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# EFFECT OF ALTERNATIVE VERSUS CONVENTIONAL BIRTHING POSITIONS ON MATERNAL AND NEONATAL OUTCOMES: A QUASI-EXPERIMENTAL STUDY

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**Abstract**

**Background:**Birthing position during the second stage of labor can significantly influence maternal and neonatal outcomes. While the supine or lithotomy position is commonly used in institutional settings, alternative positions such as squatting, kneeling, or lateral postures may offer physiological advantages. However, evidence from resource-constrained and provider-led contexts like India remains limited.

**Objective:**To evaluate and compare maternal and neonatal outcomes associated with alternative versus conventional birthing positions during the second stage of labor.

**Methods:**This quasi-experimental study was conducted at Saveetha Medical College & Hospitals with 48 term pregnant women in active second stage of labor. Participants were alternately assigned to Group A (alternative birthing positions: squatting, kneeling, lateral, birthing stool) or Group B (conventional supine/lithotomy position). Maternal outcomes assessed included duration of second stage, pain score (VAS), maternal satisfaction (Likert scale), perineal status, and estimated blood loss. Neonatal outcomes included Apgar scores, NICU admission, and birth weight. Data were analyzed using SPSS v25.0 with $p< 0.05$ considered significant.

**Results:**Both groups were comparable at baseline in terms of maternal age, parity, gestational age, and birth weight. The mean duration of second stage was significantly shorter in Group A (36.4 ± 7.8 minutes) compared to Group B (45.2 ± 10.3 minutes; $p = 0.004$). Pain scores were lower in the alternative position group (6.1 ± 1.2 vs. 7.0 ± 1.3; $p = 0.021$), and maternal satisfaction was significantly higher ($p = 0.016$). Perineal integrity was better preserved in Group A, with fewer third-degree tears and lower episiotomy rates ($p = 0.028$). Neonatal outcomes, including Apgar scores and NICU admissions, were comparable between groups ($p> 0.05$), indicating no compromise in neonatal safety.

**Conclusion:**Alternative birthing positions offer significant maternal benefits in terms of reduced labor duration, lower pain, higher satisfaction, and improved perineal outcomes without affecting neonatal safety. Integrating position choice into labor protocols could enhance individualized, woman-centered care in institutional birth settings.

**Keywords:** Birthing position, Second stage of labor, Maternal outcomes, Neonatal outcomes, Perineal integrity, Quasi-experimental study

## INTRODUCTION

The second stage of labor, defined as the interval from full cervical dilation to the expulsion of the fetus, is a critical phase that significantly influences both maternal and neonatal outcomes. Traditionally, institutional deliveries across the world—including in India—have predominantly been conducted with the mother in the supine or lithotomy position, largely due to convenience for healthcare providers(1).

However, this position may not always align with the physiological or comfort needs of the laboring woman, as it can compress major blood vessels, reduce uteroplacental perfusion, narrow the pelvic outlet, and potentially prolong the duration of labor.

Birthing positions refer to the various postures a pregnant woman may assume during delivery, including supine, squatting, sitting, side-lying, or kneeling. Research suggests that the position adopted during the second stage of labor can have a substantial impact on the ease of delivery and the overall birth experience. When women are allowed to choose their preferred birthing position, many opt for upright or non-supine positions such as squatting or kneeling, which facilitate the use of gravity and pelvic mobility to aid fetal descent(2–5). Historically, upright positions were the norm in many cultures, especially in Western countries up to the 17th century (5). The shift toward supine positions began with the advent of obstetric instruments, particularly forceps, in the 18th century, which required easier access for the attending provider (6,7). Consequently, supine and lithotomy positions became standardized practices in clinical obstetrics. In recent years, surveys continue to show that women frequently deliver in the supine position, often not because of preference but due to institutional practices and lack of options (8).

