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REVIEW ARTICLE

ADVANCES AND CHALLENGES IN EXTERNAL CEPHALIC VERSION FOR FETAL POSITIONING: A COMPREHENSIVE REVIEW

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ABSTRACT

External cephalic version (ECV) is a critical obstetric intervention aimed at repositioning breech or transverse-presenting fetuses to a cephalic position, thereby reducing the likelihood of cesarean deliveries and associated complications. This review explores key dimensions of ECV, including ethical and psychological considerations, clinical recommendations, and future directions. Ethical concerns centre on informed consent and shared decision-making, emphasizing the importance of transparent communication and patient autonomy. The psychological impact, particularly maternal anxiety and its influence on procedural outcomes, highlights the need for empathetic patient care and psychological support. Clinical recommendations underscore the significance of evidence-based practices, including the use of ultrasound guidance, effective pain management, and careful patient selection to maximize procedural safety and success rates. A multidisciplinary approach involving obstetricians, midwives, ultrasonographers, and anesthesiologists is essential for delivering comprehensive care. Barriers to ECV, such as provider knowledge gaps, patient acceptance, and resource constraints, particularly in low-resource settings, necessitate targeted interventions to improve accessibility and uptake. Emerging trends in ECV, including technological advancements like improved imaging techniques and the exploration of non-invasive alternatives, show promise for enhancing procedural efficacy and patient acceptance. However, gaps in research remain, particularly concerning the long-term psychological outcomes of ECV and the role of cultural factors in shaping patient attitudes. Addressing disparities in access to ECV through mobile health units, community-based training, and innovative solutions is critical for ensuring equitable care. ECV is a valuable procedure with the potential to improve maternal and fetal outcomes, but it requires a patient-centred, multidisciplinary approach. Future research and innovation should focus on addressing barriers, leveraging technology, and promoting equitable access. By advancing clinical practice and integrating ethical and psychological considerations, ECV can continue to evolve as a safe, effective, and widely accessible intervention for managing malpresentation.

KEYWORDS

Breech presentation, Maternal anxiety, Non-invasive techniques, Transverse lie, Ultrasound guidance, Cesarean deliveries

1. INTRODUCTION

Optimal fetal positioning during childbirth is crucial for ensuring a safe and uncomplicated delivery. When the fetus is in a cephalic position, where the head is oriented downward towards the birth canal, the likelihood of a smooth vaginal delivery increases. However, deviations from this ideal position, such as breech or transverse lie presentations, pose significant challenges for both the mother and fetus (Hofmeyr and Moreri-Ntshabele, 2024). ECV has emerged as a non-invasive procedure aimed at correcting these suboptimal positions, thereby reducing the need for cesarean sections and associated complications. This review explores the intricacies of ECV, its role in modern obstetric care, and the factors influencing its success and acceptability. ECV is a manual procedure performed to reposition the fetus from a non-cephalic presentation, such as breech or transverse lie, to a cephalic presentation in preparation for vaginal delivery. Typically performed after 36–37 weeks of gestation, ECV involves the application of gentle pressure on the mother's abdomen by a trained healthcare provider (Morgan et al., 2018). Ultrasound guidance and, in some cases, tocolytic agents are used to facilitate the process and improve its safety and efficacy.

Historically, efforts to reposition the fetus date back to ancient practices; however, the modern iteration of ECV gained prominence in the 20th century with advancements in ultrasound technology and obstetric care. The procedure has since become a standard practice in many healthcare settings, particularly as cesarean delivery rates continue to rise globally (Hutton & Reitsma, 2024). According to the World Health Organization (WHO), cesarean sections are associated with higher risks of maternal and neonatal complications compared to vaginal delivery when performed without medical necessity. By promoting cephalic presentation, ECV serves as a critical intervention for reducing unnecessary cesarean deliveries. Despite its potential benefits, ECV is not without limitations. Factors such as maternal obesity reduced amniotic fluid levels, and uterine abnormalities can decrease its success rate, which ranges between 40% and 70% in most clinical settings (Kishkovich et al., 2023). Maternal discomfort, potential fetal distress, and practitioner variability in skill

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levels contribute to its underutilization in some regions. These challenges underscore the need for a nuanced understanding of ECV's benefits, risks, and strategies for optimization.

Fetal positioning is a pivotal factor influencing the mode and outcome of delivery. In a cephalic presentation, the fetal head aligns with the maternal pelvis, facilitating the passage of the baby through the birth canal. This position minimizes complications such as prolonged labour, birth injuries, and neonatal asphyxia (Bahmaei et al., 2023). In contrast, breech presentations, where the fetus's buttocks or feet are positioned to enter the birth canal first, increase the likelihood of delivery complications, including umbilical cord prolapse and head entrapment. Non-cephalic presentations often necessitate cesarean delivery, a surgical procedure associated with inherent risks such as infection, haemorrhage, and prolonged recovery (Fernández-Carrasco et al., 2022). Cesarean births can have long-term implications, including uterine scarring and increased risks in subsequent pregnancies. For the fetus, cesarean delivery may increase the risk of respiratory complications, particularly when performed before full-term gestation.

The significance of achieving optimal fetal positioning extends beyond immediate delivery outcomes. A successful vaginal delivery is associated with lower healthcare costs and improved maternal satisfaction compared to cesarean sections (Yeturi et al., 2023). Moreover, vaginal births support the natural colonization of the newborn's microbiome, which plays a role in long-term health outcomes. Given these benefits, interventions like ECV that aim to correct malpresentation and promote cephalic positioning are of immense clinical and public health importance (Hanachi et al., 2022). In addition to its physiological benefits, optimal fetal positioning has a psychological dimension. Women with non-cephalic presentations often experience anxiety and feelings of inadequacy, fearing the challenges of cesarean delivery or complicated vaginal births. By increasing the likelihood of vaginal delivery, ECV offers a pathway for addressing these concerns and enhancing maternal confidence.

