Saudi Journal of Medicine and Public Health

https://saudijmph.com/index.php/pub

https://doi.org/10.64483/202522469

Nursing Roles and Clinical Considerations in the Induction of Labor

Fahad Abdullah Nasir Alotibi [(1)] , Khulud Abdullah Aldosseri [(2)] , Abrar Yousef Banibakhsh [(3)] , Raed Ibrahim Ismail Mawkili [(4)] , Wejdan Ibrahim Alaithan [(5)] , Bander Hussan Almutery [(6)] , Abdulrahman Almutairi [(7)] , Muqrin Khalaf Almutairi [(8)] , Heassa Saleh Saad Alhumaidy [(9)] , Woroud Jarallah Mualla Alreshidi [(10)] , Adel Khalid Saad Alharbi [(11)] , Shatha Ali Albargi [(12)]

(1) Dharma Hospital in Dharma Governorate, Ministry of Health, Saudi Arabia,
(2) PHC Badr 3, Ministry of Health, Saudi Arabia,
(3) Ministry of Health - Virtual Health Hospital, Saudi Arabia,
(4) Prince Sultan Health Center in Ahmadiyya, Ministry of Health, Saudi Arabia,
(5) Forensic Medical Services Center in Al-Ahsa - Ministry of Health, Saudi Arabia,
(6) King Faisal District primary Health care center, Ministry of Health, Saudi Arabia,
(7) Healthy Mansoura, Ministry of Health, Saudi Arabia,
(8) King Khaled Hospital-Majmaah, Ministry of Health, Saudi Arabia,
(9) Ministry of Health, Saudi Arabia,
(10) Hail General Hospital, Ministry of Health, Saudi Arabia,
(11) Health Cluster in Qassim, Ministry of Health, Saudi Arabia,
(12) Al-Quwayiyah General Hospital, Ministry of Health, Saudi Arabia

Abstract

Background: Induction of labor is a common obstetric intervention used to initiate uterine contractions when continuation of pregnancy poses greater maternal or fetal risk than delivery. Its global use has increased substantially, requiring safe, evidence-based clinical practice and effective interprofessional collaboration.

Aim: This article aims to review the clinical considerations of labor induction and highlight the essential nursing roles in ensuring maternal and fetal safety during the induction process.

Methods: A narrative review of current obstetric guidelines, clinical trials, and systematic reviews was conducted to examine indications, contraindications, methods, complications, and nursing interventions related to induction of labor.

Results: Induction of labor is indicated for various maternal and fetal conditions such as hypertensive disorders, diabetes, fetal growth restriction, and post-term pregnancy. Mechanical and pharmacological methods are widely used, each with specific benefits and risks. Evidence demonstrates that appropriately managed induction does not increase cesarean section rates and may improve perinatal outcomes. Nurses play a pivotal role in assessment, medication administration, continuous fetal monitoring, early detection of complications, and patient education.

Conclusion: Induction of labor is a complex yet essential obstetric intervention that requires comprehensive clinical assessment and skilled nursing care. Adherence to evidence-based protocols and effective teamwork is critical to optimizing outcomes.

Keywords: Induction of labor, Nursing care, Cervical ripening, Obstetric nursing, Maternal–fetal safety

Introduction

Induction of labor represents a fundamental obstetric intervention aimed at artificially initiating uterine contractions before the spontaneous onset of labor in order to achieve vaginal delivery when continuation of pregnancy poses greater risk than delivery [1]. Over recent decades, the utilization of induction of labor has increased substantially, with reported rates nearly doubling since the early 1990s [2]. This rise reflects advancements in obstetric surveillance, expanded indications related to maternal and fetal wellbeing, and evolving perceptions regarding the balance between expectant management and timely intervention. Despite its widespread use, induction of labor remains a practice characterized by marked global variability. Differences in induction rates across regions are influenced by heterogeneity in clinical guidelines, institutional policies, practitioner preferences, and the availability of resources, as well as disparities in access to comprehensive antenatal care. In high-income countries, induction of labor has become an integral component of contemporary obstetric practice, with approximately one quarter of all births

*Corresponding author e-mail: Falotaibi77@moh.gov.sa (Fahad Abdullah Nasir Alotibi).
Receive Date: 03 December 2025, Revise Date: 28 December 2025, Accept Date: 31 December 2025

occurring following planned induction [1]. In contrast, rates in low- and middle-income countries remain considerably lower, often reflecting limited access to induction agents, monitoring technologies, and trained personnel, rather than lower clinical need. This disparity underscores broader inequities in maternal healthcare delivery and highlights the importance of evidence-based, context-appropriate guidelines to ensure safe and effective use of induction methods worldwide. From a clinical perspective, induction of labor encompasses a range of pharmacological and mechanical techniques designed to promote cervical ripening and stimulate uterine activity. The decision to induce labor requires careful assessment of maternal and fetal indications, gestational age, cervical status, and potential risks. While induction can reduce morbidity associated with prolonged pregnancy or maternal disease, inappropriate or poorly managed induction may increase the likelihood of adverse outcomes, including failed induction, operative delivery, uterine hyperstimulation, and fetal compromise. Consequently, a thorough understanding of the indications, contraindications, potential complications, and available methodologies is essential for healthcare professionals involved in maternity care. Within this context, nursing practice plays a critical role in patient assessment, monitoring, education, and supportive care throughout the induction process, ensuring both maternal safety and positive birth outcomes [1][2].

