helps the fetal head descend, shortens the first stage, and improves maternal satisfaction and wellbeing. According to Taiwanese studies, women who engaged in birth ball exercises had shorter first stages of labor, used analgesics less frequently, and had fewer sectio caesarias [1].

Stretching of the cervical and uterine segments, along with the existence of uterine muscle ischemia, are the two main causes of labor pain, which manifests as the contraction (shortening) of the uterine muscle [2]. In 2015, the WHO projected that 830 women died annually from problems related to pregnancy and delivery. Effleurage massage, a application of a circular massage technique to the belly, waist, or thighs utilizing the palms of the fingers, is one approach that has proven to be particularly successful in treating pain. In 2018, the Linez clinic in Gunungsitoli conducted a study to ascertain The impact of an effleurage massage on a pregnant woman's first-stage labor pain intensity.

Between 65% and 100% of midwives, according to a literature study, are thought to have utilized one or more alternative therapies [3]. According to recent Australian data, During childbirth, 66.7% women reported taking non-pharmacological painkillers, while 74.4% of women employed supportive measures in some capacity during pregnancy [4]. However, there is great demand in Indian Scenario. This study will help mothers and maternity nurses to improve quality care and support, alternately, maternal morbidity and mortality will also be declined.

METHODS

The primary objective of this review is to further investigate the effectiveness of labour supportive measures on selected maternal physiological parameters, labour pain and maternal satisfaction on pregnant women in labor. The purpose of this literature review is to learn more about the effects of birth balls, birth bars, counter massage, effleurage, and breathing patterns on pregnant women in labor. This assessment's sources include a thorough search of electronic databases like Research Gate, Google Scholar, Pubmed, Science Direct, and IJSR. Birth ball, breathing, effleurage, counter massage, and maternal satisfaction were the keywords utilized in the search. According to the exclusion and inclusion criteria, the studies were assessed. We manually searched the references of the pertinent publications that met the criteria for inclusion to find more research. The inclusion criteria were applied to the screening of the remaining original full-text publications.

Labor Supportive Measures

The effectiveness of maternal physiological parameters, maternal pain level and maternal satisfaction between mothers adopting labour supportive measures of Birth Ball, Birth Bar, Effleurage, Counter Massage, Breathing Patterns are discussed in this section.

Birth Ball during first stage of labour

Childbearing is seen as a significant experience in many women's life, despite the fact that the impact of pain on this event is evident. One of the non-invasive techniques for pain management is the birth ball. Shirazi et al.'s [5] intention was to assess how the birth ball affected pregnant women's perceptions of their own discomfort and level of self-efficacy during labour. Yet, a portion of this effect might be explained by a 30%–40% rise in patients' self-efficacy.

Makvandi et al. [6] were founded with the intention of doing a critical assessment of the information that is currently available about the influence of birth ball use on labor pain alleviation. Birth ball exercises significantly reduced labor pain, according to the meta-analysis (95% confidence range -1.28; pooled mean difference -0.921; I² = 33.7%; P = 0.0000005;). According to Farrag [7], using a birthing ball during the early stages of labor has a positive impact on how things turn out. Sheishaa et al. [8], explored that there were no significant variations between the control and intervention groups in terms of general traits and obstetric history, proving that the two groups were equal.

Karthigha [9], proposed the usage of a birthing ball during the initial stage of labor among prim parturient mother was beneficial in lowering the perception of labor pain and raising the coping level without changing fetomaternal parameters. According to a statistical analysis by Apriani et al. [10], discomfort during labor might be brought on by poor self-efficacy in the range of 30 to 40%. Self-efficacy is stronger during the active labor phase. Although less frequently use of epidural anaesthesia is not statistically significant. Less caesarean section is not statistically supported after utilizing the birth ball.

The benefits of two non-pharmacological techniques, like the heat and birth ball therapy, on

labor pain alleviation were examined by Taavoni et al. [11]. To compare the usage of birth balls by expecting mothers in labor to the treatment as usual group, Yeung et al. [12] conducted a randomised controlled experiment (RCT). To determine the impact of birth balls on pain and the experience of primiparous moms giving birth, an experimental study is carried out. Additionally, it investigated the effect of birth ball use on the course of labor [13].