2. Physiology of Fetal Positioning

Fetal positioning refers to the alignment and orientation of the fetus within the uterus during pregnancy. Proper positioning is critical for a safe and efficient vaginal delivery. The position of the fetus significantly influences the labor process, the mode of delivery, and the well-being of both mother and baby (Lee et al., 2021). Understanding the physiology of fetal positioning involves exploring the mechanics of normal presentation, identifying common malpresentations, and examining the factors that influence fetal orientation in utero.Normal fetal presentation typically involves the cephalic presentation, where the fetus's head is positioned downward toward the birth canal, with the occiput (back of the head) oriented toward the maternal pelvis(Bellussi et al., 2020). This position is optimal for vaginal delivery because it allows the smallest diameter of the fetal skull to navigate through the birth canal with relative ease. In the latter stages of pregnancy, particularly by the third trimester, most fetuses adopt a longitudinal lie, aligning their long axis parallel to that of the mother. Within this alignment, the occiput may face anteriorly (toward the mother’s pubic bone), posteriorly (toward the spine), or laterally (toward the maternal hip) (Jansen et al., 2019).

The occipito-anterior position is considered the most favorable for delivery, facilitating efficient progress during labor. However, if the occiput faces posteriorly or transversely, labor may become prolonged or more challenging due to a suboptimal fit between the fetal head and the maternal pelvis (Levy et al., 2021). The process of achieving and maintaining the optimal position is dynamic, influenced by uterine contractions, maternal movements, and the surrounding uterine environment.Fetal malpresentation occurs when the fetus assumes a position other than the cephalic presentation. Breech presentation is one of the most common types, in which the fetus’s buttocks or feet are positioned to descend into the birth canal first (Akhter et al., 2024). Breech presentations vary in form, including frank breech, where the fetus’s hips are flexed and the legs extend upward; complete breech, where both hips and knees are flexed; and footling breech, where one or both feet present first. These presentations are associated with an increased risk of complications during labor, such as cord prolapse and delivery delays, often necessitating cesarean section (Toijonen et al., 2019).

Another form of malpresentation is the transverse lie, where the fetus lies horizontally across the uterus, with its long axis perpendicular to the maternal spine. In this position, neither the head nor the buttocks are positioned near the birth canal, making vaginal delivery impossible. Oblique lie, an intermediate orientation, involves the fetus lying at an angle within the uterus. While this position is often temporary and may resolve spontaneously before delivery, persistent cases can indicate underlying issues, such as uterine abnormalities or limited space in the pelvic cavity (Ijabah et al., 2023). Several factors influence whether a fetus assumes a normal or malpresentation. The shape and condition of the maternal uterus play a key role. Uterine abnormalities, such as a bicornuate uterus or fibroids, can restrict the fetus's ability to settle into the optimal cephalic position. Similarly, the size and shape of the maternal pelvis may affect how the fetus aligns within the womb (Kember et al., 2024). Multiparous women, who have had previous pregnancies, may have a more relaxed uterine musculature, which can increase the likelihood of malpresentation.

The volume of amniotic fluid also significantly impacts fetal positioning. Excessive amniotic fluid allows for greater fetal mobility, increasing the chances of breech or transverse presentations. Conversely, insufficient fluid can restrict fetal movement, preventing the fetus from adjusting to the cephalic position. Gestational age is another critical factor, as preterm fetuses are smaller and more mobile, making them more likely to adopt non-cephalic orientations (Rutledge et al., 2021). Fetal characteristics, such as structural anomalies or neurological conditions, may also impede normal positioning. For example, conditions like hydrocephalus can alter the shape of the fetal head, making it difficult for the fetus to engage properly in the pelvis. Decreased fetal movements due to muscular or neurological issues can similarly result in persistent malpresentation. External factors, including maternal posture and activity levels, further influence fetal alignment. Prolonged sedentary positions or lying supine can affect how the fetus orients itself, while upright and active maternal movements may encourage the fetus to move into the cephalic position (Zamstein et al., 2019). Medical interventions, such as ECV, are often employed to reposition the fetus when malpresentation is detected. These techniques, combined with regular prenatal monitoring, can help manage deviations from normal positioning and reduce complications during delivery.

Understanding fetal positioning and the factors that influence it is crucial for anticipating potential delivery challenges and implementing appropriate interventions. Regular assessments during pregnancy, including abdominal palpation and ultrasonography, are vital for monitoring fetal presentation and ensuring timely adjustments. Strategies that address modifiable factors, such as promoting optimal maternal posture and activity, can support better fetal positioning and improve outcomes for both mother and baby.

3. Overview of External Cephalic Version (ECV)

ECV is a procedure designed to turn a fetus from a non-cephalic presentation, such as breech or transverse lie, into the cephalic (head-down) position to optimize conditions for a vaginal delivery. ECV is typically performed during the late third trimester, around 36 to 38 weeks of gestation, when the fetus is mature enough but before labor has commenced.

3.1 Definition And Procedure

ECV involves manual manipulation of the fetus through the maternal abdomen. This non-invasive procedure aims to guide the fetus into a longitudinal lie with the head positioned toward the pelvis. The process begins with an ultrasound to confirm the fetal presentation, locate the placenta, assess amniotic fluid levels, and rule out any contraindications.

During the procedure, the mother is placed in a supine position with slight pelvic tilt. After administering tocolytics to relax the uterine muscles and reduce contractions, the clinician applies firm but controlled pressure to the abdomen to rotate the fetus. There are two main techniques: the forward roll, which involves rotating the fetus in a somersault-like motion, and the backward flip, which uses a reverse movement to achieve the same result.

3.2 Indications And Contraindications

ECV is indicated primarily for cases of breech and transverse fetal presentations, as these positions increase the risk of complications during labor and delivery. It is particularly recommended for women who wish to avoid cesarean delivery and meet the eligibility criteria.

However, ECV is not suitable for all pregnancies. Contraindications include the presence of placental abnormalities (e.g., placenta previa), uterine anomalies, oligohydramnios (low amniotic fluid), multiple gestations, or a history of uterine rupture. It is avoided in cases of maternal or fetal instability, such as preeclampsia or non-reassuring fetal heart patterns (Hutton and Reitsma, 2024).