Anatomy:

The uterus is a hollow, muscular organ composed primarily of two anatomically and functionally distinct regions, the uterine body and the cervix, each of which plays a critical role in pregnancy, labor, and delivery. The uterine body, or corpus, is predominantly made of smooth muscle fibers arranged in longitudinal, circular, and oblique layers. These fibers are responsible for generating coordinated uterine contractions that facilitate fetal descent during labor. Throughout pregnancy, the myometrium undergoes significant hypertrophy and hyperplasia under the influence of hormonal stimulation, particularly estrogen and progesterone, allowing the uterus to accommodate fetal growth while maintaining uterine quiescence until term. In contrast, the cervix is structurally distinct and consists mainly of dense connective tissue rich in collagen, elastin, and proteoglycans, with relatively little smooth muscle content. During most of pregnancy, the cervix remains firm, long, and closed, providing mechanical support to maintain the pregnancy. As term approaches, the cervix undergoes a series of complex biochemical and structural changes collectively referred to as cervical ripening. These changes include collagen remodeling, increased water content, and alterations in extracellular matrix composition, leading to cervical softening, shortening (effacement), and eventual dilation. This process is mediated by inflammatory pathways, prostaglandins, nitric oxide, and enzymatic degradation of collagen fibers. Labor induction aims to mimic or accelerate these natural physiological processes when spontaneous labor does not occur and delivery is clinically indicated. Mechanical methods, such as balloon catheters, promote cervical ripening by applying direct pressure to the internal os, stimulating local prostaglandin release and mechanical dilation. Pharmacological agents, particularly prostaglandins and oxytocin, act on cervical tissue and uterine smooth muscle to enhance cervical softening and initiate effective uterine contractions. Understanding the distinct anatomical composition and physiological behavior of the uterine body and cervix is essential for selecting appropriate induction methods and optimizing maternal and fetal outcomes. This knowledge underpins safe clinical decision-making and effective nursing and medical management during the induction of labor [1][2][3].

Indications

The decision to initiate induction of labor is fundamentally grounded in a careful assessment of maternal and fetal risk, balancing the potential benefits of delivery against the risks associated with continued expectant management. Induction of labor is considered appropriate when clinical judgment suggests that continuation of pregnancy is likely to result in less favorable outcomes for the mother, the fetus, or both, compared with planned delivery [3]. The timing of delivery in late preterm, early term, late-term, and post-term pregnancies is therefore individualized and depends on a comprehensive evaluation of obstetric history, underlying medical conditions, fetal well-being, and gestational age. Professional bodies, particularly the American College of Obstetricians and Gynecologists, have issued detailed recommendations to guide clinicians in determining optimal delivery timing across a wide range of clinical scenarios [4]. Several fetal indications warrant planned delivery at specific gestational windows to reduce the risk of morbidity and mortality. Oligohydramnios, which reflects reduced amniotic fluid volume and is associated with adverse perinatal outcomes, is an indication for delivery between 36 0/7 and 37 6/7 weeks of gestation. Similarly, fetal intrauterine growth restriction necessitates careful surveillance and timely intervention. In cases where growth restriction is present without abnormal Doppler findings, delivery is generally recommended between 38 0/7 and 39 6/7 weeks of gestation. When Doppler studies demonstrate absent end-diastolic flow, the risk of fetal compromise increases substantially, supporting delivery at approximately 34 0/7 weeks of gestation. Reversed end-diastolic flow represents a more severe degree of placental insufficiency and typically

necessitates delivery as early as 32 0/7 weeks of gestation to prevent fetal demise or severe hypoxic injury.

Maternal medical conditions also play a central role in determining the indication and timing for induction of labor. Chronic hypertension that does not require pharmacologic treatment is commonly managed with delivery between 38 0/7 and 39 6/7 weeks of gestation to limit the risk of superimposed preeclampsia and placental complications. Gestational hypertension, once diagnosed, warrants delivery at 37 0/7 weeks of gestation or at the time of diagnosis if identified later in pregnancy. Similarly, preeclampsia without severe features is an indication for delivery at 37 0/7 weeks of gestation or upon diagnosis beyond this gestational age. In contrast, preeclampsia with severe features represents a significant threat to maternal and fetal health and typically necessitates delivery at 34 0/7 weeks of gestation or immediately upon diagnosis if it occurs later, regardless of gestational age. Metabolic disorders of pregnancy further influence induction decisions. Well-controlled pregestational diabetes is generally managed with delivery between 39 0/7 and 39 6/7 weeks of gestation to reduce the risk of stillbirth while minimizing neonatal complications associated with early delivery. Gestational diabetes that is adequately controlled through diet or exercise alone allows for a slightly broader delivery window, typically between 39 0/7 and 40 6/7 weeks of gestation.