Taavoni et al. [14] examined the impact of honey syrup ingestion, natural noises, and pelvic special motions using a birth ball on labor pain in nulliparous women. Using a birth ball throughout

pregnancy to exercise, Sari [15] examined the impact on a primigravida's perceptions of discomfort and level of self-efficacy during labor. According to Farrag and Omar's [16] hypothesis, the course and outcome of labor are positively affected by using a birthing ball during the early stages of labor. In an experimental investigation, Fernández et al. [17] compared the usage of the birthing ball to the subcutaneous administration of haloperidol (2.5 mg) and pethidine (50 mg) to see how the birthing ball affected the satisfaction of the expecting mother. Figure 1 displays the comfort measures using birth ball.

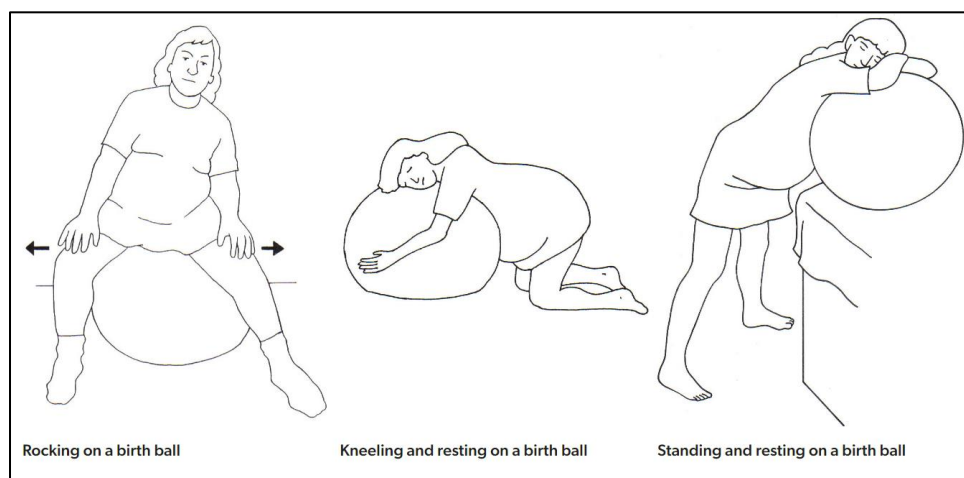


FIGURE 1: Comfort measures using birth ball

Birth bar and upright position during second stage of labour

The investigational device Relax birth(R), which is intended to aid upright position intrapartum, was piloted, according to Doyle et al.'s [18] proposal for a prospective product usage and retrospective case control research. Rocha et al. [19] discovered that there was no statistically significant difference between upright and horizontal positions. In the second stage of labor without receiving epidural anaesthesia, Gupta and Nikodem [20] assessed the potential advantages and disadvantages of various birth positions on fetal, neonatal, maternal, and caregiver outcomes. The results of this research pointed to shorter second-stage labors with less pain, fewer episiotomies, and supported childbirths. WHO recommendation in 2018 suggested birthing position should be a choice of

women, however, upright position is recommended.

Significant differences were identified between the groups according to Gizzo et al. [21] in terms of Numeric Rating Scale score, labor length, delivery method, analgesia request rate, fetal occiput rotation and requirement for episiotomy. Neonatal outcomes did not show any differences. In the second stage of labor, Hofmeyr et al. [22] used a novel technique called gentle assisted pushing (GAP), which involves delivering slow, soft pressure to the uterine fundus of a woman. Fundal pressure should only be used in situations where it can help vaginal birth securely, that will require more research into the methods or circumstances. Women should be urged to take the role they find most fulfilling. According to a review study by Kopas [23], the practices of spontaneous (nondirected) pushing, delayed pushing, and mother choice of postures are

supported by the data on the management of the second stage of labor. In order to determine whether choosing particular delivery positions affects control sense in women during labor, Nieuwenhuijze et al. [24] conducted a survey.

A comparison study on birthing experiences according to various delivery procedures was carried out by Carquillat et al. [25]. The influence of delivering technique on the aspects affecting a woman's labor experience is still up for debate. The requirement for an instrumental delivery, and maternal and fetal problems were not significantly different, according to Dani et al. [26]. This prospective observational study demonstrates how much more practical the squatting position is for mothers.

The number of instrumentally aided deliveries is decreased when healthy nulliparous women during the second stage of labor, use a birthing seat, which may balance out any increase in blood loss and perineal trauma, according to a randomized controlled trial conducted by Lagergren et al. [27]. De Jonge and Lagro-Janssen [28] did a qualitative study to examine different birthing positions in order to learn more about the factors that affect women's use of birthing postures in addition to their laboring experiences in connection to those positions.