Despite growing global interest in humanizing childbirth and incorporating woman-centered approaches, the uptake of alternative birthing positions remains limited, especially in resource-constrained or provider-led settings such as India. There is a paucity of region-specific evidence evaluating the comparative effectiveness of alternative versus conventional birthing positions in improving maternal and neonatal outcomes.

This quasi-experimental study was therefore undertaken to evaluate and compare outcomes between alternative birthing positions and the conventional supine position during the second stage of labor. The findings aim to inform evidence-based, individualized intrapartum care and encourage practices that enhance maternal autonomy and satisfaction in childbirth.

## METHODOLOGY

### Study Design

This prospective interventional study was conducted as a quasi-experimental trial at Saveetha Medical College & Hospitals to compare maternal and neonatal outcomes associated with alternative versus conventional birthing positions during the second stage of labor.

### Study Population

Pregnant women admitted in active labor (second stage) in the labor ward were screened for eligibility. Inclusion criteria included:

- Singleton pregnancy
- Term gestation (37–42 weeks)
- Cephalic presentation
- Spontaneous onset of labor
- No obstetric or medical complications

Exclusion criteria:

- Multiple gestation
- Preterm labor
- Malpresentation
- High-risk pregnancies (e.g., preeclampsia, uncontrolled diabetes)
- Contraindications to vaginal delivery

### Sample Size

A sample size of 48 participants was determined based on a power analysis assuming an effect size of 0.7, alpha level of 0.05, and power of 80%. Participants were allocated equally into two groups of 24 each.

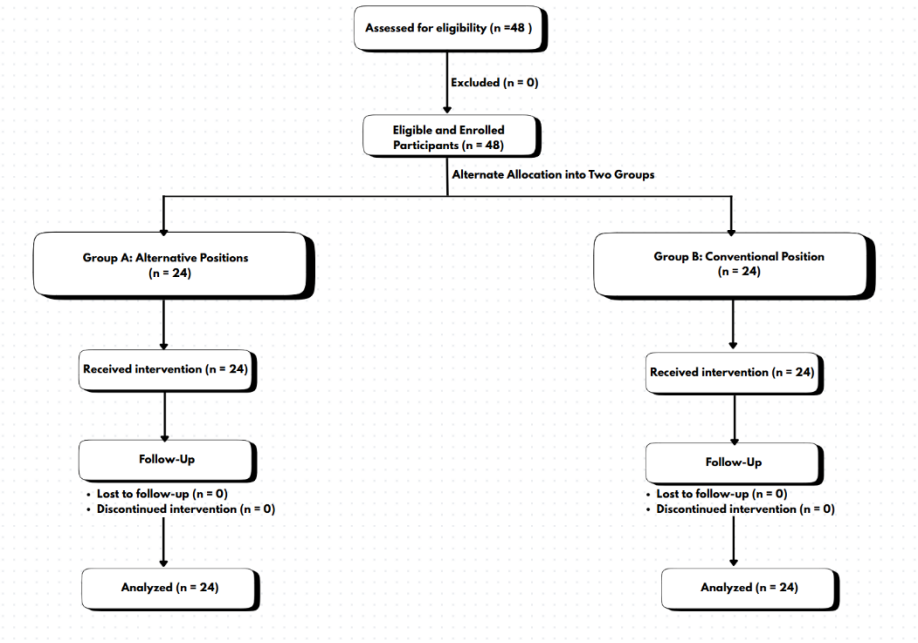
### Randomization and Grouping

Eligible participants were alternately assigned to either:

- Group A (Alternative Birthing Positions): Women were encouraged and assisted to adopt upright or non-supine positions such as squatting, kneeling, lateral (Sim's), or using a birthing stool during the second stage of labor.
- Group B (Conventional Position): Women were managed in the traditional supine or lithotomy position.

The selection of a specific alternative position in Group A was individualized based on maternal preference and comfort.

**Figure -1 Participant Flow Diagram for the Quasi-Experimental Study on Birthing Positions**




**Study Procedure**

Upon entering the second stage of labor (full cervical dilation with active pushing efforts), participants were allocated to their respective groups. A trained midwife or obstetrician supervised the birthing position and assisted in delivery as per protocol. Standard labor monitoring protocols were followed for both groups.