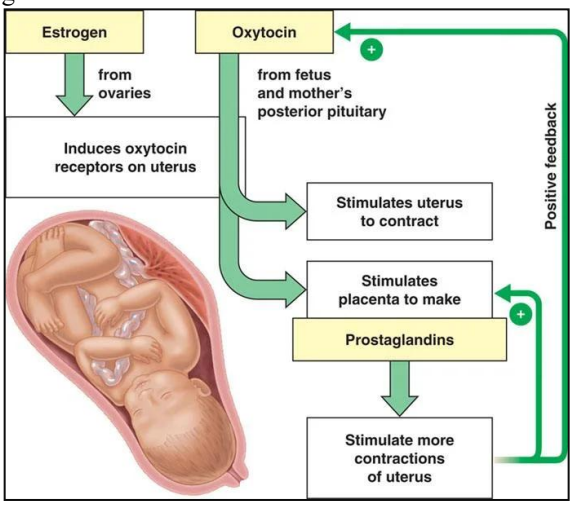

Fig. 1: Induction of labour.

Preterm prelabor rupture of membranes constitutes another important indication for induction, with delivery recommended at 34 0/7 weeks of gestation or at the time of diagnosis if it occurs later, due to the increasing risk of infection and fetal compromise with prolonged membrane rupture [3].

Certain obstetric emergencies mandate prompt induction or immediate delivery regardless of gestational age. These include abruptio placentae, which poses an acute risk of maternal hemorrhage and fetal hypoxia, chorioamnionitis, which requires delivery to control infection and prevent maternal and neonatal sepsis, and intrauterine fetal demise, where induction is necessary to avoid maternal complications and facilitate appropriate obstetric care. In addition to medical and obstetric indications, labor induction may occasionally be undertaken for logistical or psychosocial reasons, such as a history of precipitous labor, significant geographic distance from the delivery facility, or compelling psychosocial circumstances. In such cases, careful consideration of fetal maturity is essential. Although assessment of fetal lung maturity may be performed, evidence indicates that a documented mature fetal lung profile alone does not justify elective delivery before 39 weeks of gestation in the absence of appropriate clinical indications [2]. Adherence to established guidelines ensures that induction of labor is undertaken judiciously, optimizing maternal and neonatal outcomes while minimizing unnecessary intervention.

Contraindications

Contraindications to induction of labor represent clinical situations in which the initiation of uterine contractions is associated with a high risk of severe maternal or fetal harm and therefore should be avoided. In these circumstances, vaginal delivery is unsafe, and alternative obstetric management strategies, most commonly cesarean delivery, are required to optimize outcomes. A clear understanding of these contraindications is essential to prevent catastrophic complications and to guide appropriate clinical decision making [2]. Placenta previa and vasa previa are absolute contraindications to induction of labor because they involve placental or fetal vessels overlying or near the cervical os. Uterine contractions and cervical dilation in these conditions significantly increase the risk of massive hemorrhage, which can result in rapid maternal hemodynamic instability and fetal exsanguination. Similarly, umbilical cord prolapse constitutes a direct contraindication to induction, as continued labor may worsen cord compression, leading to acute fetal hypoxia and potential fetal death if immediate delivery is not achieved. Abnormal fetal presentations also preclude induction of labor in most cases. A transverse fetal lie prevents safe passage of the fetus through the birth canal, and attempts to induce labor under these conditions substantially increase the risk of uterine rupture and fetal trauma. Unless spontaneous correction or successful external cephalic version occurs, induction of labor is contraindicated in transverse presentation due to the mechanical impossibility of vaginal delivery. The history of a prior classical cesarean section represents another major contraindication to induction of labor. The vertical uterine incision associated with this procedure significantly weakens the uterine wall, placing the patient at a markedly increased risk of

uterine rupture during labor. This risk is further amplified with the use of pharmacologic agents that stimulate uterine contractions. Similarly, a previous myomectomy that breached the endometrial cavity compromises uterine integrity and increases the likelihood of rupture, making induction of labor unsafe in such patients [2].

Active genital herpes infection at the time of labor is also a contraindication to induction because of the high risk of vertical transmission to the neonate during vaginal delivery. Neonatal herpes infection is associated with severe morbidity and mortality, and induction in this setting may prolong fetal exposure to the virus. For this reason, cesarean delivery is recommended to reduce neonatal risk. Collectively, these contraindications emphasize the importance of thorough antenatal assessment and accurate obstetric history. Identifying conditions in which induction of labor is unsafe allows clinicians to avoid preventable complications and ensures that delivery planning prioritizes maternal and fetal safety [2].