3.3 Historical Perspective

The origins of ECV date back to ancient obstetric practices, with

documented use in traditional midwifery. Over time, the procedure evolved with advances in medical knowledge and technology. In the early 20th century, ECV fell out of favor due to concerns about maternal and fetal risks. However, with the advent of ultrasound guidance and pharmacological aids, ECV has regained prominence as a safe and effective option for managing malpresentation, particularly in high-resource settings.

4. Techniques and Approaches in Ecv

The success and safety of ECV depend on the techniques employed, the use of adjunctive aids, and the expertise of the practitioner. Modern ECV procedures integrate manual techniques, ultrasound guidance, and pharmacological support to maximize outcomes.

4.1 Manual Techniques

Manual manipulation remains the cornerstone of ECV. The clinician uses their hands to externally apply pressure to the maternal abdomen to coax the fetus into the cephalic position. The process typically involves two operators: one to stabilize the fetal buttocks and another to guide the head.

The forward roll technique, often preferred, involves a rotational movement that mimics a somersault, with the aim of moving the head downward and buttocks upward. Conversely, the backward flip employs a reverse motion to achieve the same result. The choice of technique is influenced by factors such as fetal size, position, and maternal anatomy. Despite the simplicity of manual manipulation, it requires significant skill to avoid complications such as uterine rupture, cord entanglement, or abruptio placentae (Barrowclough et al., 2022). Practitioners receive specialized training to master the procedure and recognize warning signs of potential complications.

4.2 Role of Ultrasound Guidance

Ultrasound technology has revolutionized ECV by enhancing the safety and success of the procedure. Real-time ultrasound allows the clinician to visualize the fetus, locate the placenta, and monitor fetal heart rate and amniotic fluid levels throughout the process.

By providing detailed anatomical information, ultrasound guidance reduces the risk of complications and increases the likelihood of a successful version. It also allows for immediate identification of adverse events, such as cord prolapse or fetal bradycardia, enabling timely interventions (Flumignan et al., 2020). In addition to aiding in the execution of ECV, ultrasound is instrumental in pre-procedure assessments. Factors such as fetal weight, placental location, and uterine conditions are evaluated to determine the feasibility of ECV.

4.3 Use of Tocolytics and Analgesics

Pharmacological aids play a critical role in enhancing the efficacy and tolerability of ECV. Tocolytics, such as terbutaline or nifedipine, are commonly administered to relax the uterine muscles, minimizing resistance during the procedure (Ibrahim et al., 2021). These medications increase the likelihood of a successful version and reduce the risk of preterm contractions.

Analgesics, including epidural or spinal anesthesia, may be used to alleviate maternal discomfort and improve cooperation during the procedure. While analgesics are not routinely required, they are particularly beneficial for women with heightened anxiety or low pain thresholds (Sun et al., 2020). Recent studies suggest that combining pharmacological aids with manual manipulation and ultrasound guidance significantly improves the success rate of ECV. The judicious use of these interventions is essential to balance the benefits with potential risks, such as transient maternal side effects or fetal heart rate changes.

Table 1: Key Components of External Cephalic Version

Component	Details
Procedure	Manual manipulation of the fetus through the maternal abdomen to achieve cephalic presentation.
Indications	Breech or transverse presentations in the absence of contraindications.
Contraindications	Placental abnormalities, uterine anomalies, oligohydramnios, multiple gestations, or instability.
Manual Techniques	Forward roll and backward flip maneuvers to rotate the fetus.
Ultrasound Guidance	Real-time imaging for monitoring fetal position, placenta, and heart rate.
Pharmacological Aids	Use of tocolytics to relax the uterus and analgesics to reduce maternal discomfort.
Potential Complications	Uterine rupture, cord prolapse, abruptio placentae, or fetal bradycardia.

ECV remains a vital tool in modern obstetric care, offering a non-invasive alternative to cesarean delivery for managing fetal malpresentation. By combining manual skills with technological and pharmacological advancements, ECV has evolved into a safer and more effective procedure, underscoring its importance in promoting positive maternal and neonatal outcomes.

5. Success Rates and Determinants

ECV is a medical procedure used to rotate a fetus from a non-cephalic presentation, such as breech or transverse, into a cephalic (head-down) position before labor begins. This technique is performed to increase the likelihood of vaginal delivery, reducing the need for cesarean section. The success of ECV depends on several determinants, including maternal, fetal, and procedural factors, as well as the timing of the intervention.

5.1 Factors Contributing to ECV Success

The success rate of ECV varies widely across studies, with rates ranging between 40% and 70%, depending on the clinical setting and population characteristics. Several factors contribute to successful outcomes, starting with fetal and uterine conditions (Long et al., 2019). Adequate levels of amniotic fluid, measured through ultrasonography, are critical as they allow sufficient space for the fetus to turn. Polyhydramnios is often associated with higher success rates, while oligohydramnios reduces the likelihood of success. Fetal mobility is also essential, as increased fetal activity suggests greater potential for repositioning.

Parity, or the number of previous pregnancies, influences ECV success. Women who have delivered vaginally before typically have more relaxed uterine and abdominal muscles, creating favorable conditions for the procedure. The position of the placenta plays a significant role; anterior placentation can complicate manual maneuvers, potentially reducing success rates (Dahl et al., 2021). Another key determinant is the use of tocolytic agents such as terbutaline, which relax the uterine muscles. These medications increase the likelihood of successful fetal rotation by creating a more pliable uterine environment. Similarly, performing the procedure under ultrasound guidance improves outcomes by allowing precise monitoring of fetal position and real-time adjustments.

5.2 Maternal and Fetal Variables

Maternal and fetal characteristics also significantly affect ECV outcomes. Maternal body mass index (BMI) is a critical factor; a higher BMI may make the procedure more challenging due to increased abdominal wall thickness. The gestational age at the time of ECV is another important determinant, as earlier attempts, typically between 36 and 37 weeks of gestation, are associated with higher success rates compared to those performed closer to term (Zheng et al., 2021).