**Maternal Outcomes Measured:**

1. Duration of Second Stage of Labor (minutes)
2. Pain Score using Visual Analog Scale (VAS, 0–10)
3. Perineal Status: Intact, episiotomy, first-degree/second-degree/third-degree tear
4. Maternal Satisfaction Score (using a validated 5-point Likert scale)
5. Estimated Blood Loss (in mL using calibrated drapes)

**Neonatal Outcomes Measured:**

1. Apgar Score at 1 and 5 minutes
2. NICU Admission
3. Birth Weight (grams)

**Statistical Analysis**

Data were entered into Microsoft Excel and analyzed using SPSS version 25.0. Continuous variables were expressed as mean ± SD and compared using independent t-test or Mann-Whitney U test depending on data distribution. Categorical variables were expressed as frequencies and percentages and analyzed using Chi-square or Fisher's exact test. A p-value < 0.05 was considered statistically significant.

## RESULTS

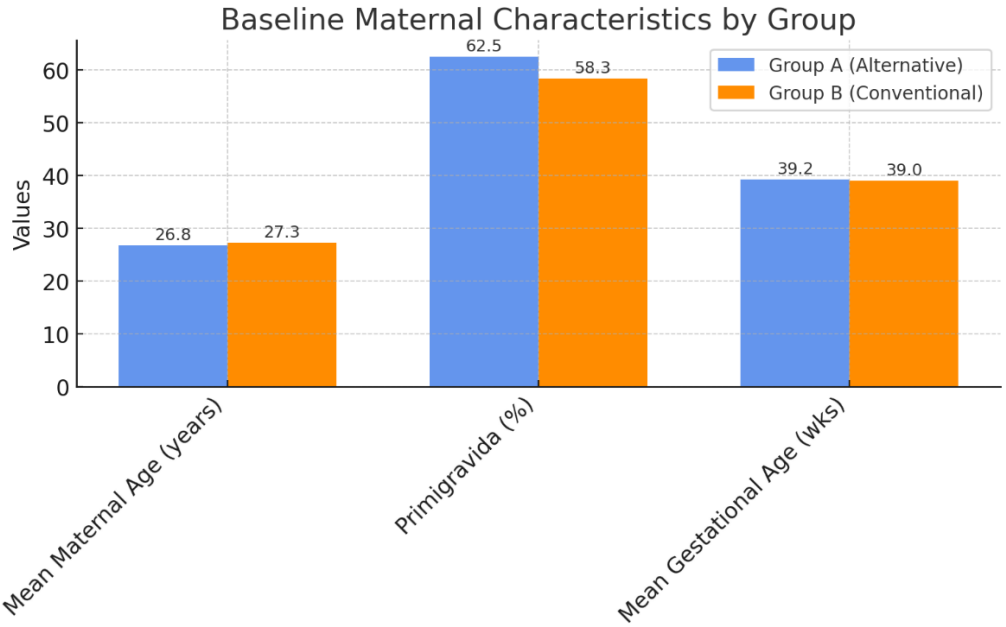
**Baseline Characteristics**

Table 1 and Figure 2 present the baseline demographic and obstetric profiles of participants in both study groups. The mean maternal age was comparable (Group A: 26.8 ± 3.2 years vs. Group B: 27.3 ± 3.6 years; p = 0.52). The proportion of primigravida women was nearly identical between groups (62.5% in Group A vs. 58.3% in Group B; p = 0.77), and the mean gestational age at delivery also showed no significant difference (39.2 ± 1.1 weeks in Group A vs. 39.0 ± 1.3 weeks in Group B; p = 0.44). Birth weights of neonates were comparable (2950 ± 270 g vs. 2890 ± 260 g; p = 0.33). These findings indicate that both groups were well matched at baseline, minimizing the risk of confounding in outcome interpretation.