Equipment

The equipment used for induction of labor reflects the two principal approaches to this intervention, namely mechanical and pharmacological methods, both of which are selected according to cervical status, maternal history, and clinical indication. Cervical ripening devices and uterotonic agents are essential components when the cervix is unfavorable, commonly defined by a Bishop score of less than eight. In such cases, the primary objective of equipment selection is to promote cervical softening, effacement, and dilation while maintaining maternal and fetal safety [2]. Mechanical methods of induction rely on physical devices that exert direct pressure on the cervix to stimulate endogenous prostaglandin release. Commonly used equipment includes a Foley catheter or a double-balloon catheter, such as the Cook cervical ripening balloon, which is inserted through the endocervical canal under sterile conditions. Once correctly positioned, the balloon or balloons are inflated with saline to apply sustained pressure at the internal cervical os, facilitating gradual cervical dilation. These devices are widely used due to their relative simplicity, low cost, and reduced risk of uterine tachysystole compared with pharmacological agents [2]. Additional mechanical equipment includes osmotic dilators, such as laminaria or synthetic alternatives, which are placed within the cervical os. These dilators absorb fluid from surrounding tissues, expand progressively, and mechanically dilate the cervix over several hours, contributing to cervical ripening in a controlled manner. Pharmacological induction requires the availability of uterotonic medications and appropriate delivery systems. Prostaglandins are the primary pharmacological agents used for cervical ripening. Misoprostol, a synthetic prostaglandin E1 analog, and dinoprostone, a prostaglandin E2 preparation, are administered through various routes, including vaginal, oral, or intracervical, depending on institutional protocols and patient-specific factors. These agents promote cervical remodeling and stimulate uterine contractions. However, prostaglandins must be used cautiously in patients with a history of a low transverse cesarean section because of the increased risk of uterine rupture associated with excessive uterine stimulation [2]. Oxytocin represents the cornerstone pharmacological agent for labor induction after cervical ripening has been achieved. It is administered intravenously using infusion pumps that allow precise titration according to uterine response and fetal tolerance. Continuous fetal and uterine monitoring equipment is essential during oxytocin administration to detect tachysystole or fetal compromise. Amniotomy equipment is also commonly utilized, as artificial rupture of membranes is frequently combined with both mechanical and pharmacological methods to enhance labor progression. Together, these tools form the essential equipment framework for safe and effective induction of labor [2].

Personnel

The safe and effective induction of labor depends on the coordinated efforts of a comprehensive inpatient obstetric care team. This team includes nurses, midwives, obstetrics and gynecology residents, attending obstetricians, anesthesiologists, neonatologists, pediatricians, and lactation specialists. Each professional contributes distinct expertise that supports maternal safety, fetal well-being, and optimal outcomes throughout labor, delivery, and the immediate postpartum period. Induction of labor is a dynamic clinical process that requires continuous assessment, rapid decision making, and clear communication among all team members. Nurses play a central role in the ongoing management of induced labor. They provide continuous maternal and fetal monitoring, assess uterine activity, administer medications as prescribed, and identify early signs of complications such as uterine tachysystole or fetal distress. Their close bedside presence allows for timely reporting of clinical changes and supports prompt intervention. Midwives may lead or co-manage induction in appropriately selected cases, offering patient-centered care, labor support, and clinical surveillance within established protocols. Residents and obstetricians are responsible for clinical decision making, procedural interventions, and escalation of care when indicated. The obstetrician evaluates candidacy for induction, selects appropriate methods, and oversees progression of labor. Critically, a trained obstetrician capable of performing an emergency cesarean section must be immediately available whenever induction of labor is undertaken, as rapid surgical intervention may become necessary in the event of maternal or

fetal compromise [5]. Anesthesiologists provide pain management options, including regional anesthesia, and maintain readiness for operative delivery if required. Neonatologists and pediatricians ensure preparedness for neonatal resuscitation and postnatal care, particularly in high-risk inductions or preterm deliveries. Lactation services contribute to early breastfeeding support, enhancing maternal confidence and neonatal outcomes after delivery. Effective collaboration, clear role delineation, and shared clinical goals among all personnel are essential to maintaining a safe environment during induction of labor and ensuring continuity of care across the peripartum period [4][5].

