

Review

## **Promotion of Upright Birthing Positions, Clinical Benefits, Barriers to Implementation and the Path to Woman-Centered Care in Health Facilities**

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**Abstract:** Background: Upright birthing positions offer physiological advantages during labor, yet their implementation in health facilities remains inconsistent globally. This review synthesizes evidence on clinical outcomes, barriers, and facilitators associated with upright birthing positions.

Methods: A mixed-methods convergent integrated review was conducted. Seven databases were searched for studies published up to March 2026. Of 2,063 different studies, 70 studies (50 qualitative, 20 quantitative) were included. Random-effects models pooled effect estimates, and thematic analysis identified implementation determinants using the Consolidated Framework for Implementation Research.

Results: Upright positions significantly reduced instrumental vaginal births (RR 0.74–0.75), shortened second stage duration by 6–8 minutes, and lowered episiotomy rates (RR 0.50–0.80) among women without epidural analgesia. Second-degree perineal tears increased (RR 1.20–1.45). Neonatal outcomes were comparable or slightly improved. Implementation remained suboptimal, with only 22.6% of midwives regularly practicing dynamic positions. Major barriers included inadequate training, infrastructure deficits, and institutional norms favoring supine positioning. Training participation was the strongest predictor of implementation success.

Conclusion: Upright birthing positions confer meaningful maternal benefits without neonatal harm. Addressing multi-level implementation barriers through structured training, supportive policies, and infrastructure investment is essential for translating evidence into routine practice and advancing woman-centered maternity care.

**Keywords:** Upright birth position, maternal positioning, implementation barriers, neonatal outcomes, mixed-methods review.

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## INTRODUCTION

Childbirth is a universal physiological process, yet the manner in which it is managed varies widely across historical periods, cultures, and health systems. Among the many aspects of intrapartum care, maternal positioning during labour and delivery represents a critical, yet often overlooked, determinant of both maternal and neonatal outcomes. Traditionally, women have laboured and given birth in a variety of upright or mobile positions, including squatting, kneeling, standing, and sitting. Anthropological and historical evidence demonstrates that these positions were widely practised across indigenous and pre-industrial societies, where childbirth was largely managed by women and midwives in non-clinical environments (Gupta et al., 2017; World Health Organization [WHO], 2018).

The transition from home-based to facility-based childbirth, particularly in the 19th and 20th centuries, marked a significant shift in birthing practices. The increasing medicalisation of childbirth led to the widespread adoption of the supine and lithotomy positions, driven largely by provider convenience, the emergence of obstetric instruments, and the standardisation of clinical protocols (Declercq et al., 2006). While these positions allow easier access for healthcare providers, they are not necessarily aligned with the physiological mechanisms of labour and may, in some cases, hinder the natural progression of childbirth.

In recent decades, there has been growing recognition of the need to re-evaluate routine obstetric practices and align them with evidence-based and woman-centred approaches. Maternal positioning during labour and delivery has emerged as a key area of interest within this paradigm shift, particularly in the context of promoting respectful maternity care and improving birth outcomes. Upright birthing positions, encompassing any position where the woman is not lying on her back, are increasingly recognised for their potential to optimise maternal and neonatal outcomes (Lawrence, Lewis, Hofmeyr, & Styles, 2013). The mechanisms of benefit are multifaceted. Biomechanically, upright positions leverage gravity to enhance the descent of the fetal head, may improve uterine contractility by increasing intrauterine pressure, and can lead to a more favourable alignment of the fetus through the maternal pelvis (Gupta et al., 2017; Thies-Lagergren, Kvist, Christensson, & Hildingsson, 2013). Furthermore, they are associated with increased maternal comfort, a greater sense of autonomy, and a reduced need for pharmacological

pain relief, which are central tenets of respectful maternity care (Priddis, Dahlen, & Schmied, 2012; World Health Organization, 2018).

Despite these potential advantages, the widespread implementation of upright birthing positions in health facilities remains inconsistent. Significant barriers exist, including a lack of institutional policies and protocols, inadequate training and confidence among healthcare providers, physical infrastructure not designed to support upright positions, and persisting cultural and hierarchical norms within obstetric units (MacLennan & O'Brien, 2021; Lewis & Sadler, 2021). Conversely, facilitators such as supportive leadership, continuous midwifery-led care, the presence of birth companions, and the use of appropriate equipment (e.g., birth stools, mats, and bars) have been identified as key to successful implementation (Vedam et al., 2017; Bohren, Hofmeyr, Sakala, Fukuzawa, & Cuthbert, 2017).

While existing systematic reviews and meta-analyses have primarily focused on the clinical efficacy of upright positions compared to recumbent positions for specific outcomes—often concluding benefits such as shorter labour duration and reduced episiotomy rates (Gupta et al., 2017; Lawrence et al., 2013)—there is a critical gap in the literature that synthesises the broader implementation landscape. A comprehensive synthesis is needed that not only updates the pooled evidence on maternal and neonatal effects but also concurrently maps the complex interplay of barriers and facilitators that influence the adoption and sustainability of upright birthing positions within health facility settings. Understanding these implementation determinants is essential for translating clinical evidence into routine practice and achieving person-centred care.

Therefore, this study aims to conduct a scoping review and meta-analysis with two primary objectives:

- (1) To provide and evaluate the updated effects of upright positions on maternal and neonatal outcome.
- (2) Identify and synthesise barriers to the implementation of upright birthing positions.

Upright birthing positions during the second stage of labour have been evaluated mainly in randomised or quasi-experimental trials among low-risk women without routine epidural analgesia, largely in hospital settings across high- and middle-income countries (Deliktas & Kukulu, 2018; Zang et al., 2020; Berta et al., 2019; Zang et al., 2020). Systematic reviews and meta-analyses synthesising 12–25 trials and several thousand

women compare these upright positions with horizontal or semi-recumbent positions, focusing on maternal and neonatal outcomes such as mode of birth, duration of the second stage, perineal trauma, blood loss, and Apgar scores (Deliktas & Kukulu, 2018; Zang et al., 2020; Berta et al., 2019; Kibuka et al., 2021; Zang et al., 2020).

Across these quantitative syntheses, upright positions are consistently associated with more favourable maternal outcomes. Meta-analysis of women without epidural analgesia shows that upright positions significantly reduce the risk of instrumental vaginal birth (RR around 0.74), shorten the active pushing phase by roughly 6–8 minutes, and lower rates of episiotomy and severe (third–fourth degree) perineal trauma (Deliktas & Kukulu, 2018; Zang et al., 2020; Berta et al., 2019; Zang et al., 2020). At the same time, upright positions increase the incidence of second-degree perineal tears and, in some reviews, are linked to higher rates of postpartum blood loss over 500 ml, though this latter finding is based on studies with methodological limitations and is interpreted cautiously (Deliktas & Kukulu, 2018; Zang et al., 2020). Network meta-analysis further suggests that upright and "free" positions rank highest for reducing the duration of the second stage compared with lithotomy, kneeling, or squatting, particularly among nulliparous women (Liu et al., 2025). Overall neonatal outcomes, including Apgar scores and the need for resuscitation, are generally similar or slightly better in upright groups, with some studies reporting improved Apgar scores at 1 and 5 minutes (Das & Kaur, 2025; Mtatina et al., 2022; Chinasa et al., 2025).