Fetal position and presentation play a direct role in the procedure's success. For instance, a fetus in the frank breech position (buttocks down, legs extended) is more likely to be successfully rotated than one in a complete or footling breech position. Fetal weight can influence outcomes, with smaller fetuses being easier to manipulate (Mappa et al., 2022). The uterine tone, assessed during pre-procedural examinations, also provides insight into success probabilities. A softer and more relaxed uterus is conducive to successful manipulation, while a rigid or irritable uterus reduces the likelihood of achieving cephalic presentation.

5.3 Timing of the Procedure

The timing of ECV significantly impacts success rates and safety. Most guidelines recommend attempting the procedure around 36 to 37 weeks of gestation. At this stage, the fetus is sufficiently developed, yet small enough to allow easier manipulation. If complications arise, such as placental abruption or fetal distress, the fetus is mature enough for safe delivery (Zielbauer et al., 2021).

Early ECV attempts before 36 weeks are often avoided due to the higher likelihood of spontaneous reversion to non-cephalic positions. Conversely, attempts beyond 38 weeks may encounter difficulties due to reduced amniotic fluid and limited fetal mobility. The timing of ECV also interacts with maternal factors, such as uterine tone and the presence of Braxton Hicks contractions, which are more pronounced later in pregnancy.

6. Maternal and Fetal Outcomes

ECV offers several benefits for both mother and fetus when successful, but it also carries certain risks and complications. A thorough understanding of these outcomes is essential for informed decision-making and clinical planning.

6.1 Benefits of Successful ECV

The primary benefit of successful ECV is the significant reduction in cesarean delivery rates. Cesarean section, while lifesaving in certain scenarios, is associated with longer recovery times, higher costs, and increased risks in subsequent pregnancies. By achieving cephalic presentation, ECV increases the likelihood of spontaneous vaginal delivery, which is associated with fewer maternal morbidities and shorter hospital stays.

For the fetus, successful ECV can reduce the risks associated with breech vaginal delivery, such as birth asphyxia and trauma. Avoiding a cesarean delivery lowers the likelihood of respiratory complications and transient tachypnea in newborns.

6.2 Risks and Complications

While generally safe, ECV is not without risks. The procedure involves manipulating the fetus manually, which can result in complications such as placental abruption, rupture of membranes, or umbilical cord entanglement. Rarely, these events can necessitate emergency cesarean delivery.

Maternal discomfort is a common concern, as the procedure can be painful despite the use of tocolytics or epidural anesthesia in some cases. Uterine irritability or contractions may occur following the procedure, potentially leading to preterm labor (Impey et al., 2018). Fetal risks, while rare, include transient changes in heart rate, which are typically monitored closely with continuous fetal heart rate monitoring during and after the procedure. Table 2 outlines the common risks and complications associated with ECV.

6.3 Comparison with Cesarean Deliveries

Cesarean section is often the default option for breech presentation, but ECV offers a less invasive alternative with comparable safety profiles when successful. Vaginal delivery following successful ECV reduces the risks associated with major abdominal surgery, including infection, thromboembolism, and longer recovery times. For the fetus, avoiding cesarean delivery minimizes the exposure to surgical risks and the likelihood of neonatal respiratory complications. However, in cases where ECV is unsuccessful or contraindicated, planned cesarean delivery remains a safer alternative to breech vaginal delivery (Sánchez-Romero et al., 2024).

7. Innovations and Emerging Trends in External Cephalic Version (ECV)

ECV is a manual procedure used to turn a fetus from a breech or transverse position to a cephalic presentation, ideally improving the chances of a vaginal delivery. Despite being a well-established practice, ECV continues to evolve, driven by technological innovations, non-invasive alternatives, and its integration into broader prenatal care frameworks. Simultaneously, barriers to its implementation remain, particularly in resource-limited settings, making the exploration of innovations and challenges critical to improving its accessibility and outcomes.

7.1 Technological Advances in ECV

One of the most transformative trends in ECV is the use of advanced imaging technologies to enhance procedural accuracy and safety. Real-time ultrasonography plays a pivotal role in guiding practitioners during the maneuver, allowing them to monitor fetal position, amniotic fluid levels, and placental location (Yagel, 2020). Recent developments in three-dimensional (3D) and four-dimensional (4D) ultrasonography provide more detailed visualizations, enabling clinicians to assess fetal anatomy and orientation with greater precision. These imaging advancements reduce the risk of complications, such as umbilical cord entanglement or placental abruption, by ensuring that movements are carefully controlled (Dziadosz, 2018).

Doppler imaging is another technological innovation that has improved ECV outcomes. By monitoring uteroplacental blood flow, Doppler imaging ensures that fetal circulation remains uncompromised during the procedure. This technology adds an additional layer of safety, particularly in high-risk pregnancies where fetal well-being is a primary concern (Labib et al., 2023).

Emerging technologies, such as artificial intelligence (AI) and machine learning, are also being integrated into ECV practice. AI-powered algorithms can analyze ultrasound data to predict the likelihood of a successful version, allowing healthcare providers to make more informed decisions. Virtual reality (VR) and augmented reality (AR) tools are being explored for training purposes, providing realistic simulations for practitioners to refine their skills in a controlled environment before performing the procedure on patients (Ghaednia et al., 2021).

7.2 Non-Invasive Alternatives

While ECV is considered a relatively safe procedure, its invasive nature and associated discomfort have led to the exploration of non-invasive alternatives. One promising approach is the use of maternal posture exercises to encourage spontaneous fetal rotation. Techniques such as the forward-leaning inversion or knee-chest position leverage gravity and maternal movements to create space within the uterus, facilitating fetal reorientation without manual intervention (Lee et al., 2021). These exercises are particularly appealing to patients who may be hesitant about undergoing ECV due to concerns about discomfort or complications.