Effleurage during first stage of labour

Effleurage massage was studied by Desideria Yosepha et al. [29] as a touch or delicate, long, gradual, and uninterrupted stroke using the fingertips. The mother is supposed to feel at peace and relaxed during this massage effleurage in order to close the pain gate and produce more endorphins. In order to expand their knowledge and use it when providing birthing care in an effort to lessen labor discomfort, Saragih [30] proposed that midwives should update their midwifery services and practices, such as by enrolling in the most recent midwifery training.

According to Manjula [31], primigravida mothers who received an effleurage massage saw a substantial lessening of their labor pain's intensity ($p < 0.05$). The results of the numerical pain scale suggest that labor pain was less intense for primigravida mothers. Therefore, it was discovered that effleurage massage was a cost-effective method for lowering labor pain in primigravida mothers.

Fitriana and Antarsih [32] investigated that there is a difference between the length of uterine contractions before and after the intervention ($p < 0.05$), contractions lasted 10.270 seconds longer in the intervention group than in the control group (2,297 seconds) and is significantly influenced by the Effleurage massage. Abd-Ella's [33] goal was to assess how well effleurage massage reduced parturient women's labor pain severity. The current investigation was performed at the delivery or labor unit of the Mansoura University Hospital using a quasi-experimental research methodology. The findings revealed that after receiving effleurage massage, the intervention group's NPRS pain score was significantly less than the control group's (5.9 ± 0.8 vs. 6.3 ± 0.9 , $p < 0.039$).

Effleurage and Counter Pressure massage during first stage of labour

The effectiveness of counter-pressure and effleurage massages for lowering labor pain in stage 1 of the active labor phase was examined by Santiasari et al. [34]. In the effleurage group, the post- and pre- intervention labor pain scores were 6.88 ± 1.22 and 9.26 ± 1.05 ($p = 0.00$). The corresponding figures in the counter-pressure groups were, however, 6.59 ± 1.28 and 9.00 ± 0.98 ($p = 0.00$). Average labor pain decreased by 2.38 and 2.41, respectively, in the effleurage and counter-pressure groups ($p = 0.74$). In terms of easing labor pain, there was no discernible difference between counter-pressure and effleurage. Paseno et al. [35] compared the effectiveness of massage effleurage with counterpressure massage in treating early labor pain. According to the study, counterpressure massage reduces labor pain in the initial stages more effectively than massage effleurage.

Malliga [36] used the purposive random sample strategy to select 60 primigravida moms from the labor ward who were in the initial stage of labor for his quasi-experimental design. Descriptive and inferential statistics, including the mean deviation and chi-square test, were employed in order to examine the data. The majority of the mothers in the experimental group pre-tested with extreme levels of anxiety and pain perception (76.7% & 36.7%, respectively). Following the test, 20.0% of the mothers in the experimental group reported light pain, 90.0% reported moderate pain, and 16.7% reported

severe pain. The influence of massage on labor pain perception and anxiety was studied by Chang et al. [37].

Breathing pattern during first and second stage of labour

The duration of labor and the impact of breathing technique training on pregnant women's anxiety levels have been examined by Cicek and Basar [38]. This study found that using breathing exercises during labor can shorten the time it takes to deliver a baby and reduce anxiety. To lessen the impression of labor pain and shorten the time required for the second stage of birth, Yuksel et al. [39] recommended breathing exercises for pregnant women that involve deep inhalations and exhalations. As a result, this study suggests breathing exercises as a practical method for shortening labor and controlling pain.

According to Boaviagem et al. [40], controlling anxiety, pain, exhaustion, and mother satisfaction during the initial stage of labour did not involve the use of breathing patterns. This study showed that during the first stage of labor, people tend to breathe slowly and deeply, sigh with a post-exhalation pause, and purse their lips. The impact of breathing technique on primiparous women's changes in maternal behavior in relation to labor pain and apgar score was examined by Parsa et al. [41]. The findings indicated that exercise during the first and second phases of labor reduced discomfort and enhanced mothers' behavioral reactions, but had no impact on the fate of the newborn. Using statistical studies, Indra [42] came to the conclusion that adopting a certain Patterned breathing method could reduce discomfort in primigravida mother during the early stage of labor.