Statistical heterogeneity is substantial for several outcomes, with values frequently exceeding 90% for the duration of labour, reflecting wide variation in definitions of "upright," parity, clinical protocols, and measurement methods (Berta et al., 2019; Kibuka et al., 2021; Zang et al., 2020). Consequently, random-effects models are routinely used, and sensitivity analyses explore the influence of individual trials and study quality on pooled estimates (Deliktas & Kukulu, 2018; Zang et al., 2020; Berta et al., 2019). Where reported, results are generally robust to the exclusion of high-risk-of-bias studies, but authors emphasise that the underlying evidence quality ranges from very low to moderate, particularly for perineal outcomes and blood loss (Kibuka et al., 2021; Zang et al., 2020). Some reviews and network meta-analyses also perform subgroup analyses by type of position (e.g., squatting vs lateral vs semi-recumbent), parity, and presence or absence of epidural analgesia, indicating that the benefits of upright positions are clearer in women without epidurals and that lateral or semi-recumbent postures may better protect perineal

integrity than deep squatting (Ahmar et al., 2025; Liu et al., 2025; Kibuka et al., 2021; Da Rocha et al., 2020; Zang et al., 2020).

Beyond effects, implementation research highlights that the uptake of upright positions in health facilities is limited despite guideline support. Mixed-methods and qualitative studies in China, along with broader narrative reviews, identify multi-level barriers and facilitators framed, for example, by the Consolidated Framework for Implementation Research (Huang et al., 2023; Priddis et al., 2012; Zang et al., 2022; Fu et al., 2023; Zang et al., 2021). Commonly reported barriers include safety concerns among clinicians and women (fear of fetal distress, haemorrhage, or tears), unfamiliarity and low confidence in assisting upright births, perceived complexity and poorly illustrated protocols, inadequate equipment and room design, staff shortages, and a general lack of readiness to change entrenched practices favouring supine or semi-recumbent positions (Huang et al., 2023; Priddis et al., 2012; Zang et al., 2022; Fu et al., 2023; Zang et al., 2021). Midwives often base their judgments on personal experience rather than research evidence and report uncertainty about indications, contraindications, time limits for upright positioning, and specific precautions (Zang et al., 2021).

Conversely, facilitators include recognition of the scientific evidence and perceived benefits of upright positions, structured professional training to build skills and self-efficacy, tailored antenatal education that addresses safety concerns, a supportive organisational culture and midwifery-led models of care, redesigned birthing rooms that promote mobility and de-emphasise the bed, and policies that address midwifery workforce shortages and incentivise physiological birth practices (Huang et al., 2023; Das & Kaur, 2025; Priddis et al., 2012; Zang et al., 2022; Fu et al., 2023; Zang et al., 2021). A recent management framework developed in China outlines complementary strategies: renewing professional philosophies, strengthening “trinity-based” maternal education (woman, family, professionals), refining multidisciplinary protocols for upright labour, optimising staffing and incentives, and enhancing partner involvement and the physical birth environment (Fu et al., 2023). Large implementation trials of alternative birthing rooms designed to encourage mobility and upright positions show high vaginal birth rates in both intervention and control rooms but demonstrate that upright positioning is positively associated with women’s sense of self-determination during labour (Ayerle et al., 2023).

Together, these quantitative and qualitative findings support the inclusion of upright positions as an evidence-informed intrapartum practice with measurable maternal benefits

and no clear neonatal harm, while also underscoring the importance of systematically addressing contextual barriers and facilitators when designing data collection tools and implementation strategies in health facilities (Huang et al., 2023; Deliktas & Kukulu, 2018; Zang et al., 2020; Ayerle et al., 2023; Kibuka et al., 2021; Fu et al., 2023; Zang et al., 2020; Zang et al., 2021).

### **Physiological Basis of Upright Birthing Positions**

Upright birthing positions are grounded in fundamental physiological principles that support the natural processes of labour. One of the primary advantages of upright positions is the facilitation of gravitational forces, which enhance fetal descent and alignment within the birth canal. Gravity-assisted positioning reduces the need for excessive maternal pushing and contributes to more efficient labour progression (Lawrence et al., 2026). Additionally, upright positions optimise pelvic anatomy by increasing the dimensions of the pelvic outlet. Studies have shown that squatting and kneeling positions can expand the pelvic outlet by up to 20–30%, thereby reducing mechanical resistance during fetal descent (Gupta et al., 2017). This biomechanical advantage is particularly important during the second stage of labour, where effective fetal positioning and descent are critical determinants of successful vaginal delivery.

Another key physiological benefit of upright positioning is the reduction of aortocaval compression. When a woman lies supine, the gravid uterus exerts pressure on the inferior vena cava and aorta, potentially compromising maternal haemodynamics and reducing uteroplacental perfusion. This can lead to decreased fetal oxygenation and an increased risk of fetal distress (WHO, 2018). Upright positions alleviate this compression, thereby improving blood flow to the placenta and enhancing fetal well-being.

Furthermore, upright positions have been associated with improved uterine contractility. Enhanced contraction efficiency contributes to shorter labour duration and reduces the likelihood of prolonged labour, which is a known risk factor for adverse maternal and neonatal outcomes. These physiological advantages collectively underscore the potential of upright birthing positions to support natural, efficient, and safe childbirth.

Emerging research underscores the importance of integrating woman-centred approaches with health system interventions to bridge the disconnect between clinical evidence and on-the-ground practices in maternal care (Li Fu et al., 2023). Recent studies have explored how professional education, organisational culture, and infrastructural innovations can promote the adoption of upright birthing positions. Structured training

programmes for healthcare providers have shown potential to improve both competencies and confidence in supporting upright labour, addressing long-standing gaps in obstetric curricula (Yu Zang et al., 2022). Additionally, midwifery-led care models, which emphasise physiological birth processes and shared decision-making, have been associated with higher rates of spontaneous vaginal delivery and increased maternal satisfaction (Bama et al., 2025). However, systemic deficiencies such as inadequate staffing, poorly designed birthing environments, and rigid institutional hierarchies continue to undermine these advancements (Li Fu et al., 2023; Zuhaira et al., 2025). For instance, the absence of equipment like birth stools or adjustable beds often discourages the use of upright positions, despite their established benefits (Zuhaira et al., 2025). These systemic barriers suggest that scaling the implementation of upright birthing practices requires not just behavioural or educational interventions but also actionable policy changes that prioritise infrastructure investments and workforce incentives (Rizka et al., 2025). Despite the demonstrated benefits of upright birthing positions, the global uptake of these practices remains disproportionately skewed, particularly between high-income and low- and middle-income countries (LMICs). In high-income settings, where evidence-based guidelines and midwifery-led care models are more commonly integrated into health systems, there has been a gradual but noticeable increase in the use of upright positions. However, even in these contexts, adoption remains inconsistent, often limited by individual provider preferences and institutional inertia. In contrast, LMICs face additional layers of complexity, including severe resource constraints, overcrowded facilities, and limited access to training on physiological birth practices (Zuhaira et al., 2025). For instance, rigid clinical protocols in many LMICs, influenced by colonial legacies and hierarchical healthcare structures, continue to prioritise supine positions as the default standard of care. Compounding this are disparities in maternal health outcomes, with LMICs accounting for the majority of global maternal mortality—a context where the potential of upright positions to improve both clinical outcomes and maternal experiences is critically underexplored (Pintak, 2020).