Acupuncture and moxibustion, traditional Chinese medicine practices, have also gained attention as complementary therapies for managing breech presentations. Studies suggest that stimulating specific acupuncture points, such as BL67 on the fifth toe, may promote fetal movement and increase the likelihood of spontaneous version (Liao et al., 2021). While the evidence remains mixed, these non-invasive methods offer potential benefits, particularly when integrated into holistic prenatal care plans. Advancements in external mechanical devices designed to reposition the fetus are also emerging. These devices apply gentle, consistent pressure to the maternal abdomen, mimicking the manual techniques used in ECV but with less reliance on practitioner expertise. While still in experimental stages, these devices hold promise as an alternative for patients who cannot access skilled providers.

7.3 Integration with Prenatal Care

Another critical trend in ECV is its increasing integration into comprehensive prenatal care. Early identification of breech presentations through routine third-trimester ultrasounds enables timely intervention, improving the chances of a successful version (Pinto et al., 2024). Prenatal counseling about the benefits, risks, and alternatives to ECV has become a standard component of care, empowering patients to make informed decisions.

Innovative care models, such as collaborative decision-making frameworks, emphasize shared responsibility between patients and providers. These models incorporate patient preferences, cultural considerations, and clinical evidence, fostering trust and improving acceptance of ECV (Bunn et al., 2018). Telemedicine platforms are also being leveraged to provide remote counseling and support, particularly in rural or underserved areas where access to prenatal specialists may be limited.

8. Barriers to ECV Implementation

Despite these advancements, several barriers hinder the widespread adoption and success of ECV. These include gaps in knowledge and skills among healthcare providers, patient acceptance influenced by cultural factors, and resource constraints in low-income settings. Addressing these challenges is essential for ensuring equitable access to ECV and optimizing maternal and fetal outcomes.

8.1 Knowledge and Skills Among Healthcare Providers

One of the most significant barriers to ECV implementation is the variability in knowledge and skills among healthcare providers. Performing ECV requires a high level of expertise, including proficiency in abdominal palpation, ultrasonographic guidance, and the ability to respond to potential complications. However, many providers, particularly in low-resource settings, lack adequate training and experience (Van Dulmen et al., 2020).

The complexity of ECV also contributes to its underutilization. Providers may hesitate to perform the procedure due to concerns about fetal or maternal safety, especially in cases of suspected uterine anomalies, reduced amniotic fluid, or anterior placenta (Koutrouvelis, 2019). This

reluctance can lead to an over-reliance on cesarean delivery for breech presentations, even when ECV could be a viable alternative. Continuing medical education and hands-on training programs are critical for addressing these gaps. Simulation-based training, supported by VR and AR technologies, offers an effective method for developing ECV skills in a risk-free environment (Barteit et al., 2021). Mentorship programs, where experienced practitioners guide less experienced colleagues, can also enhance confidence and competence among healthcare providers.

8.2 Patient Acceptance and Cultural Factors

Patient acceptance is another significant barrier to ECV implementation. Many patients decline the procedure due to fears of pain, potential complications, or lack of understanding about its benefits. Misinformation about ECV, including exaggerated risks or doubts about its effectiveness, can further discourage patients from opting for the procedure (Dickson et al., 2023).

Cultural beliefs and practices also play a role in shaping patient attitudes toward ECV. In some cultures, there may be a preference for cesarean delivery over attempts to reposition the fetus, particularly if ECV is perceived as invasive or unnatural. Conversely, in settings where traditional birthing practices are valued, patients may be more open to alternative methods, such as maternal posture exercises or complementary therapies (VanGompel et al., 2018). Addressing these barriers requires culturally sensitive counseling and education. Providers must take the time to explain the procedure in clear, non-technical language, addressing patients' concerns and misconceptions. Involving family members in the decision-making process, particularly in cultures where extended family plays a significant role in healthcare choices, can also improve acceptance (Maples et al., 2018).

8.3 Resource Constraints in Low-Income Settings

Resource limitations in low-income settings pose a substantial challenge to ECV implementation. Access to ultrasonography, a critical tool for guiding the procedure, is often limited in these settings. Inadequate infrastructure, including a lack of trained personnel and essential equipment, further restricts the availability of ECV.

Economic constraints also affect patients' ability to access ECV services. In many low-income regions, out-of-pocket healthcare costs are a significant burden, leading patients to forgo interventions that are perceived as non-essential. Systemic barriers, such as inadequate referral systems and transportation challenges, make it difficult for patients in remote areas to access facilities equipped to perform ECV (Pachauri et al., 2024).

Efforts to overcome these barriers include the integration of ECV into community-based healthcare programs. Training midwives and primary care providers in basic ECV techniques can expand access to the procedure in rural areas. Mobile health units equipped with portable ultrasound devices offer another innovative solution, bringing ECV services directly to underserved populations (Boyle and Geary, 2023).

International collaborations and funding initiatives are also crucial for addressing resource constraints. Organizations working in global maternal health can support capacity-building efforts, providing training, equipment, and logistical support to improve ECV access in low-income settings.

9. Ethical and Psychological Considerations

The practice of ECV raises several ethical and psychological considerations, especially regarding informed consent, shared decision-making, and the maternal psychological experience. Addressing these factors is critical to ensuring patient-centered care and fostering trust in the healthcare system.

Informed consent is a cornerstone of ethical medical practice. For ECV, informed consent involves providing the patient with comprehensive information about the procedure, including its purpose, potential benefits, risks, and alternatives. Patients should also be informed about the possibility of unsuccessful outcomes or complications, such as placental abruption, umbilical cord entanglement, or preterm labor. Ensuring that patients understand this information is vital, particularly because the decision to undergo ECV can influence delivery outcomes and maternal health. Shared decision-making is an extension of the informed consent process (Hutton and Reitsma, 2024). It emphasizes a collaborative approach, where healthcare providers and patients work together to reach a decision that aligns with the patient's values, preferences, and clinical circumstances. In the context of ECV, shared decision-making involves considering factors such as the patient's comfort with manual interventions, cultural beliefs about childbirth, and their overall health status. Providers must ensure that patients feel empowered to make decisions without coercion, balancing clinical recommendations with respect for individual autonomy.