**Table 1. Baseline Characteristics of Study Participants**

| Parameter | Group A (Alternative) n=24 | Group B (Conventional) n=24 | p-value |
|---|---|---|---|
| Mean Maternal Age (years) | 26.8 ± 3.2 | 27.3 ± 3.6 | 0.52 |
| Primigravida (%) | 62.5% | 58.3% | 0.77 |
| Mean Gestational Age (wks) | 39.2 ± 1.1 | 39.0 ± 1.3 | 0.44 |
| Mean Birth Weight (g) | 2950 ± 270 | 2890 ± 260 | 0.33 |

**Figure 2:Comparison of Baseline Maternal Characteristics Between Study Groups**




**Duration of Second Stage of Labor**

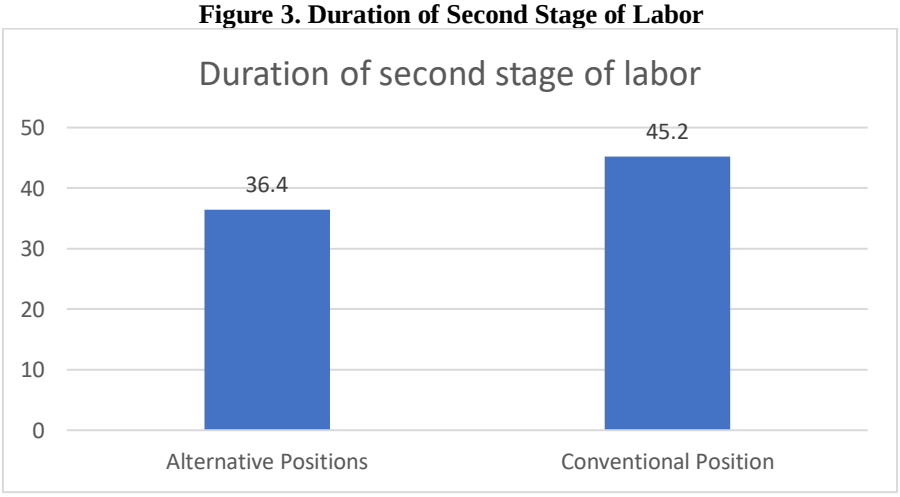
A significant reduction in the mean duration of the second stage of labor was observed in women adopting alternative birthing positions (36.4 ± 7.8 minutes) compared to those in the conventional group (45.2 ± 10.3 minutes; p = 0.004).

**Table 2** and **Figure 3** highlight this finding, suggesting that upright or lateral positions may facilitate more efficient labor progression, possibly due to gravitational advantage and improved fetal alignment.

**Table 2. Duration of Second Stage of Labor**

| Group | Mean Duration (minutes) | SD | p-value |
|---|---|---|---|
| Alternative Positions | 36.4 | 7.8 | 0.004** |
| Conventional Position | 45.2 | 10.3 | |

**Figure 3. Duration of Second Stage of Labor**




**Pain Scores During Second Stage**

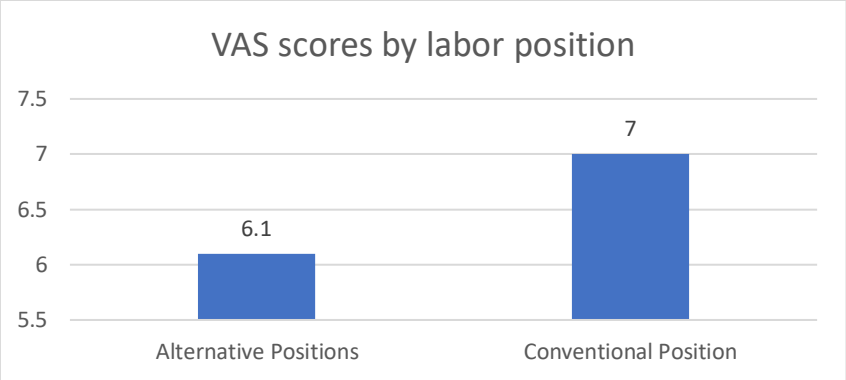
Pain assessment using the Visual Analog Scale (VAS) revealed significantly lower scores in Group A (mean: 6.1 ± 1.2) than in Group B (7.0 ± 1.3; p = 0.021).