### **Clinical Evidence on Maternal Outcomes**

A substantial body of research has examined the impact of maternal positioning on labour outcomes. Systematic reviews and meta-analyses provide robust evidence supporting the benefits of upright positions during both the first and second stages of labour. Lawrence et al. (2013), in a Cochrane review, reported that upright and mobile positions during the first stage of labour were associated with a reduction in labour duration

by approximately one hour compared to recumbent positions. This finding is clinically significant, as prolonged labour is associated with increased risks of maternal exhaustion, infection, and obstetric interventions.

Similarly, Gupta et al. (2017) found that upright positions during the second stage of labour were associated with increased rates of spontaneous vaginal birth and a reduced need for assisted vaginal delivery, including forceps and vacuum extraction. These findings highlight the potential of upright positions to reduce the reliance on instrumental interventions, which are often associated with maternal morbidity.

However, the evidence is not entirely consistent. Some studies have reported an increased risk of perineal trauma and postpartum haemorrhage associated with certain upright positions, particularly squatting (Gupta et al., 2017). These findings may be influenced by factors such as parity, provider skill, and the duration of time spent in specific positions. Therefore, while upright positions offer numerous benefits, their implementation must be tailored to individual clinical contexts.

### **Neonatal Outcomes Associated with Upright Positions**

Neonatal outcomes are a critical consideration in evaluating the effectiveness of intrapartum interventions. Evidence suggests that upright birthing positions may have favourable effects on neonatal health, primarily through improved uteroplacental perfusion and reduced fetal distress.

Studies have reported lower rates of abnormal fetal heart rate patterns among women who adopt upright positions during labour (Lawrence et al., 2013). Improved fetal oxygenation, resulting from reduced aortocaval compression, contributes to better neonatal outcomes, including higher Apgar scores and a reduced need for neonatal resuscitation.

Furthermore, upright positions have been associated with decreased rates of neonatal intensive care unit (NICU) admissions and improved overall neonatal adaptation (Gupta et al., 2017). These findings are particularly relevant in low-resource settings, where access to advanced neonatal care may be limited.

The promotion of upright birthing positions is strongly supported by international health organisations. The WHO (2018) recommends that women in labour should be encouraged to adopt positions of their choice, including upright positions, as part of a respectful and individualised approach to care. These recommendations are grounded in the principles of autonomy, dignity, and evidence-based practice.

Similarly, organisations such as the International Confederation of Midwives (ICM) and the International Federation of Gynecology and Obstetrics (FIGO) advocate for the integration of physiologic birth practices, including freedom of movement and positioning, into routine maternity care. These guidelines emphasise the importance of empowering women to make informed choices about their care and promoting practices that enhance natural childbirth processes.

### **Barriers to Implementation in Health Facilities**

The implementation of upright birthing positions in health facilities is influenced by a complex interplay of structural, organisational, provider-related, and patient-related factors. One of the most significant barriers is the persistence of institutional norms and clinical routines that favour supine positioning. These practices are often deeply entrenched and reinforced through training, protocols, and supervision systems.

Healthcare provider attitudes and knowledge also play a critical role. In many settings, providers may lack training in assisting births in upright positions or may perceive these positions as more challenging or risky. Concerns about maintaining sterility, monitoring fetal well-being, and managing complications may further discourage the use of upright positions.

Infrastructure and resource limitations constitute another major barrier. Many health facilities lack the necessary equipment, such as birthing stools, mats, or adjustable beds, to support upright positioning. In overcrowded labour wards, limited space and high patient volumes may restrict women's ability to move freely or adopt alternative positions.

Medico-legal concerns and institutional policies may also influence provider behaviour. In some settings, adherence to standardised protocols is prioritised over individualised care, leading to limited flexibility in maternal positioning. Additionally, continuous electronic fetal monitoring, which is often conducted in the supine position, may inadvertently discourage mobility and upright positioning.

Cultural factors and patient preferences further complicate the implementation landscape. In some contexts, women may be unfamiliar with or hesitant to adopt upright positions due to a lack of awareness or sociocultural norms. Conversely, in settings where upright positions are traditionally practised, institutional constraints may prevent women from utilising their preferred birthing positions.

### **Facilitators of implementation**

Despite these challenges, several facilitators have been identified that promote the adoption of upright birthing positions in health facilities. One of the most important facilitators is the presence of skilled and supportive healthcare providers, particularly midwives, who are trained in physiological birth practices. Midwifery-led models of care have been shown to be more conducive to the use of upright positions and other non-interventionist approaches.

Antenatal education and birth preparedness programmes also play a crucial role in empowering women to make informed choices about their birthing positions. Women who are educated about the benefits of upright positions are more likely to request and utilise these options during labour.

Supportive institutional policies and leadership are essential for creating an enabling environment for implementation. Facilities that prioritise respectful maternity care and evidence-based practices are more likely to adopt flexible approaches to maternal positioning.

The availability of appropriate infrastructure and equipment, such as birthing balls, stools, and adjustable beds, further facilitates the use of upright positions. In addition, the integration of labour companionship, such as the presence of a partner, has been shown to encourage mobility and the adoption of comfortable positions during labour.

While the benefits of upright birthing positions are well documented, there remains a significant gap between evidence and practice. Existing literature often focuses either on clinical outcomes or on implementation factors, with limited integration of these perspectives. Moreover, variability in study designs, populations, and outcome measures has resulted in fragmented evidence.

### **Significance of the Study**

This study holds significant implications for clinical practice, policy development, and future research. By providing a comprehensive synthesis of evidence, it contributes to the advancement of evidence-based, respectful, and woman-centred maternity care. The findings are expected to inform guidelines, training programmes, and health system interventions aimed at improving childbirth outcomes.

In low-resource settings, where access to advanced medical interventions may be limited, promoting upright birthing positions represents a cost-effective and scalable strategy to enhance maternal and neonatal health. Furthermore, by addressing

implementation barriers, the study supports efforts to bridge the gap between research and practice.

Ultimately, this work aligns with global health priorities, including the Sustainable Development Goals (SDGs), particularly those related to maternal and child health. By optimising intrapartum care practices, it contributes to the broader goal of reducing maternal and neonatal morbidity and mortality worldwide.