In the latent labor phase before delivery, Yildirim and Sahin [43] showed that pregnant women experienced less pain when given nursing assistance, patient-directed labor education, and non-pharmacological pain control measures. This led to a better birthing experience. Mc Nabb [44] carried out an experimental study to create a thorough description of a massage, regulated breathing, and visualization routine that birth partners should follow starting at 36 weeks of pregnancy with the help of a skilled professional after being admitted to the hospital for labor and delivery. In an unrandomized trial involving 51

expectant mothers from the final hour of the first stage of labor through delivery, Griffin and Reynolds [45] examined the impact of analgesia on the incidence of hypoxaemia.

Maternal support during labour on birth experiences

To deepen their understanding of the phenomena, Lunda et al. [46] combined the results from many research on expecting mother's experiences of ongoing assistance throughout labor. According to research by Gunilla Sydsjö et al. [47], acute fear of childbirth (FOC) in an expectant mother may benefit from continuous midwifery care while giving birth. To improve the experience of labor for women with severe FOC, midwives must recognize the value of ongoing support.

The estimated length of labor for expecting mother receiving supportive care (median time, 3.05 h vs. 1.5 h), shorter than receiving the routine hospital maternal care was 2.03 times (95% CI 1.86 to 2.21), according to Wang et al.'s [48] investigation of multiple linear regressions adjusting for birth weight, BMI, and maternal age. A national sample of low-risk childbearing women in Chile's reports on their level of maternal satisfaction during labor was described by Pantoja et al. [49] by highlighting the aspects of intrapartum treatment that most significantly influenced overall satisfaction. When compared to standard care, Hodnett et al. [50] evaluated the effects of one-to-one intrapartum and continuous support to see if the effects are affected by the following factors: (1) standard policies and practices; (2) the healthcare professional's relationship to the woman and the hospital; and (3) onset timing.

Hossen [51] carried out a descriptive study that inquired into non-drug pain management techniques in physiological labor. 308 mothers were chosen as candidates for natural vaginal birth in this descriptive study. A common questionnaire on non-pharmacological labor pain alleviation techniques was utilized to obtain the data. The aforementioned findings indicated that aromatherapy, massage, and breathing techniques were low-cost intervention strategies that could be successful in easing labor discomfort and fostering a positive attitude about it. Labour Supportive Measures are depicted in figure 2.

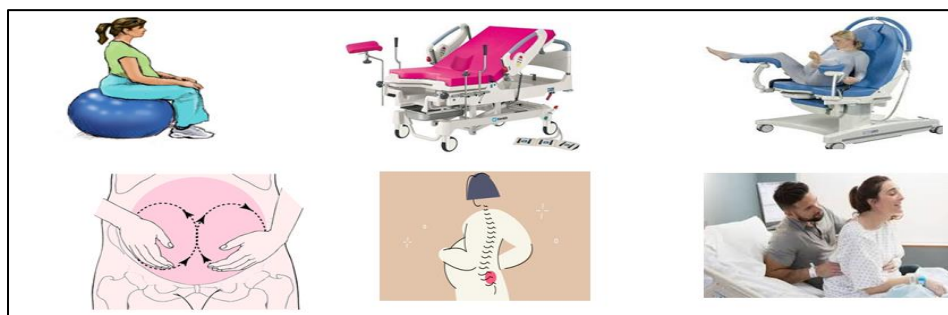


FIGURE 2: Labour Supportive Measures

RESULTS AND DISCUSSION
The summary data of the labour supportive measures of Birth Ball, Birth Bar, Effleurage,

Counter Massage, Breathing Patterns are depicted in Table 1.

TABLE 1: Summary data of labour supportive measures

Reference	Samples	Methods	Procedures	Result
Wai-Lei et al. [52]	A total of 217 individuals were chosen for the study, with 107 in the control group and 110 in the study group.	A quasi experimental study	Both groups measured baseline and hourly pain and anxiety using a visual analogue scale. The study group completed a birth ball satisfaction questionnaire after delivery.	The birth ball lowered labor pain and anxiety. It did not affect second-stage duration, vaginal delivery rate, or episiotomy. The study group had a shorter first stage of labor (5.3 vs 7.1 hrs, $p < 0.03$). The majority (95%) indicated that they would like to use birth ball in future pregnancies. This study concluded that the use of the birth ball is safe and offers women an alternate means of pain management in labour.
Fahlevie et al. [53]	Out of 30 respondents, 15 (50%) women who had given birth were assigned to the Birth Ball treatment group, while the other 15 (50%) women were to the Birth Ball control group.	Pre-experimental analytical research with an Intact-Group Comparison design	When the active phase began, the respondent sat on the ball and moved left and right, then clockwise.	Birth Ball faster the first active phase of primigravida, $p\text{-value} = 0.002 < 0.05$. it can be seen that the respondents who used Birth Ball were 15 people, in the first stage the active phase was fast 6 hours as many as 14 people (46.66%) and those who were slow ≥ 6 hours were 1 person (3.34%) while in the group control of 15 people whose active phase was fast 6 hours as many as 5 people (16.66%) and 10 people who were slow ≥ 6 hours (33.34%).