Preparation

Preparation for induction of labor begins with a systematic clinical assessment of cervical readiness, most commonly performed using the Bishop scoring system. This standardized tool evaluates cervical dilation, effacement, consistency, position, and fetal station, providing an objective estimate of the likelihood of successful vaginal delivery. Assessment is typically performed in the late third trimester and repeated at the time induction is initiated. A Bishop score of 8 or higher is generally associated with a favorable cervix and a high probability of vaginal birth, whereas a score of 3 or lower correlates with a substantially reduced likelihood of successful induction and an increased risk of prolonged labor or operative delivery [2]. Clear communication of this information is essential, as it allows pregnant women to form realistic expectations regarding the induction process, potential duration of labor, and possible outcomes. Informed consent is a central component of preparation and must be obtained before initiating induction of labor. Pregnant women should receive a comprehensive explanation of the indications for induction, anticipated benefits, potential maternal and fetal risks, and available alternatives, including expectant management when clinically appropriate. Many risks associated with induction mirror those of spontaneous labor and include the possibility of cesarean section, operative vaginal delivery, chorioamnionitis, non-reassuring fetal heart rate patterns, and postpartum hemorrhage. The concept of failed induction should be clearly defined during counseling. Failure of induction is typically diagnosed when adequate cervical dilation and labor progression do not occur despite appropriate use of pharmacological agents, with or without amniotomy. According to recommendations from the American College of Obstetricians and Gynecologists, oxytocin should be administered for 12 to 18 hours following amniotomy before proceeding to cesarean delivery for failed induction, provided maternal and fetal conditions remain stable [6].

An essential aspect of preparation involves educating women about the range of induction methods available and the rationale for selecting specific approaches. Mechanical and pharmacological methods may be used independently or in combination, depending on cervical status, clinical indications, and institutional protocols. Evidence suggests that combined methods may shorten the time to delivery in selected populations. A randomized controlled trial published in 2016 examined women with singleton pregnancies in vertex presentation and an unfavorable cervix defined by a Bishop score below 6. The study demonstrated that combinations such as a Foley catheter with misoprostol or a Foley catheter with syntocinon resulted in a shorter median time to delivery compared with misoprostol alone or Foley catheter alone. However, after adjustment for confounding variables, the combination of Foley catheter and syntocinon did not show superiority over a single induction method [7]. These findings highlight the importance of individualized decision making rather than routine use of combined strategies. Comparative effectiveness research and systematic reviews have further informed preparation and counseling. Cochrane reviews comparing amniotomy, mechanical methods, and pharmacological agents indicate that balloon catheter induction is likely as effective as vaginal prostaglandin E2 for initiating labor. Importantly, mechanical methods appear to have a more favorable neonatal safety profile, particularly with respect to uterine tachysystole and fetal heart rate abnormalities. Evidence suggests that balloon catheters may be slightly less effective than oral misoprostol in achieving timely vaginal delivery, although differences in neonatal safety outcomes remain unclear. When compared with low-dose vaginal misoprostol, balloon catheters may demonstrate lower efficacy but potentially improved fetal safety. These findings suggest that future research should focus less on efficacy comparisons and more on neonatal safety outcomes and maternal satisfaction with the induction experience [8].

Discussion of cesarean delivery rates is a critical element of preparation, particularly given heightened public and professional attention to cesarean trends. Pregnant women frequently express concern regarding the association between induction of labor and cesarean birth. Recent high-quality evidence has challenged the long-standing perception that elective induction increases cesarean risk. The ARRIVE trial, published in the New England Journal of Medicine, compared nulliparous women undergoing elective induction at 39 weeks of gestation with those managed expectantly. The study demonstrated a statistically significant reduction in cesarean delivery rates in the induction group without an increase in adverse perinatal outcomes [9]. These findings have influenced contemporary obstetric practice and underscore the importance of evidence-based counseling during preparation for induction. Additional observational studies further support these conclusions. A large retrospective analysis published

in 2013 found reduced odds of cesarean delivery among both nulliparous and multiparous women electively induced between 37 and 40 weeks of gestation. The study also reported no increase in operative vaginal delivery or severe perineal lacerations across gestational ages [10]. Such data provide reassurance that, in appropriately selected patients, induction of labor does not inherently increase maternal morbidity and may offer comparable or improved outcomes relative to expectant management. Women undergoing induction for specific medical or obstetric indications often inquire about potential neonatal risks. Evidence addressing neonatal outcomes is therefore an essential component of preparation. The same 2013 retrospective study from California evaluated neonatal endpoints and found no significant differences in fetal death, neonatal intensive care unit admission, or respiratory distress across gestational ages or parity among induced pregnancies [10]. Nevertheless, other literature has highlighted potential risks associated with early-term delivery. A 2009 New England Journal of Medicine study using data from the Eunice Kennedy Shriver National Institute reported higher rates of respiratory and non-respiratory complications among neonates delivered at 37 weeks of gestation by cesarean section compared with those delivered at 38 or 39 weeks. These findings reinforce the need for careful timing of induction and individualized risk-benefit assessment, particularly when considering early-term delivery. Overall, thorough preparation for induction of labor requires a structured clinical evaluation, transparent communication, and integration of current evidence. By addressing cervical readiness, outlining procedural expectations, discussing maternal and neonatal outcomes, and contextualizing cesarean delivery risks, healthcare providers can support informed decision making and promote safe, patient-centered induction practices [10].