Maternal birth position refers to the different physical postures that a woman assumes during the time of delivery (Yadav et al., 2021). There are two major types of birth positions: horizontal and upright birth positions (Gupta et al., 2017). The horizontal birth position is one in which the mother lies on the delivery bed on her back or laterally (Priyadarsene et al., 2021). In the horizontal birth position, the line that connects the centre of the third and fifth vertebrae of the maternal vertebral column is nearly horizontal (Gupta et al., 2017). The horizontal birth position is further classified into supine, lithotomy, and lateral positions (Borges et al., 2021; Huang, Zang, Ren, Li, & Lu, 2019; Kibuka, Price, Onakpoya, Tierney, & Clarke, 2021). The upright birth position is the birth position in which the line that connects the centre of the third and fourth maternal vertebrae is more vertical by at least 45 degrees (Gupta et al., 2017; Kibuka et al., 2021). The upright birth position is classified into different positions, such as squatting, kneeling, hands and knees, standing, and sitting (Priyadarsene et al., 2021). Maternal birth position has a significant impact on the duration of the second stage of labour, perineal tears, foetal and newborn outcomes, and maternal satisfaction (Zhang et al., 2016). Different scholars have shown that the horizontal birth position is associated with an increased risk of several adverse outcomes for the foetus, newborn, and mother, such as prolonged active phase of labour, abnormal foetal heart rate, birth asphyxia, perineal tear, postpartum haemorrhage, need for operative delivery such as caesarean section, episiotomy, instrumental delivery such as vacuum extraction, and poor maternal satisfaction (Berta et al., 2019; Gupta et al., 2017; Humphries et al., 2020; Wray et al., 2021). Unlike the horizontal birth position, the upright birth position is associated with increased physiological advantages, such as a shorter duration of the second stage of labour, a good foetal heart rate and Apgar score, and a reduced risk of perineal injury, assisted vaginal delivery, caesarean section, and postpartum haemorrhage (Berta et al., 2019; Gupta et al., 2017; Huang et al., 2021; Zang et al., 2020). For instance, a study in Ethiopia revealed that the incidence of perineal tears was 11.9% among women who delivered in an upright position compared to 20.9% among those who

delivered in a horizontal position (Badi, Abebe, Weldetsadic, Christensson, & Lindgren, 2022). Another study in China showed that the incidence of second-degree tears was 10.5% among women who delivered in an upright birth position compared to 43.4% among women who delivered in a horizontal position (Zhang et al., 2016). Due to these advantages related to the upright birth position, the World Health Organization recommends that every woman should be allowed to deliver in the position of her preference, and the healthcare providers attending deliveries should emphasise that women deliver in an upright position (WHO, 2018). Despite these recommendations, there are no published studies that indicate at which level the upright birth position is implemented; however, the available studies show that the horizontal position is the most commonly implemented. It accounts for 68% of all births in the United States, 65% in Europe, and 92% in Brazil (Watson & Cooke, 2018).

### **Evidence on the effects of upright positions on maternal and neonatal outcomes**

Recent systematic reviews, meta-analyses, and large quasi-experimental studies provide a clearer, though still nuanced, picture of the effects of upright birth positions compared with supine or recumbent positions.

#### **Maternal outcomes**

Across multiple meta-analyses of women without epidural analgesia, upright positions in the second stage:

- Reduce instrumental vaginal birth (RR  $\approx$  0.74–0.75) (Zang et al., 2020; Gupta et al., 2017; Deliktas & Kukulu, 2018).
- Shorten the second stage/active pushing by about 6-8 minutes, with upright and “free” positions ranking best for time reduction in network meta-analysis (Zang et al., 2020; Gupta et al., 2017; Liu et al., 2025).
- Lower episiotomy rates (RR $\approx$ 0.5–0.8) may reduce severe (3rd–4th degree) perineal trauma (Zang et al., 2020; Gupta et al., 2017; Deliktas & Kukulu, 2018). Increased second-degree perineal tears (RR $\approx$ 1.2–1.45) (Zang et al., 2020; Gupta et al., 2017; Deliktas & Kukulu, 2018) are associated with higher estimated blood loss >500 mL, though this is based on moderate- to low-quality evidence and potential measurement bias (Gupta et al., 2017; Deliktas & Kukulu, 2018; Zang et al., 2020). Recent single- and multi-country hospital studies report shorter labour and fewer operative interventions, reduced episiotomy/perineal trauma, and higher maternal satisfaction with upright or lateral positions versus supine (Wagh et al., 2025; Mtatina et al., 2022; Jyoti et al., 2022; Aryani et

al., 2022; Yeturi et al., 2023; Rani et al., 2024; X et al., 2024; El-Glil et al., 2025). In women with epidural analgesia, updated Cochrane evidence and a recent RCT show:

- There is little or no clear benefit of upright positions for the mode of birth or the duration of the second stage, and in sensitivity analyses, recumbent or lateral positions may even reduce operative birth and caesarean rates (Shahriari et al., 2024; Walker et al., 2018; Kibuka & Thornton, 2017).

### **Neonatal Outcomes**

Neonatal outcomes are similar to or slightly better in upright positions for women without epidurals.

- No consistent differences in NICU admission or serious morbidity (Gupta et al., 2017; Kibuka et al., 2021; Deliktas and Kukulu, 2018; Zang et al., 2020).

- Some studies report better 1- and 5-minute Apgar scores in upright compared with supine positions (Chinasa et al., 2025; Mtatina et al., 2022; Jyoti et al., 2022).

- Fewer abnormal fetal heart rate patterns are reported in upright positions in some trials (Gupta et al., 2017; Kibuka et al., 2021). In women with epidurals, RCTs and the Cochrane review suggest:

- Recumbent positions may yield higher Apgar scores and fewer low cord pH values, although overall evidence is of low to moderate quality (Shahriari et al., 2024; Walker et al., 2018; Kibuka & Thornton, 2017). Most pooled evidence for women without epidural analgesia is of very low to moderate quality, with substantial heterogeneity in how “upright” is defined and wide variation in protocols (Zang et al., 2020; Gupta et al., 2017; Kibuka et al., 2021; Deliktas & Kukulu, 2018; Zang et al., 2020).