As depicted in **Table 3** and **Figure 4**, women in alternative positions experienced reduced pain intensity, potentially due to increased maternal mobility, reduced sacral compression, and improved fetal descent.

**Table 3. Pain Scores During Second Stage of Labor (VAS)**

| Group | Mean VAS Score | SD | p-value |
|---|---|---|---|
| Alternative Positions | 6.1 | 1.2 | 0.021* |
| Conventional Position | 7.0 | 1.3 | |

**Figure 4. VAS scores by labor position**



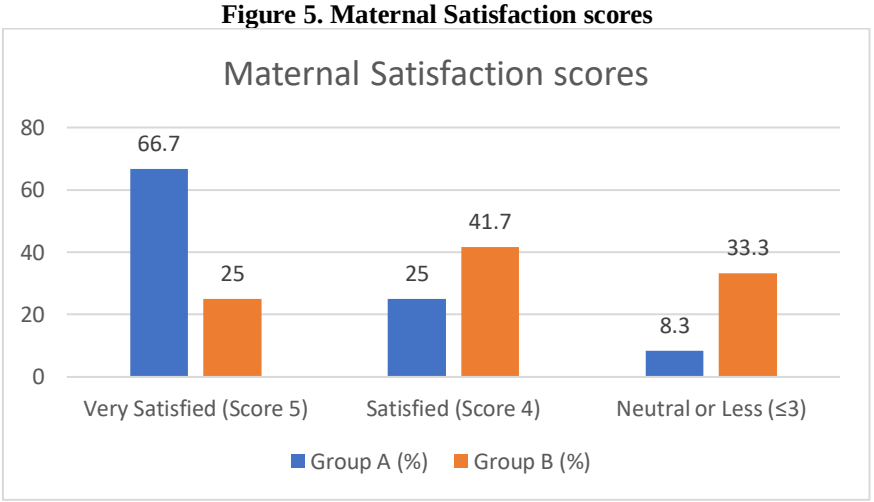

**Maternal Satisfaction**

Maternal satisfaction, measured via a 5-point Likert scale, was significantly higher in the alternative position group (p = 0.016). As shown in **Table 4** and **Figure 5**, 66.7% of women in Group A reported being "very satisfied" compared to 25.0% in Group B. Conversely, dissatisfaction (scores ≤3) was notably higher in the conventional group (33.3%) than in Group A (8.3%).

**Table 4. Maternal Satisfaction Scores**

| Satisfaction Level | Group A (%) | Group B (%) | p-value |
|---|---|---|---|
| Very Satisfied (Score 5) | 66.7 | 25.0 | |
| Satisfied (Score 4) | 25.0 | 41.7 | |
| Neutral or Less (≤3) | 8.3 | 33.3 | 0.016* |

**Figure 5. Maternal Satisfaction scores**




**Perineal Outcomes**

Perineal integrity was better preserved in Group A, with 29.2% of women achieving an intact perineum versus 8.3% in Group B. While episiotomy rates were high in both groups, they were notably lower in Group A (33.3%) than in Group B (50.0%). The incidence of third-degree perineal tears was lower in the alternative group (4.2%) than the conventional group (8.3%). Overall, these differences reached statistical significance (p = 0.028), as summarized in **Table 5**.

These findings suggest a protective effect of alternative positions on the perineum, likely due to better control during delivery and reduced perineal stretching.