Gau et al. [54]	188 pregnant women were recruited (recruitment rate: 47%) and randomly assigned to the two study arms. Only 39 control group and 48 intervention participants completed the trial.	A Randomised controlled trial	The 26-page manual and 19-minute video that were part of the birth ball training program included regular prenatal exams. The experimental group was told to perform the stretches and postures three times per week for 20 minutes at home for six to eight weeks.	Birth ball exercises significantly improved childbirth self-efficacy and pain. Self-efficacy mediated birth ball exercise-childbirth pain connections by 30–40%. The experimental group had less epidural analgesia, shorter first-stage labor, and fewer caesarean delivery.
Shirazi et al. [55]	178 participants, 89 women per group. Participation, 30-32 weeks of gestation, a normal pregnancy, and no disease or obstetric difficulties based on a regular prenatal chart were the eligibility criteria.	Randomized clinical trial.	The intervention group was advised to do a 20-minute birth ball exercise three times a week for 6–8 weeks at home, while the control group continued their prenatal care.	Birth ball exercises significantly improved childbirth self-efficacy and discomfort, resulting in decreased labor pain in this group ($P < 0.001$ in both cervical dilatations). The intervention group had stronger self-efficacy than the control group ($P < 0.001$).
Sahara et al. [56]	30 mothers, 15 in the intervention group and 15 in the control group.	A quasi-experimental approach	Univariate and bivariate analysis using Independent and Paired T-Tests are used.	The univariate analysis showed that the intervention group had an average pain level of 7.46 before the birth ball and 4.46 after it. On examination 1, the control group had 7.06 pain and on examination 2, 6.80. The bivariate study showed that primigravida mothers utilizing a birth ball reduced labor discomfort in the first stage of the active phase with a p value of 0.000.
Valiani [57]	96 primiparous pregnant women from Isfahan and Jahrom hospitals were recruited via convenient sampling. Women with singleton pregnancies, 37-42 weeks gestation, cephalic presentation and physiologic first labor, were chosen.	Randomized clinical trial.	Lithotomy, sitting, and squatting groups were randomly assigned. VAS and McGill present pain intensity (PPI) evaluated pain in the second, third, and fourth labor phases. VAS interviews and observations collected the data. Chi-square and Kruskal–Wallis tests assessed the data.	In the latent phase of the second labor stage, lithotomy (2.27) and squatting (2.48) positions had lower mean pain severity than sitting (5.33) ($P = 0.001$). Squatting posture (6.14) had considerably less pain in the active phase of the second and third labor phases than sitting and lithotomy positions (7.59 and 7.41, respectively) ($P = 0.024$). All three groups had similar fourth-stage labor pain.
Pinar and Demirel [58]	80 women (40 intervention, 40 control) attended the maternity unit. The first 15-minute	A Randomized controlled trial	Personal Information Form, State Anxiety Inventory, Visual Analogue Scale, and	Effect size at 95% confidence interval following therapeutic touch was -3.33 (-3.96 / -2.62) for