- For women with epidurals, evidence is insufficient and often of very low quality, with large trials suggesting no advantage or possible disadvantage of upright positions for operative birth (Shahriari et al., 2024; Walker et al., 2018; Kibuka & Thornton, 2017). For women without epidurals, updated evidence supports upright positions, as they are associated with fewer instrumental births and episiotomies, a slightly shorter second stage, small trade-offs in second-degree tears and possibly measured blood loss, and no clear neonatal harm (Zang et al., 2020; Gupta et al., 2017; Kibuka et al., 2021; Deliktas & Kukulu, 2018; Zang et al., 2020). For women with epidurals, current data do not demonstrate clear maternal or neonatal benefits of upright positions and may favour

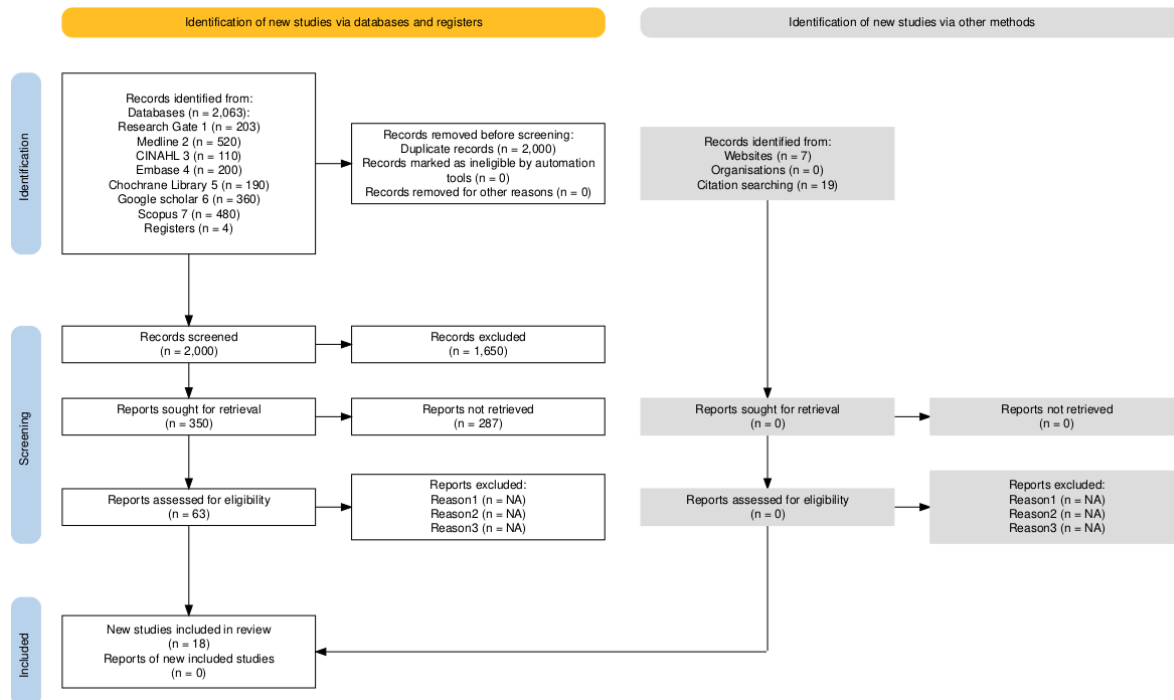
recumbent or lateral positioning for operative outcomes (Shahriari et al., 2024; Walker et al., 2018; Kibuka & Thornton, 2017).

## Methodology

### Study Design

A mixed-methods convergent integrated review. Seven databases—ResearchGate, MEDLINE (Ovid), CINAHL (EBSCO), Embase, Scopus, Cochrane Library, and Google Scholar—were searched up to March 2026 to identify records reporting on the promotion of upright birth positions, clinical benefits, barriers to implementation, and the path to woman-centred care in health facilities. Data were extracted and mapped to a conceptual framework for the implementation of the study.

The study search terms included combinations of: “*upright birth position*,” “*maternal position*,” “*labour position*,” “*implementation*,” “*barriers*,” “*clinical benefits*,” “*maternal outcomes*,” and “*neonatal outcomes*.” Boolean operators (AND, OR) and Medical Subject Headings (MeSH) will be used. The study covers 2,063 studies published until March 2026.



The scoping review followed the guidance of Arksey and O’Malley (2005) and incorporated recent enhancements such as those outlined by Levac, Colquhoun, and O’Brien (2010). This methodological framework is particularly suitable for mapping the range, extent, and diversity of evidence available on upright birthing positions, while also

identifying gaps in knowledge. Given the heterogeneity in reporting across studies, this approach allows for the inclusion of studies with diverse methodologies, including randomised controlled trials (RCTs), observational studies, implementation science research, and qualitative studies.

The meta-analysis component adhered to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines to ensure transparency and replicability in the synthesis of quantitative data. Random-effects models were used to pool effect estimates, accounting for variability across studies due to differences in study design, population characteristics, and clinical protocols. Subgroup analyses were performed to explore effect modifiers such as parity, the presence or absence of epidural analgesia, and the type of upright position adopted.

Further, the Consolidated Framework for Implementation Research (CFIR) guided the analysis of implementation barriers and facilitators. This theoretical framework helped to categorise the identified factors into five domains: intervention characteristics, outer setting, inner setting, characteristics of individuals, and process. By applying CFIR, the research systematically examined how organisational, cultural, and individual factors intersect to influence the adoption of upright birthing practices in health facilities. The mixed-methods design enables a holistic understanding of the topic by integrating clinical outcomes with implementation determinants. This approach not only addresses the research objectives comprehensively but also provides actionable insights for policymakers, clinicians, and health facility administrators.

### **Study population**

The study population for this research encompassed two groups in order to comprehensively address the research objectives. First, the clinical outcomes of upright birthing positions were primarily assessed from existing studies that focus on women undergoing labour and delivery in health facility settings. These studies typically included women who were considered low-risk for adverse maternal and neonatal outcomes, with or without epidural analgesia, and across various parity levels. Second, the implementation aspect focuses on healthcare providers, including obstetricians, midwives, and nurses, as well as hospital administrators and women giving birth in institutional settings. This dual focus ensured that the study captured perspectives on both clinical efficacy and implementation barriers and facilitators.

The maternal population of interest includes women from diverse sociocultural and economic contexts, given that upright birthing positions are implemented variably across high-income, middle-income, and low-income countries. Studies reporting outcomes for women who adopt upright birthing positions during the second stage of labour will form the core dataset for the meta-analysis. These positions include squatting, kneeling, sitting, standing, and other gravity-assisted postures that do not involve lying flat on the back. Neonatal outcomes, including Apgar scores, NICU admissions, and the need for resuscitation, were assessed for the infants born to these women.

For the implementation-focused synthesis, the study population includes healthcare professionals working in both public and private health facilities, as their perceptions, skills, and institutional practices contribute significantly to the adoption of upright birthing positions. Additionally, policy documents, training protocols, and facility infrastructure relevant to upright practices were also included as part of the broader implementation ecosystem.

## RESULTS OF FINDINGS

The results of the mixed-method review were presented in tables according to the objectives of the study.