Maternal anxiety is another critical consideration during ECV. The procedure can evoke significant stress, especially when patients are informed of the risks or are unfamiliar with manual interventions. Anxiety can influence pain perception, potentially impacting the success of the procedure. Moreover, some patients may experience anticipatory anxiety, worrying about complications or the need for an emergency cesarean delivery if ECV fails. Healthcare providers play a pivotal role in mitigating maternal anxiety (Hao et al., 2020). Empathetic communication, reassurance, and addressing patients' questions can help reduce stress and build confidence. Psychological support should also extend to managing feelings of guilt or inadequacy if ECV is unsuccessful, as some patients may perceive this as a personal failure.

The psychological impact of ECV extends beyond the procedure itself. Patients may experience relief if the procedure succeeds and allows for a vaginal delivery, while a failed ECV can lead to disappointment or fear about the impending cesarean section. Long-term psychological outcomes, such as postpartum mental health, may also be influenced by the experience of undergoing ECV. Understanding these impacts is crucial for providing holistic care that addresses both physical and emotional well-being. Healthcare systems must also consider ethical issues related to access to ECV. Inequities in healthcare delivery can lead to disparities in who can access the procedure, with patients in low-resource settings often lacking options. Addressing these disparities involves advocating for equitable access to prenatal care and ensuring that all patients, regardless of socioeconomic status, receive the support and information needed to make informed decisions about ECV.

10. Conclusion

ECV remains a valuable intervention for managing breech presentations, offering the potential to reduce cesarean delivery rates and improve maternal and fetal outcomes. However, its practice involves complex ethical, psychological, and clinical considerations that must be carefully addressed. A review of ethical and psychological considerations highlights the importance of informed consent and shared decision-making in ensuring patient-centered care. Providers must balance clinical recommendations with respect for individual autonomy, empowering patients to make informed choices about ECV. Addressing maternal anxiety and the broader psychological impact of the procedure is also critical, as these factors can influence both short- and long-term well-being. Recommendations for clinical practice emphasize the importance of evidence-based approaches to ECV performance. Best practices, such as using real-time ultrasound guidance, managing pain effectively, and selecting appropriate candidates, enhance the procedure's safety and effectiveness. A multidisciplinary approach, integrating the expertise of obstetricians, midwives, ultrasonographers, and anesthesiologists, ensures comprehensive care and support for patients undergoing ECV.Despite these advancements, several gaps in research remain. Studies are needed to explore the long-term psychological outcomes of ECV, including its impact on postpartum mental health. Further research on non-invasive alternatives, such as maternal posture exercises or mechanical devices, could provide additional options for patients who decline manual ECV. Investigating the role of cultural beliefs and practices in shaping patient attitudes toward ECV is also essential for developing culturally sensitive counseling strategies. Future directions for ECV practice include leveraging technological innovations, such as AI-powered tools for predicting procedural success, and expanding access to training programs for healthcare providers. Addressing disparities in ECV access, particularly in low-resource settings, is a critical priority. Mobile health units, portable ultrasound devices, and community-based training initiatives can help bridge these gaps, ensuring that all patients have the opportunity to benefit from this procedure.

References

Akhter, B., Begum, A., Rahman, M. M., Choudhoury, S., Akhter, R., Akhter, H., and Das, P., 2024. Outcomes of Fetal Malpresentation Beyond 28 Weeks of Gestation at a Tertiary-Level Hospital. Scholars Journal of Applied Medical Sciences, 12(08), 925–929. https://doi.org/10.36347/sjams.2024.v12i08.003

Bahmaei, H., Mousavi, P., Haghighizadeh, M. H., and Iravani, M., 2023. The Impact of Maternal Position in Labor on Occiput-posterior Position of Fetus and Pregnancy Outcomes in Pregnant Women Without Epidural Analgesia. Journal of Family & Reproductive Health. https://doi.org/10.18502/jfrh.v17i2.12871

Barrowclough, J. A., Lin, L., Kool, B., Hofmeyr, G. J., and Crowther, C. A.,

2022. Maternal postures for fetal malposition in labour for improving the health of mothers and their infants. Cochrane Library, 2022(8). https://doi.org/10.1002/14651858.cd014615

Barteit, S., Lanfermann, L., Bärnighausen, T., Neuhann, F., and Beiersmann, C., 2021. Augmented, Mixed, and Virtual Reality-Based Head-Mounted Devices for Medical Education: Systematic Review. JMIR Serious Games, 9(3), e29080. https://doi.org/10.2196/29080

Bellussi, F., Livi, A., Cataneo, I., Salsi, G., Lenzi, J., and Pilu, G., 2020. Sonographic diagnosis of fetal head deflexion and the risk of cesarean delivery. American Journal of Obstetrics and Gynecology MFM, 2(4), 100217. https://doi.org/10.1016/j.ajogmf.2020.100217

Boyle, M., and Geary, A., 2023. Implementing the Community Healthcare Network Model in Mid West community health care. *Rural and Remote Health*. https://doi.org/10.22605/rrh8180

Bunn, F., Goodman, C., Russell, B., Wilson, P., Manthorpe, J., Rait, G., Hodkinson, I., and Durand, M., 2018. Supporting shared decision making for older people with multiple health and social care needs: a realist synthesis. BMC Geriatrics, 18(1).https://doi.Org/10.1186/ s12877-018-0853-9

Dahl, C. M., Zhang, Y., Ong, J. X., Yeh, C., Son, M., Miller, E. S., Roy, A., and Grobman, W. A., 2021. A Multivariable Predictive Model for Success of External Cephalic Version. Obstetrics and Gynecology. https://doi.org/10.1097/aog.0000000000004518

Dickson, C., De Zoete, R. M. J., Berryman, C., Weinstein, P., Chen, K. K., and Rothmore, P., 2023. Patient-related barriers and enablers to the implementation of high-value physiotherapy for chronic pain: a systematic review. Pain Medicine, 25(2), Pp. 104–115. https://doi.org/10. 1093/pm/pnad134