Technique or Treatment

Induction of labor may be achieved through mechanical, pharmacological, or combined techniques, with the choice of method guided by cervical status, gestational age, maternal and fetal conditions, and institutional protocols. Mechanical cervical dilation remains a widely used and effective approach, particularly in women with an unfavorable cervix. One of the most commonly employed methods is the transcervical Foley catheter. In this technique, the catheter is carefully advanced through both the external and internal cervical os under aseptic conditions. Once correctly positioned, the balloon is inflated with sterile normal saline, typically in volumes ranging from 30 mL to 80 mL. Inflation of the balloon applies direct pressure to the internal cervical os, stimulating local prostaglandin release and promoting cervical effacement and dilation [2]. Evidence supports the use of higher inflation volumes in selected patients. A study published in the American Journal of Obstetrics and Gynecology in 2012 demonstrated that inflation with 80 mL resulted in a shorter induction-to-delivery interval and reduced need for syntocinon augmentation when compared with a 30 mL volume [11]. This finding highlights how technical adjustments in mechanical methods can influence labor progression. Double-balloon catheters, such as the Cook catheter, represent a modification of the Foley technique and are designed to exert pressure on both sides of the cervix. One balloon is positioned above the internal os, while the second balloon rests against the external os. Each balloon can be inflated independently with varying volumes of saline, allowing tailored pressure distribution across the cervix. This bidirectional pressure is intended to enhance cervical ripening while minimizing discomfort and displacement. Whether a single-balloon Foley catheter or a double-balloon device is used, these mechanical dilators are typically removed once cervical dilation reaches approximately 3 to 4 centimeters, at which point labor is often able to progress with or without additional pharmacological support. Osmotic dilators, including laminaria and synthetic alternatives, provide another mechanical option. These devices are inserted into the cervical canal, where they gradually absorb moisture, expand, and exert gentle radial pressure that promotes cervical dilation over time [11].

Pharmacological cervical ripening is commonly achieved with prostaglandins, most notably misoprostol and dinoprostone. Misoprostol, a prostaglandin E1 analogue, can be administered via oral, vaginal, or sublingual routes, offering flexibility based on clinical context and provider preference. Typical dosing for term induction ranges from 25 micrograms to 50 micrograms per administration [2]. Lower doses are generally favored to reduce the risk of uterine tachysystole and associated fetal heart rate abnormalities. In contrast, specific clinical scenarios may warrant higher dosing. For example, in cases of intrauterine fetal demise during the second trimester, the American College of Obstetricians and Gynecologists supports the use of higher prostaglandin doses, such as 400 micrograms every three hours for up to five doses, reflecting differences in risk-benefit considerations in this context [12]. Dinoprostone, a prostaglandin E2 preparation, is available in both vaginal gel and controlled-release vaginal insert formulations. The gel is typically administered at a dose of 0.5 mg, while the vaginal insert contains 10 mg of dinoprostone and provides a sustained release over several hours [2]. These agents act by softening cervical collagen and increasing uterine contractility, thereby facilitating cervical ripening and the onset of labor. Continuous fetal and uterine monitoring is recommended during prostaglandin use due to the potential for uterine

hyperstimulation. Oxytocin, commonly referred to as syntocinon, is a cornerstone of pharmacological induction and augmentation of labor. It is administered intravenously using infusion pumps that allow precise titration. Dosing regimens vary among institutions but are generally adjusted to achieve regular uterine contractions occurring every two to three minutes, sufficient to promote cervical dilation while maintaining fetal well-being [2]. Special considerations apply to women undergoing a trial of labor after cesarean section, as many hospitals impose strict upper limits on oxytocin dosing to mitigate the risk of uterine rupture.

Amniotomy, or artificial rupture of membranes, is frequently used as an adjunct to both mechanical and pharmacological induction methods. This procedure is performed using an amnio hook once the cervix is sufficiently dilated to allow safe access to the membranes. The decision to perform amniotomy is individualized and takes into account factors such as fetal station, engagement of the presenting part, maternal comfort, and patient preference. Adequate fetal head engagement is particularly important to reduce the risk of umbilical cord prolapse. When appropriately timed, amniotomy can enhance endogenous prostaglandin release and strengthen uterine contractions, thereby facilitating labor progression. Overall, the technique of labor induction requires careful selection and sequencing of mechanical and pharmacological methods. Successful implementation depends on clinical judgment, ongoing maternal and fetal assessment, and adherence to evidence-based protocols to optimize outcomes and minimize complications [2].