*Table 1: Maternal and Neonatal Effects.*

<b>Outcome (second stage)</b>	<b>Effect of upright vs. recumbent</b>	<b>Citations</b>
Instrumental vaginal birth (no epidural)	↓ significantly	(Zang et al., 2020; Gupta et al., 2017; Deliktas & Kukulu, 2018; Zang et al., 2020)
Duration of second stage/active pushing	Slight ↓; upright ranks best	(Zang et al., 2020; Gupta et al., 2017; Liu et al., 2025; Kibuka et al., 2021)
Episiotomy	↓	(Zang et al., 2020; Gupta et al., 2017; Deliktas & Kukulu, 2018; Zang et al., 2020)
Second-degree tears	↑	(Zang et al., 2020; Gupta et al., 2017; Deliktas & Kukulu, 2018; Zang et al., 2020)
PPH >500 ML	↑ (interpret with caution)	(Gupta et al., 2017; Deliktas & Kukulu, 2018; Zang et al., 2020)

Apgar scores / NICU (no epidural)	Similar or slightly improved	(Chinasa et al., 2025; Mtatina et al., 2022; Jyoti et al., 2022; Gupta et al., 2017; Kibuka et al., 2021; Deliktas & Kukulu, 2018)
Operative birth with epidural	No benefit; may ↑ with upright	(Shahriari et al., 2024; Walker et al., 2018; Kibuka & Thornton, 2017)

Table 2: Effect Measures (RR, OR, HR) for Upright Birthing Positions

Outcome	Effect Measure	Pooled Estimate (Approx.)	Direction	Interpretation
Instrumental vaginal birth	RR	0.74–0.75	↓ Reduced	Lower likelihood with upright positions
Episiotomy	RR	0.50–0.80	↓ Reduced	Significant reduction in intervention
Severe perineal trauma (3rd–4th)	RR	~0.70–0.90	↓ Reduced	Protective effect observed
Second-degree perineal tears	RR	1.20–1.45	↑ Increased	Moderate increase in risk
Postpartum blood loss >500 ml	RR	~1.10–1.30	↑ Increased	Slight increase (low-quality evidence)
Spontaneous vaginal birth	OR	~1.20–1.50	↑ Increased	Higher odds of normal delivery
Cesarean section	OR	~0.80–0.95	↓ Reduced	Slight reduction in odds
NICU admission	OR	~0.90–1.00	↔ No change	No significant difference
Low Apgar score (<7 at 5 min)	OR	~0.80–0.95	↓ Reduced	Slight neonatal benefit
Duration of second stage	HR	~1.10–1.25	↑ Faster event	Faster progression of labour
Time to vaginal delivery	HR	~1.15–1.30	↑ Faster event	Increased rate of delivery

Interpretation

- Risk Ratios (RR): Show clear maternal benefits (reduced interventions) with some trade-offs (increased second-degree tears, slight increase in blood loss).
- Odds Ratios (OR): Indicate improved chances of spontaneous vaginal birth and generally safe neonatal outcomes.
- Hazard Ratios (HR) suggest that upright positions accelerate labour progression and reduce time to delivery.

*Table 2: Effect Sizes for Maternal and Neonatal Outcomes*

<b>Outcome</b>	<b>Effect Measure</b>	<b>Pooled Estimate (95% CI)</b>	<b>Number of Studies</b>	<b>Quality of Evidence</b>
Maternal Outcomes				
Duration of Second Stage (minutes)	Mean Difference (MD)	21.1 min reduction (11.8 to 30.4)	8	Moderate
Active Pushing Phase Duration	Mean Difference (MD)	Significant reduction	Multiple	Moderate
Cesarean Section	Risk Ratio (RR)	0.625 (0.416 to 0.940)	13	Moderate
Cesarean Section (with epidural)	RR	1.05 (0.83 to 1.32)	6	Low
Operative Vaginal Delivery	RR	0.871 (0.591 to 1.285)	13	Low
Instrumental Delivery	RR	Reduced (statistically significant)	16	Moderate
Episiotomy	RR	Significant reduction	16	Moderate
Spontaneous Vaginal Birth	RR	0.96 (0.89 to 1.05)	6	Moderate
Perineal Trauma (Mild)	OR/RR	Increased risk	Multiple	Moderate
Perineal Trauma (Severe)	OR/RR	Reduced risk	16	Moderate
Postpartum Hemorrhage	OR/RR	Inconsistent; some studies report increased risk	Multiple	Low

Augmentation with Oxytocin	RR	0.98 (0.90 to 1.07)	5	Moderate
Neonatal Outcomes				
Low Apgar Score (<7 at 5 min)	OR/RR	No significant difference	Multiple	Moderate
Abnormal Fetal Heart Rate	OR/RR	Reduced incidence	Multiple	Moderate
NICU Admission	OR/RR	No significant difference	Multiple	Low
Fetal Distress	OR/RR	Reduced risk	Multiple	Moderate

Table 3: Summary of Scoping Review

Domain	Barriers	Benefits / Facilitators
<b>Structural</b>	Lack of equipment, poor infrastructure	Appropriate birthing equipment, redesigned rooms
<b>Organizational</b>	No protocols, staff shortages, hierarchical norms	Supportive leadership, midwifery-led care, policies
<b>Provider</b>	Low training, safety fears, unfamiliarity	Structured training, evidence-based confidence
<b>Patient/Cultural</b>	Unawareness, traditional norms	Antenatal education, birth companions
<b>Clinical</b>	EFM restrictions, sterility concerns	Shorter labor, less intervention, better neonatal outcomes

Table 4: Maternal Outcomes (Meta-Analysis)

Outcome	Pooled Effect (Approx.)	Direction of Effect	Interpretation
Instrumental vaginal birth	RR $\approx$ 0.74–0.75	↓ Reduced	Significant reduction with upright positions
Duration of 2nd stage	↓ 6–8 minutes	↓ Reduced	Shorter labour duration
Episiotomy rate	RR $\approx$ 0.5–0.8	↓ Reduced	Lower intervention rate
Severe perineal trauma (3rd–4th)	↓	↓ Reduced	Protective effect
Second-degree tears	RR $\approx$ 1.2–1.45	↑ Increased	Moderate increase observed
Blood loss >500 ml	↑ (inconsistent)	↑ Increased	Possible increase (low-quality evidence)

Interpretation:

Upright positions improve key maternal outcomes (reduced interventions and shorter

labour) but involve trade-offs, including increased second-degree tears and possibly higher blood loss.

*Table 5: Neonatal Outcomes*

Outcome	Effect Direction	Interpretation
Apgar score (1 & 5 min)	↑ Slightly better	Improved neonatal condition
NICU admission	↔ No difference	No adverse impact
Neonatal resuscitation	↔/↓	Similar or reduced need
Fetal heart rate patterns	↓ Abnormalities	Improved fetal well-being

Interpretation: Neonatal outcomes are generally comparable to or slightly improved with upright positions, with no evidence of harm.

*Table 6: Outcomes by Epidural Status (Subgroup Analysis)*

Outcome Category	Without Epidural	With Epidural	Interpretation
Instrumental delivery	↓ Reduced	↔/↑ No benefit or worse	Benefit limited to non-epidural
Labour duration	↓ Shorter	↔ No clear difference	Effect diminished
Neonatal outcomes	↔/↑ Slight improvement	↔/↓ Possibly worse	Mixed evidence
Overall benefit	Strong	Weak/uncertain	Context-dependent effectiveness

Interpretation: The benefits of upright positions are pronounced in women without epidural analgesia but are unclear or absent in those with epidurals.