**Table 5. Perineal Outcomes**

| Outcome | Group A (%) | Group B (%) | p-value |
|---|---|---|---|
| Intact Perineum | 29.2 | 8.3 | |
| Episiotomy | 33.3 | 50.0 | |
| First/Second Degree Tear | 33.3 | 33.3 | |
| Third-Degree Tear | 4.2 | 8.3 | 0.028* |

Neonatal outcomes were comparable across both groups. Mean Apgar scores at 1 minute (Group A: 7.8 vs. Group B: 7.4; p = 0.15) and 5 minutes (8.9 vs. 8.7; p = 0.28) were not significantly different. NICU admission rates were low and statistically similar (4.2% in Group A vs. 8.3% in Group B; p = 0.55), as outlined in **Table 6**. These findings affirm the safety of alternative birthing positions with respect to immediate neonatal well-being.

**Table 6. Neonatal Outcomes**

| Parameter | Group A | Group B | p-value |
|---|---|---|---|
| Mean Apgar at 1 min | 7.8 | 7.4 | 0.15 |
| Mean Apgar at 5 min | 8.9 | 8.7 | 0.28 |
| NICU Admission (%) | 4.2 | 8.3 | 0.55 |

## DISCUSSION

This quasi-experimental study compared maternal and neonatal outcomes associated with alternative birthing positions versus the conventional supine position during the second stage of labor. The results underscore several advantages of alternative positions, including improved labor efficiency, reduced pain, higher maternal satisfaction, and favorable perineal outcomes—without compromising neonatal safety.

Both groups in the study were well-matched in terms of key baseline characteristics such as maternal age, parity, gestational age, and neonatal birth weight. This comparability enhances the internal validity of the findings and minimizes potential confounding(9).

A primary outcome of interest—the duration of the second stage of labor—was significantly shorter among women in alternative birthing positions (mean: 36.4 ± 7.8 minutes) compared to those in the conventional group (45.2 ± 10.3 minutes; $p = 0.004$). These findings are consistent with existing research demonstrating that upright or lateral postures optimize uterine contractility, utilize gravity for fetal descent, and improve maternal pushing effectiveness, leading to shorter labor duration (9–11).

A recent cohort study, for instance, found that the sitting position led to a shorter second stage and higher spontaneous vaginal delivery rates compared to the lithotomy position (9).

Pain perception was also notably better among women in alternative positions, as reflected by significantly lower VAS scores (6.1 vs. 7.0; $p = 0.021$). Enhanced mobility, decreased sacral compression, and increased autonomy likely contributed to this reduction in perceived pain (12).These findings resonate with prior studies where women expressed higher levels of comfort and empowerment when allowed to choose their labor posture, highlighting the psychosocial importance of bodily autonomy during childbirth (13)(12).

Maternal satisfaction, a key experiential outcome, was significantly higher in the alternative group, with 66.7% of participants reporting being "very satisfied" compared to only 25.0% in the conventional group ($p = 0.016$). This aligns with global literature emphasizing the association between position choice and positive childbirth experiences. Women who feel supported in choosing a comfortable position often report better overall satisfaction with the birthing process (13).

From a clinical perspective, perineal outcomes favored the alternative group, where a higher proportion of women achieved an intact perineum (29.2% vs. 8.3%) and fewer experienced third-degree perineal tears (4.2% vs. 8.3%), with the overall difference reaching statistical significance ($p = 0.028$). These results are supported by cohort data indicating that lateral and kneeling positions, in particular, are associated with reduced perineal trauma due to better control during fetal expulsion and reduced directed pushing (10,14).

While certain positions like squatting may increase perineal risk among primiparas, the overall evidence still supports a protective trend for many alternative postures (10).

Crucially, neonatal outcomes—including Apgar scores at 1 and 5 minutes and NICU admission rates—did not differ significantly between groups, affirming the safety of alternative birthing positions(9,10). Several systematic reviews and large-scale observational studies have similarly concluded that maternal posture during the second stage of labor does not adversely impact neonatal well-being(9,11).

This study's strengths include its prospective design, focus on a patient-centered intervention, and use of clinically relevant outcome measures. However, some limitations must be acknowledged. The relatively small sample size may limit statistical power for less common outcomes. Additionally, the non-randomized design introduces potential for selection bias, although baseline matching mitigates this to some extent.