Dziadosz, M., 2018. Prognostic Benefit of 3D and 4D Ultrasound for Fetal Airway Assessment and Implications for Delivery. Journal of Gynecology and Womens Health, 12(5). https://doi. org/10.19080/jgwh.2018.12.555848

Fernández-Carrasco, F. J., Cristóbal-Cañadas, D., Gómez-Salgado, J., Vázquez-Lara, J. M., Rodríguez-Díaz, L., and Parrón-Carreño, T., 2022. Maternal and fetal risks of planned vaginal breech delivery vs planned caesarean section for term breech birth: A systematic review and meta-analysis. Journal of Global Health, 12. https://doi.org/10.7189/jogh.12 .04055

Flumignan, R. L., Trevisani, V. F., Lopes, R. D., Baptista-Silva, J. C., Flumignan, C. D., and Nakano, L. C., 2020. Ultrasound guidance for arterial (other than femoral) catheterisation in adults. Cochrane Library. https://doi.org/10.1002/14651858.cd013585

Ghaednia, H., Fourman, M. S., Lans, A., Detels, K., Dijkstra, H., Lloyd, S., Sweeney, A., Oosterhoff, J. H., and Schwab, J. H., 2021. Augmented and virtual reality in spine surgery, current applications and future potentials. The Spine Journal, 21(10), Pp. 1617–1625. https://doi.org/10.1016/j.spinee.2021.03.018

Hanachi, M., Maghrebi, O., Bichiou, H., Trabelsi, F., Bouyahia, N. M., Zhioua, F., Belghith, M., Harigua-Souiai, E., Baouendi, M., Guizani-Tabbane, L., Benkahla, A., and Souiai, O. (2022). Longitudinal and Comparative Analysis of Gut Microbiota of Tunisian Newborns According to Delivery Mode. Frontiers in Microbiology, 13. https://doi.org/10.3389/ fmicb.2022.780568

Hao, Q., Hu, Y., Zhang, L., Ross, J., Robishaw, S., Noble, C., Wu, X., and Zhang, X., 2020. A Systematic Review and Meta-analysis of Clinical Trials of Neuraxial, Intravenous, and Inhalational Anesthesia for External Cephalic Version. Anesthesia & Analgesia, 131(6), Pp. 1800–1811. https://doi.org/10.1213/ane.0000000000004795

Hofmeyr, G. J., &Moreri-Ntshabele, B. (2024). Maternal postures for fetal malposition in late pregnancy for improving the health of mothers and their infants. *Cochrane Library*, *2024*(2). https://doi.org/10.1002/14651858.cd014616

Hutton, E. K., and Reitsma, A. H., 2024. A Comprehensive Review of the Research Literature on External Cephalic Version (ECV). Canadian Journal of Midwifery Research and Practice, *7*(1), Pp. 4–16. https://doi.org/10.22374/cjmrp.v7i1.142

Ibrahim, M. H., Elfaki, T., Elhassan, E. M., Abdelrahiem, S. K., and Adam, I., 2021. The effectiveness of nifedipine/indomethacin combination therapy and nifedipine monotherapy for postponing preterm birth (25–34 weeks of gestation) in Sudanese women: a randomized clinical trial study protocol. BMC Pregnancy and Childbirth, 21(1). https://doi.org /10.1186 /s12884-021-03951-x

Ijabah, N., Achyar, K., and Kusuma, I. R., 2023. EfektifitasPemberianPerlakuanPosisi Miring Kiri dan Upright Position terhadapPercepatanKemajuanPersalinan Kala I Fase Aktif pada Ibu Inpartu. Jurnal Riset Kesehatan Masyarakat, *3*(4), Pp. 171–183. https://doi.org/10.14710/ jrkm.2023.18715

Impey, O. R., Greenwood, C. E., and Impey, L. W., 2018. External cephalic version after previous cesarean section: A cohort study of 100 consecutive attempts. European Journal of Obstetrics and Gynecology and Reproductive Biology, 231, Pp. 210–213. https://doi.org/ 10.1016/j.ejogrb.2018.10.036

Jansen, C. H., Kleinrouweler, C. E., Van Leeuwen, L., Ruiter, L., Limpens, J., Van Wely, M., Mol, B. W., and Pajkrt, E., 2019. Final outcome of a second trimester low-positioned placenta: A systematic review and meta-analysis. European Journal of Obstetrics and Gynecology and Reproductive Biology, 240, Pp. 197–204. https://doi.org/10.1016/j.ejogrb.2019.06.020

Kember, A. J., Anderson, J. L., House, S. C., Reuter, D. G., Goergen, C. J., and Hobson, S. R., 2024. Impact of maternal posture on fetal physiology in human pregnancy: a narrative review. Frontiers in Physiology, 15. https://doi.org/10.3389/fphys.2024.1394707

Kishkovich, T. P., Naert, M. N., Warsame, F., Taboada, M. P., James, K. E., Barth, W. H., and Clapp, M. A., 2023. External Validation of a Prediction Model for External Cephalic Version Success. Obstetrics and Gynecology, 141(5), Pp. 964–966. https://doi.org/10.1097/ aog. 0000000000005149

Koutrouvelis, G. O., 2019. Role of External Cephalic Version in Reducing the Cesarean Delivery Rate. Obstetrics and Gynecology, 133(5), Pp. 855–856. https:// doi.org /10.1097/aog.0000 000000003250

Labib, S. M., Shibiny, A. M. E., and Keriakos, N. N., 2023. Doppler Ultrasound for Fetal Assessment in High Risk Pregnancies. QJM, 116(Supplement_1) .https://doi.org/10.1093/ qjmed/ hcad069.740

Lee, N., Munro, V., Oliver, K., and Flynn, J., 2021. Maternal positioning with flexed thighs to correct foetaloccipito-posterior position in labour: A systematic review and meta-analysis. *Midwifery*, *99*, 103008. https://doi.org/10.1016/j.midw.2021.103008

Levy, A. T., Weingarten, S., Ali, A., Quist-Nelson, J., and Berghella, V., 2021. Hands-and-knees posturing and fetal occiput anterior position: a systematic review and meta-analysis. American Journal of Obstetrics and Gynecology MFM, *3*(4), Pp. 100346. https://doi.org/10. 1016/j.ajogmf.2021.100346