	therapeutic touch application was done during the active phase of the first stage of labor, and the second during the second stage.		Childbirth Attitudes Questionnaire collected data. In the latent phase of the first and the fourth stage of labor the forms were completed.	State Anxiety Inventory, -2.98 (-3.59/-2.32) for Childbirth Attitudes Questionnaire and -1.65 (-2.14 / -1.13) for Visual Analogue Scale. Women in the intervention group reported a decrease in pain and anxiety levels, and more positive attitudes towards childbirth after therapeutic touch. The control group showed an increase in pain scores, and no change in anxiety and attitude scores.
Nikula [59]	260 postnatal new mothers	A cross-sectional, descriptive, correlational survey	Bryanton Adaptation of Nursing Support in Labor Questionnaire (BANSILQ) collected data. Data analysis was nonparametric.	Mothers prioritized emotional support. The survey's midwives' labor support behaviors most useful were expressing praise, treating individually, and answering questions honestly and clearly.
Mohamad Eid et al. [60]	150 labor unit patients were separated into control and study groups of 75 each.	Quasi-experimental design	Structured interview questions, satisfaction scale and observation checklists.	84% of companions provided sufficient assistance. Study women had shorter Stage I and Stage II durations than control group women. Compared to 20.0% in the control group, 86.7% of study group women were satisfied ($p < 0.001$). Supportive care from a companion is effective in shortening the duration of labor and higher levels of satisfaction among laboring women. Establish systems, protocols, policies and strategies to enhance the application of companion support during labor.
Aifa et al. [61]	Accidental sampling selected 16 mothers.	A quantitative research and pre-experimental design.	Observation sheets with univariate and bivariate analyses were used. Pairwise t test analyzed data.	Counterpressure with birth balls reduced labor discomfort in the first stage, with p -value 0.000. The use of a birth ball and counter pressure during labor can reduce pain levels because it stimulates postural reflexes and keeps the muscles and spine in good condition, thereby reducing anxiety, minimal use of

				pethidine, facilitates descent of the fetal head, reduces the length of the first stage.
Ahmed et al. [62]	96 parturient women were selected and assigned to counter-pressure, control, or effleurage massage groups.	A quasi-experimental design (non-equivalent control group pretest/posttest)	Numeric Pain Rating Scale (NPRS) and structured interviewing questionnaire schedule.	Control and intervention groups had similar baseline pain scores ($p>0.05$). However, at 30 minutes, 1 hour, and 2 hours after intervention, the mean pain scores of the control group and intervention group differed significantly ($p<0.001$). Neither baseline nor post-intervention mean pain scores differed between counter-pressure and effleurage groups ($p>0.05$).

Social, Physiological and Psychological Benefits

- The **birth ball and birth bar** are two labor equipment. They are easy to use, beneficial, and encourage comfortable childbirth in addition to helping to lessen pain. For years, birthing balls have been used to exercise and rehabilitate individuals. They are expertly made to be used in physical treatment. Using the birthing ball during labor for the following reasons, such as,
 - The benefits of sitting on a birth ball include: maintaining the baby's proper alignment in the pelvis; encouraging the baby to descend (drop down) further into the pelvis by letting gravity work in conjunction with the laboring mother; and facilitating the laboring woman's ability to rock her pelvis, shift her weight, and find comfortable positions more quickly.
 - The ball can be utilized while squatting on your hands and knees. Due to less pressure and stress on the wrists and hands, the position can now be held for longer periods of time.
- **Movement and Upright Position:** The most comfortable positions for laboring women are typically upright ones like sitting, standing, and strolling. As labor progresses, numerous individuals choose a lying-down position. It usually feels more pleasant to move around during labor than to remain still, and doing so might hasten the process due to the simple effects of gravity and the shifting shape of the pelvis. By redistributing pressure and enabling the infant to move, it may also reduce pain. During the first stage

of labor, they can try lying down, getting on their hands and knees, walking, and sitting. During the second stage of labor, they can try standing or sitting up straight.

- **Effleurage:** To gently massage the belly during effleurage, make circular, rhythmic strokes with the palm of your hand. This raises the temperature of the muscles, which improves circulation. Concentrating on the beat Movement will aid in the brain's ability to "forget" the pain response, which can lessen pain, and the massage itself can aid in the mother's relaxation. A massage technique called effleurage promotes lymphatic, blood, and relaxation flow.
- **Counter-pressure** involves applying a consistent, powerful amount of pressure to one location on the lower back during contractions with the heel of the hand, or applying pressure with both hands to the side of each hip. During labor, counterpressure can relieve back pain.
- **Patterned Breathing:** These breathing techniques help with comfort and concentration while accelerating labor. Patterned breathing improves oxygen delivery to the infant and is essential for the uterus's contractions.

CONCLUSION

In this review, numerous journals were found that described the effect of birth ball, birth bar, effleurage, counter massage, and breathing exercises on the progression of opening the labor process in laboring mothers based on the results

of the journal search through the stages of assessment, admissibility, and identification. The efficiency of maternal physiological parameters, the level of pain experienced by mothers, and the satisfaction of mothers with regard to labor support measures are assessed. As a result there is a significant difference in the maternal physiological parameters, maternal pain level and maternal satisfaction of mothers adopting labour supportive measures of Birth Ball, Birth Bar, Effleurage, Counter Massage, Breathing Patterns.

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