Complications

As the use of labor continues to rise globally, often in non-urgent clinical contexts, careful consideration of associated complications has become increasingly important. When induction is elective rather than emergent, the balance between maternal–fetal safety and method effectiveness must be carefully evaluated. Mechanical induction techniques have gained attention in this regard because they are generally inexpensive, widely accessible, and associated with a lower incidence of systemic side effects compared with pharmacological agents. One of the principal advantages of mechanical methods is the reduced risk of excessive uterine activity, which may offer improved fetal safety. Excessively frequent or prolonged uterine contractions can compromise uteroplacental blood flow, potentially reducing fetal oxygenation and increasing the risk of adverse fetal outcomes. Pharmacological induction methods, particularly prostaglandins, are associated with a well-documented risk of uterine tachysystole, defined as more than five contractions within a ten-minute period [13]. Uterine tachysystole may lead to fetal heart rate abnormalities, including variable or late decelerations and, in severe cases, sustained fetal bradycardia. The literature extensively documents this association, emphasizing the importance of close fetal monitoring during pharmacological induction [13]. Beyond uterine hyperstimulation, induction of labor is associated with a range of intrapartum and postpartum complications. These include intrapartum vaginal bleeding, which may signal placental abruption or uterine rupture, and the presence of meconium-stained amniotic fluid, which can be associated with fetal distress. Umbilical cord prolapse, although uncommon, represents a critical obstetric emergency that may occur following amniotomy, particularly when the fetal head is not well engaged. Maternal complications related to induction also include heightened pain perception that may not be adequately relieved by regional anesthesia, increased rates of perineal lacerations, and postpartum hemorrhage [2]. Infectious complications such as chorioamnionitis during labor and postpartum endometritis have also been reported, particularly with prolonged induction processes and repeated vaginal examinations [2]. Collectively, these risks underscore the necessity of individualized decision-making, continuous assessment, and vigilant monitoring throughout the induction process to mitigate preventable adverse outcomes.

Clinical Significance

Induction of labor represents a critical clinical intervention that allows healthcare providers to influence the timing of birth for maternal, fetal, or combined benefit. Its clinical significance lies in the potential to prevent adverse outcomes associated with prolonged pregnancy or maternal and fetal pathology, while simultaneously introducing risks that must be carefully managed. Over the past several decades, a substantial body of research has examined the safety, efficacy, and outcomes associated with induction of labor, with particular attention to maternal morbidity, neonatal outcomes, and cesarean section rates. These investigations have shaped contemporary clinical guidelines and informed shared decision-making between providers and pregnant women. One of the most clinically relevant areas of research has focused on whether induction of labor increases or decreases the likelihood of cesarean delivery. Historically, induction was believed to elevate cesarean section rates, especially in nulliparous women with unfavorable cervical conditions. However, more recent high-quality studies have challenged this assumption, demonstrating that, when appropriately indicated and managed, induction does not necessarily increase cesarean rates and may, in certain populations, reduce them. This evolving evidence base highlights the importance of standardized protocols, accurate cervical assessment, and appropriate method selection in optimizing outcomes. Despite the growing volume of research, gaps remain in understanding the broader clinical implications of induction, particularly regarding maternal experience, neonatal well-being beyond

immediate outcomes, and long-term satisfaction. Emerging evidence suggests that future research should place greater emphasis on safety endpoints from both maternal and neonatal perspectives, as well as patient-reported outcomes such as perceived autonomy, emotional well-being, and satisfaction with the birth experience [14]. In this context, induction of labor is not merely a technical obstetric procedure but a complex clinical decision that intersects with ethical considerations, patient preferences, and health system resources. Recognizing its clinical significance requires ongoing appraisal of evidence and a commitment to individualized evidence-based care [14].

Nursing, Allied Health, and Interprofessional Team Interventions

Nursing and allied health interventions are fundamental to the safe and effective management of induction of labor, particularly in settings where continuous electronic fetal monitoring is standard practice. Depending on institutional acuity and policy, nurses are responsible for ongoing surveillance of fetal heart rate patterns and uterine activity using cardiotocography. Regular documentation of fetal heart rate characteristics, contraction frequency, and maternal vital signs is essential, especially when induction agents are administered. In many healthcare systems, nurses are also required to document corrective or resuscitative measures in response to non-reassuring fetal heart rate tracings, particularly category II patterns. Timely recognition of abnormal findings is a core nursing responsibility. When concerning fetal heart rate changes or excessive uterine activity are identified, nurses must promptly notify obstetric providers and anesthetic staff. Early communication allows for rapid implementation of interventions such as maternal repositioning, intravenous fluid administration, reduction or discontinuation of oxytocin, or preparation for operative vaginal delivery or cesarean section, depending on the clinical scenario and stage of labor. Allied health professionals, including anesthetists, contribute by managing pain control and ensuring readiness for surgical intervention if required. Interprofessional collaboration ensures continuity and safety throughout the induction process. Regular updates among team members, shared documentation, and mutual respect for professional roles support coordinated care delivery. Through vigilant monitoring, clear communication, and timely escalation of concerns, nursing and allied health professionals play a decisive role in minimizing risks and promoting favorable maternal and neonatal outcomes during induction of labor [14].

Conclusion:

Induction of labor remains a vital component of modern obstetric care, offering significant benefits when pregnancy continuation poses increased maternal or fetal risk. Advances in evidence-based practice have clarified appropriate indications, optimal timing, and safe induction methods, challenging earlier assumptions regarding increased cesarean delivery rates. This article highlights that successful induction depends not only on clinical decision-making and appropriate method selection but also on vigilant monitoring and collaborative care. Nurses occupy a central role throughout the induction process by assessing cervical readiness, administering induction agents, monitoring uterine activity and fetal well-being, and responding promptly to complications. Their continuous bedside presence and patient advocacy significantly contribute to maternal safety, neonatal outcomes, and patient satisfaction. Ultimately, individualized care, adherence to clinical guidelines, clear patient communication, and effective interprofessional collaboration are essential to ensuring safe, high-quality induction of labor and positive birth experiences.