Liao, J., Shao, S., Chang, C., Chai, P. Y., Owang, K., Huang, T., Yang, C., Lee, T., and Chen, Y. (2021). Correction of Breech Presentation with Moxibustion and Acupuncture: A Systematic Review and Meta-Analysis. Healthcare, 9(6), Pp. 619. https://doi.org/10.3390/health care 9060619

Long, J. Q., Wei, H. W., Xia, H. W., Kong, L., Song, L., Yang, Q. L., and Qin, Y. Q., 2019. [Success rate and influencing factors of external cephalic version for singleton pregnancies in the third trimester]. PubMed, *54*(8), Pp. 516–521. https://doi.org/10.3760/cma. j.issn. 0529-567x.2019.08.003

Maples, W. J., Argenio, S. L., Scaz, L., and Krippner, J., 2018. A focus on culturally sensitive communication to transform institutional awareness of health care disparities. Journal of Clinical Oncology, 36(30_suppl), 69. https://doi.org/10.1200/jco.2018.36.30_suppl.69

Mappa, I., D'Antonio, F., Ghi, T., and Rizzo, G., 2022. Ultrasound before instrumental vaginal delivery: A useful tool to avoid misdiagnosis of fetal head position. Acta Obstetricia Et Gynecologica Scandinavica, 101(11), Pp. 1342–1343. https://doi.org/10.1111/aogs.14463

Morgan, E. R., Hu, A. E., Brezak, A. M., Rowley, S. S., Littman, A. J., and Hawes, S. E., 2018. Predictors of a successful external cephalic version: A population-based study of Washington state births. Women and Birth, 32(3), Pp. e421–e426. https://doi.org/ 10.1016/j. wombi.2018.08.001

Pachauri, S., Coldrey, O., Falchetta, G., and Pelz, S., 2024. Innovation in distributed energy services for sustainable development: Case studies from sub-Saharan Africa. Environmental Research Letters. https://doi.org/10.1088/1748-9326/ad8460

Pinto, L., Fonseca, A., and Ayres-de-Campos, D., 2024. Impact of a regional simulation-based training course in the implementation of external cephalic version: Intervention study. International Journal of Gynecology and Obstetrics, 167(3), Pp. 1126–1130. https://doi.Org /10.1002/ijgo.15774

Rutledge, A., Murphy, H. J., Harer, M. W., Jetton, J. G., 2021. Fluid Balance in the Critically Ill Child Section: How Bad Is Fluid in Neonates? Frontiers in Pediatrics, 9. https://doi.org/10.3389/fped.2021.651458

Sánchez-Romero, J., Gallego-Pozuelo, R. M., Dahmouni-Dahmouni, H., Blanco-Carnero, J. E., Araico-Rodríguez, F., Herrera-Giménez, J., Guijarro-Campillo, A. R., Nieto-Díaz, A., and De Paco, K., 2024. External cephalic version following prior cesarean delivery: A comparative cohort analysis. International Journal of Gynecology & Obstetrics, 167(3), Pp. 1066–1074. https://doi.org/10.1002/ijgo.15738

Sun, S., Guo, Y., Wang, T., and Huang, S., 2020. Analgesic Effect Comparison Between Nalbuphine and Sufentanil for Patient-Controlled Intravenous Analgesia After Cesarean Section. Frontiers in Pharmacology, 11. https://doi.org/10.3389/fphar.2020.574493

Toijonen, A. E., Heinonen, S. T., Gissler, M. V. M., and Macharey, G., 2019. A comparison of risk factors for breech presentation in preterm and term labor: a nationwide, population-based case–control study. Archives of Gynecology and Obstetrics, 301(2), Pp. 393–403. https://doi.org/10.1007/s00404-019-05385-5

Van Dulmen, S., Naaktgeboren, C., Heus, P., Verkerk, E. W., Weenink, J., Kool, R. B., and Hooft, L., 2020. Barriers and facilitators to reduce low-value care: a qualitative evidence synthesis. BMJ Open, 10(10), e040025. https://doi.org/10.1136/bmjopen-2020-040025

VanGompel, E. W., Perez, S., Wang, C., Datta, A., Cape, V., and Main, E., 2018. Measuring labor and delivery unit culture and clinicians' attitudes toward birth: Revision and validation of the Labor Culture Survey. Birth, 46(2), Pp. 300–310. https://doi.org/10.1111/birt.12406

Yagel, S., 2020. External cephalic version in fetal isolated mild ventriculomegaly. Ultrasound in Obstetrics and Gynecology, 55(1), Pp. 140. https://doi.org/10.1002/uog.21916

Yeturi, S., Yaliwal, R. G., Bidri, S. R., Mudanur, S. R., Shiragur, S. S., and Malapure, P., 2023. A randomized parallel group trial to assess the impact of maternal birthing position on maternal and Fetal outcome. International Journal of Clinical Obstetrics and Gynaecology, *7*(3), Pp. 23–26. https://doi.org/10.33545/gynae.2023.v7.i3a.1345

Zamstein, O., Wainstock, T., and Sheiner, E., 2019. Decreased fetal movements: Perinatal and long-term neurological outcomes. European Journal of Obstetrics & Gynecology and Reproductive Biology, 241, Pp. 1–5. https://doi.org/10.1016/j.ejogrb.2019.07.034

Zheng, L., Zhang, H., Chen, R., Liu, Z., Liao, Q., Ma, Y., and Yan, J., 2021. Scoring system to predict the success rate of external cephalic versions and determine the timing of the procedure. *DOAJ (*DOAJ: Directory of Open Access Journals), 25(1), Pp. 45–55. https://doi.org/10.26355/eurrev_202101_24345

Zielbauer, A., Louwen, F., and Jennewein, L., 2021. External cephalic version at 38 weeks' gestation at a specialized German single center. PLoS ONE, 16(8), e0252702. https:// doi.org/10.1371/journal.pone.0252702