**Limitation**

This study has several limitations. As a non-randomized, single-center trial with a small sample size, there is a risk of selection bias and limited generalizability. The lack of blinding may have introduced reporting or observer bias, particularly for subjective outcomes like pain and satisfaction. Additionally, only short-term maternal and neonatal outcomes were assessed, without long-term follow-up. The influence of healthcare providers on position selection was not formally evaluated, which may have affected the consistency of the intervention.

## CONCLUSION

The study provides compelling evidence that alternative birthing positions during the second stage of labor confer multiple maternal benefits—including shorter labor, reduced pain, improved satisfaction, and better perineal preservation—without adversely affecting neonatal outcomes. These findings support the broader movement toward individualized, respectful, and evidence-based maternity care. Facilitating position choice in labor should be considered a key component of improving intrapartum care practices, particularly in hospital settings where conventional protocols still dominate.

## REFERENCES

1. Jones M, Harvey A, Marston L, O'Connell NE. Breathing exercises for dysfunctional breathing/hyperventilation syndrome in adults. Cochrane Database Syst Rev. 2013 May 31;2013(5):CD009041.
2. Carlson JM, Diehl JA, Murray MS, McRAE M, Fenwick L, Friedman EA. Maternal Position During Parturition in Normal Labor. Obstet Gynecol. 1986 Oct;68(4):443.
3. Hanson L. Second-stage positioning in nurse-midwifery practices. Part 1: Position use and preferences. J Nurse Midwifery. 1998;43(5):320–5.
4. Hunt LM, Glantz NM, Halperin DC. Childbirth care-seeking behavior in Chiapas. Health Care Women Int. 2002 Jan;23(1):98–118.
5. Satone PD, Tayade SA. Alternative Birthing Positions Compared to the Conventional Position in the Second Stage of Labor: A Review. Cureus. 15(4):e37943.
6. Dundes L. The evolution of maternal birthing position. Am J Public Health. 1987 May;77(5):636–41.
7. Priddis H, Dahlen H, Schmied V. What are the facilitators, inhibitors, and implications of birth positioning? A review of the literature. Women Birth J Aust Coll Midwives. 2012 Sep;25(3):100–6.
8. Declercq ER, Sakala C, Corry MP, Applebaum S, Herrlich A. Major Survey Findings of Listening to MothersSM III: Pregnancy and Birth. J Perinat Educ. 2014;23(1):9–16.
9. Fu L, Huang J, Li D, Wang H, Xing L, Wei T, et al. Effects of Using Sitting Position versus Lithotomy Position during the Second Stage of Labour on Maternal and Neonatal Outcomes and the Childbirth Experience of Chinese Women: A Prospective Cohort Study. Healthcare. 2023 Nov 20;11(22):2996.
10. Devi AM. Obstacles in Facilitating Alternative Birthing Positions: Indian Current Scenario.
11. Heskett A. Effects and Outcomes of Different Laboring Positions and the Influence from Societal Norms [Internet]. 2022 [cited 2025 Jun 8]. Available from: https://scholar.dominican.edu/nursing-senior-theses/65
12. Modi SS, Desai DP, Verma RN. Mother's experience in alternate birth positions during second stage of labour. Int J Reprod Contracept Obstet Gynecol. 2023 Apr 28;12(5):1362–5.
13. Scholten N, Strizek B, Okumu MR, Demirer I, Kössendrup J, Haid-Schmallenberg L, et al. Birthing positions and mother`s satisfaction with childbirth: a cross-sectional study on the relevance of self determination. Arch Gynecol Obstet. 2025 Mar;311(3):591–8.
14. Shorten A, Donsante J, Shorten B. Birth position, accoucheur, and perineal outcomes: informing women about choices for vaginal birth. Birth Berkeley Calif. 2002 Mar;29(1):18–27.