References:

1. Tsakiridis I, Mamopoulos A, Athanasiadis A, Dagklis T. Induction of Labor: An Overview of Guidelines. Obstetrical & gynecological survey. 2020 Jan:75(1):61-72. doi: 10.1097/OGX.0000000000000752.
2. ACOG Practice Bulletin No. 107: Induction of labor. Obstetrics and gynecology. 2009 Aug:114(2 Pt 1):386-397. doi: 10.1097/AOG.0b013e3181b48ef5.
3. Marconi AM. Recent advances in the induction of labor. F1000Research. 2019:8():. pii: F1000 Faculty Rev-1829. doi: 10.12688/f1000research.17587.1.
4. ACOG committee opinion no. 560: Medically indicated late-preterm and early-term deliveries. Obstetrics and gynecology. 2013 Apr:121(4):908-910. doi: 10.1097/01.AOG.0000428648.75548.00.
5. Escobar CM, Grünebaum A, Nam EY, Olson AT, Anzai Y, Benedetto-Anzai MT, Cheon T, Arslan A, McClelland WS. Non-adherence to labor guidelines in cesarean sections done for failed induction and arrest of dilation. Journal of perinatal medicine. 2020 Oct 12:49(1):17-22. doi: 10.1515/jpm-2020-0343.
6. American College of Obstetricians and Gynecologists (College), Society for Maternal-Fetal Medicine, Caughey AB, Cahill AG, Guise JM, Rouse DJ. Safe prevention of the primary cesarean delivery. American journal of obstetrics and gynecology. 2014 Mar:210(3):179-93. doi: 10.1016/j.ajog.2014.01.026.
7. Levine LD, Downes KL, Elovitz MA, Parry S, Sammel MD, Srinivas SK. Mechanical and Pharmacologic Methods of Labor Induction: A Randomized Controlled Trial. Obstetrics and gynecology. 2016 Dec:128(6):1357-1364

8. Kemper JI, Li W, Goni S, Flanagan M, Weeks A, Alfirevic Z, Bracken H, Mundle S, Goonewardene M, Ten Eikelder M, Bloemenkamp K, Rengerink KO, Kruit H, Mol BW, Palmer KR. Foley catheter vs oral misoprostol for induction of labor: individual participant data meta-analysis. Ultrasound in obstetrics & gynecology : the official journal of the International Society of Ultrasound in Obstetrics and Gynecology. 2021 Feb:57(2):215-223. doi: 10.1002/uog.23563.
9. Grobman WA, Rice MM, Reddy UM, Tita ATN, Silver RM, Mallett G, Hill K, Thom EA, El-Sayed YY, Perez-Delboy A, Rouse DJ, Saade GR, Boggess KA, Chauhan SP, Iams JD, Chien EK, Casey BM, Gibbs RS, Srinivas SK, Swamy GK, Simhan HN, Macones GA, Eunice Kennedy Shriver National Institute of Child Health and Human Development Maternal–Fetal Medicine Units Network. Labor Induction versus Expectant Management in Low-Risk Nulliparous Women. The New England journal of medicine. 2018 Aug 9:379(6):513-523. doi: 10.1056/NEJMoa1800566.
10. Darney BG, Snowden JM, Cheng YW, Jacob L, Nicholson JM, Kaimal A, Dublin S, Getahun D, Caughey AB. Elective induction of labor at term compared with expectant management: maternal and neonatal outcomes. Obstetrics and gynecology. 2013 Oct:122(4):761-769. doi: 10.1097/AOG.0b013e3182a6a4d0.
11. Gu N, Ru T, Wang Z, Dai Y, Zheng M, Xu B, Hu Y. Foley Catheter for Induction of Labor at Term: An Open-Label, Randomized Controlled Trial. PloS one. 2015:10(8):e0136856. doi: 10.1371/journal.pone.0136856.
12. ACOG Practice Bulletin No. 135: Second-trimester abortion. Obstetrics and gynecology. 2013 Jun:121(6):1394-1406. doi: 10.1097/01.AOG.0000431056.79334.cc.
13. Kumar N, Haas DM, Weeks AD. Misoprostol for labour induction. Best practice & research. Clinical obstetrics & gynaecology. 2021 Nov:77():53-63. doi: 10.1016/j.bpobgyn.2021.09.003.
14. Chow R, Li A, Wu N, Martin M, Wessels JM, Foster WG. Quality appraisal of systematic reviews on methods of labour induction: a systematic review. Archives of gynecology and obstetrics. 2021 Dec:304(6):1417-1426. doi: 10.1007/s00404-021-06228-y