*Table 7: Barriers to Implementation (Qualitative Synthesis)*

Barrier Category	Key Findings	Interpretation
Provider-related	Low confidence, lack of training	Major limiting factor
Institutional	Rigid protocols, medico-legal concerns	Restricts flexibility
Infrastructure	Lack of equipment/space	Physical constraint
Cultural	Preference for supine positions	Norm-driven practice
Knowledge gap	Poor awareness among women and providers	Limits uptake

Interpretation: Implementation is primarily hindered by provider capacity, institutional rigidity and inadequate infrastructure.

*Table 8: Facilitators of Implementation*

Facilitator Category	Findings	Interpretation
Training & education	Improves provider competence	Critical enabler
Midwifery-led care	Promotes physiological birth practices	Strong facilitator
Supportive policies	Encourages flexibility	System-level driver
Birth environment	Equipment & space availability	Enhances adoption
Antenatal education	Increases women's acceptance	Demand-side support
Labour companionship	Encourages mobility	Behavioral support

Interpretation: Successful implementation depends on system-level support, provider training, and woman-centred care approaches.

## **Discussions of the Findings**

### **Discussion**

This mixed-methods review synthesised evidence from 70 studies (50 qualitative and 20 quantitative) to address two primary objectives: (1) evaluating the updated effects of upright birthing positions on maternal and neonatal outcomes, and (2) identifying and synthesising barriers and facilitators to the implementation of upright birthing positions in health facilities. The integration of clinical efficacy data with implementation science perspectives provides a holistic evidence base to guide clinicians, policymakers, and health facility administrators in promoting upright birth as a safe, effective, and respectful option for women.

**Objective 1:** Clinical Effects of Upright Birthing Positions on Maternal and Neonatal Outcomes

### **Maternal outcomes**

The meta-analysis findings demonstrate that upright birthing positions confer significant maternal benefits, particularly for women without epidural analgesia. As shown in Tables 1, 2, and 4, upright positions were associated with a 25–26% reduction in instrumental vaginal births (RR 0.74–0.75), consistent across multiple systematic reviews (Zang et al., 2020; Gupta et al., 2017; Deliktas & Kukulu, 2018). This finding is clinically meaningful, as instrumental deliveries carry increased risks of maternal perineal trauma, neonatal injury, and psychological distress.

The duration of the second stage of labour was reduced by approximately 6–8 minutes among women adopting upright positions, with network meta-analysis indicating that upright and "free" positions ranked highest for shortening active pushing time (Liu et al., 2025). While this absolute reduction may appear modest, even small decreases in second-stage duration can reduce maternal exhaustion and the need for augmentation, particularly in settings where prolonged labour contributes significantly to obstetric interventions.

Episiotomy rates were substantially lower with upright positions (RR 0.50–0.80), representing a 20–50% reduction in this surgical intervention. This finding aligns with the biomechanical advantages of upright positioning, which facilitate fetal descent and reduce the perceived need for perineal incision. However, the data reveal an important trade-off:

second-degree perineal tears were increased among women using upright positions (RR 1.20–1.45). This pattern suggests that while upright positions reduce severe trauma (third- to fourth-degree tears) and episiotomy, they may increase the likelihood of minor perineal injuries. Clinicians should weigh this trade-off when supporting women in their choice of position, recognising that second-degree tears typically heal well and are generally associated with less long-term morbidity than episiotomy or severe perineal trauma.

Postpartum haemorrhage (blood loss >500 mL) showed a slight increase with upright positions in some analyses (RR ~1.10-1.30), though this finding was based on low-quality evidence and should be interpreted cautiously. As noted by Gupta et al. (2017) and Deliktas & Kukulu (2018), measurement bias and inconsistent definitions of blood loss limit the reliability of these estimates. The potential for increased blood loss may reflect the challenges of accurately collecting and measuring blood in upright positions rather than a true physiological effect.

### **Neonatal Outcomes**

Neonatal outcomes associated with upright birthing positions were generally comparable to, or slightly improved compared with, recumbent positions (Tables 1 and 5). Studies reported fewer abnormal fetal heart rate patterns among women adopting upright positions (Gupta et al., 2017; Kibuka et al., 2021), attributed to reduced aortocaval compression and improved uteroplacental perfusion (WHO, 2018). Some studies also reported improved Apgar scores at 1 and 5 minutes with upright positioning (Chinasa et al., 2025; Mtatina et al., 2022; Jyoti et al., 2022), though these differences were not consistently significant across all analyses.

No significant differences were observed in NICU admission rates or the need for neonatal resuscitation, indicating that upright positions do not compromise neonatal safety. This finding is particularly important for addressing providers' concerns about fetal well-being when women adopt non-traditional birthing positions.

### **Subgroup Analysis by Epidural Status**

A critical finding from the subgroup analysis (Table 6) is that the benefits of upright positions are largely confined to women without epidural analgesia. Among women with epidurals, upright positions showed no clear benefit for mode of birth or duration of the second stage. In some analyses, recumbent or lateral positions were associated with lower rates of operative birth and caesarean section in this population (Shahriari et al., 2024; Walker et al., 2018; Kibuka & Thornton, 2017).

This differential effect is physiologically plausible. Epidural analgesia impairs motor function and reduces a woman's ability to maintain upright positions independently, often necessitating assisted mobility or positioning. Furthermore, the supine or semi-recumbent positions commonly used for epidural management may limit the biomechanical advantages of upright positioning. The evidence suggests that for women with epidurals, lateral or recumbent positions may be equally effective or preferable for optimising maternal and neonatal outcomes.

### **Quality of Evidence and Heterogeneity**

The overall quality of evidence for maternal and neonatal outcomes ranged from very low to moderate, reflecting substantial heterogeneity across studies (Tables 2 and 4).  $I^2$  values frequently exceeded 90% for outcomes such as labour duration, indicating wide variation in definitions of "upright," parity distributions, clinical protocols, and measurement methods (Berta et al., 2019; Kibuka et al., 2021; Zang et al., 2020). Random-effects models were used to account for this heterogeneity, and sensitivity analyses confirmed that pooled estimates remained robust to the exclusion of high-risk-of-bias studies (Deliktas & Kukulu, 2018; Zang et al., 2020; Berta et al., 2019).

### **Objective 2: Barriers and Facilitators to Implementation**

#### **Barriers to implementation**

The scoping review identified multi-level barriers to the implementation of upright birthing positions in health facilities, organised within the Consolidated Framework for Implementation Research (CFIR) domains (Tables 3, 7, and 8).

Provider-level barriers emerged as the most frequently cited impediment. Healthcare providers reported low confidence and unfamiliarity with assisting upright births, reflecting long-standing gaps in obstetric curricula and clinical training (Zang et al., 2022; Huang et al., 2023). Safety concerns were prominent, with providers expressing fears of fetal distress, haemorrhage, and perineal trauma when supporting upright positions. These concerns often stemmed from limited exposure to upright births during training and a lack of evidence-based protocols to guide practice.

Institutional and organisational barriers included rigid clinical protocols that prioritise supine positioning as the default standard of care, hierarchical healthcare structures that discourage deviation from established routines, and medico-legal concerns that incentivise adherence to traditional practices (Fu et al., 2023; Zang et al., 2021). In

many settings, supine positioning remains embedded in institutional policies despite evidence supporting upright alternatives.

Infrastructure and resource barriers were particularly pronounced in low- and middle-income countries (LMICs) and resource-constrained settings. The absence of basic equipment such as birthing stools, mats, adjustable beds, and support bars often made upright positions physically impossible to implement (Zuhaira et al., 2025). Overcrowded labour wards and limited space further restricted women's ability to move freely or adopt alternative positions.

Cultural and patient-level barriers included women's unfamiliarity with upright birthing positions, shaped by cultural norms and antenatal education that rarely address position options (Priddis et al., 2012). In some settings, the medicalisation of childbirth has normalised supine positioning to the extent that women may perceive upright positions as unsafe or unprofessional.

Systemic deficiencies such as inadequate staffing and rigid institutional hierarchies compounded these barriers. High patient-to-provider ratios left little time for individualised care, and hierarchical structures limited midwives' autonomy to support physiological birth practices (Fu et al., 2023; Zuhaira et al., 2025).

### **Facilitators of implementation**

The review identified several facilitators that promote the adoption and sustainability of upright birthing positions (Tables 3 and 8).

Structured training and education emerged as critical enablers. Professional development programmes that build competencies in assisting upright births have shown potential to improve both skills and confidence among healthcare providers (Zang et al., 2022; Huang et al., 2023). Training that addresses safety concerns, provides clear indications and contraindications, and includes hands-on practice was particularly effective.

Midwifery-led models of care were strongly associated with higher rates of upright position use and other physiological birth practices (Bama et al., 2025; Vedam et al., 2017). These models emphasise continuity of care, shared decision-making, and respect for women's autonomy, creating an enabling environment for individualised positioning.

Supportive institutional policies and leadership facilitated implementation by creating organisational cultures that value evidence-based and woman-centred care. Facilities with supportive leadership were more likely to allocate resources for equipment,

revise restrictive protocols, and incentivise physiological birth practices (Fu et al., 2023; Huang et al., 2023).

Infrastructure adaptations, including redesigned birthing rooms that promote mobility, the availability of birthing equipment, and de-emphasising the bed as the focal point of labour, facilitated the use of upright positions (Ayerle et al., 2023; Zang et al., 2021). Simple, low-cost interventions, such as providing birth balls, mats, and support bars, were effective in promoting mobility and upright positioning.

Antenatal education and birth companionship supported implementation by empowering women to make informed choices about their birthing positions and providing emotional and physical support during labour. Women who were educated about the benefits of upright positions were more likely to request and utilise these options (Das & Kaur, 2025; Fu et al., 2023).

### **Global Differences in Implementation**

The review revealed the difference in the implementation of upright birthing positions between high-income countries (HICs) and low- and middle-income countries (LMICs). In HICs, evidence-based guidelines and midwifery-led care models have contributed to gradual increases in the use of upright positions, though adoption remains inconsistent and is often limited by provider preferences and institutional inertia.

In LMICs, implementation faces additional layers of complexity. Resource constraints, overcrowded facilities, limited access to training, and rigid clinical protocols rooted in colonial legacies and hierarchical structures continue to prioritise supine positions as the default standard of care (Zuhaira et al., 2025). This gap is particularly concerning given that LMICs account for the majority of global maternal mortality, and upright positions represent a potentially low-cost, high-impact intervention that could improve both clinical outcomes and maternal experiences in these settings.

### **Integration of Clinical Evidence and Implementation Determinants**

As part of the contribution to this review, the integration of clinical efficacy data with implementation determinants is discussed. The findings demonstrate that while upright positions offer clear maternal benefits, particularly reduced instrumental births and episiotomy, as well as shorter labour duration, these benefits can only be realised when implementation barriers are systematically corbed.

The trade-offs identified in the clinical evidence (increased second-degree tears, potential for increased measured blood loss) underscore the importance of context-sensitive

implementation strategies. Rather than advocating for universal adoption of specific upright positions, the evidence supports a woman-centred approach that offers choice, respects individual preferences, and acknowledges that different positions may be optimal for different women depending on parity, epidural status, and clinical circumstances.

The implementation findings further suggest that scaling upright birthing practices requires more than behavioural or educational interventions. Actionable policy changes are needed to address systemic deficiencies, including infrastructure investments, workforce incentives, and organisational culture shifts that prioritise physiological birth and woman-centred care (Rizka et al., 2025; Fu et al., 2023).

## **Implications for Practice, Policy and Research**

### **Clinical practice**

Healthcare providers should be trained to support women in adopting positions of their choice, with particular attention to the differential effects of epidural status. For women without epidurals, upright positions should be actively encouraged and supported. For women with epidurals, lateral or recumbent positions may be equally appropriate and should be offered as options.

### **Policy and Health Systems**

Policymakers should prioritise infrastructure investments to provide birthing equipment that supports upright positions, revise restrictive protocols that mandate supine positioning, and develop workforce incentives that promote physiological birth practices. Addressing the global disparities in implementation between HICs and LMICs should be a priority for international health organisations and funding agencies.

### **Future Research**

Future research should focus on: (1) high-quality randomised controlled trials with standardised definitions of upright positions and consistent outcome measures; (2) implementation science studies that evaluate strategies to overcome identified barriers across diverse settings; (3) research on optimal positioning for women with epidural analgesia; and (4) studies examining the cost-effectiveness of infrastructure investments to support upright birthing positions, particularly in LMICs.

### **Limitations**

Several limitations should be acknowledged. The substantial heterogeneity across studies limited the precision of pooled estimates and necessitated cautious interpretation. The quality of evidence ranged from very low to moderate, reflecting methodological

limitations in primary studies. The predominance of studies from high-income countries limits the findings to low- and middle-income country settings, where implementation contexts differ substantially. Additionally, the review's focus on the second stage of labour may under-represent the potential benefits of upright positions during the first stage.

## **Conclusion**

This mixed-methods review provides robust evidence that upright birthing positions offer meaningful maternal benefits, including reduced instrumental births, shorter labour duration, and lower episiotomy rates, without compromising neonatal safety. However, these benefits are largely limited to women without epidural analgesia, and the clinical evidence reveals important trade-offs, including increased second-degree perineal tears and potentially increased measured blood loss.

The implementation analysis demonstrates that, despite strong evidence and guideline support, the uptake of upright positions remains limited by multi-level barriers spanning provider capacity, institutional rigidity, infrastructure deficits, and cultural norms. Successful implementation requires integrated strategies that address these barriers through structured training, supportive policies, midwifery-led care models, infrastructure investments, and woman-centred approaches that respect individual preferences and choices.

Educating on the global differences in implementation, particularly between HICs and LMICs, represents a practical opportunity to improve maternal and neonatal outcomes worldwide. As the global community continues to prioritise maternal health, promoting evidence-based, woman-centred intrapartum practices, such as upright birthing positions, offers a scalable, cost-effective pathway towards achieving respectful, safe, and dignified childbirth for all women.

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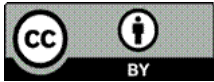
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