

Maternal Height and Labor Induction: Implications for Method Selection and Success Rates

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ABSTRACT

The impact of maternal height on the selection of methods for labor induction and its success rates is a critical aspect of obstetric care. This review article aims to explore the relationship between maternal height and the process of labor induction, success rate of labour induction and rate of cesarean section, considering various factors and outcomes. The study delves into the influence of maternal height on the efficacy of different induction methods, including pharmacological approaches such as oxytocin and prostaglandins, as well as non-pharmacological methods like membrane sweeping and amniotomy. Overall, this review provides valuable insights into the complex interplay between maternal height and the selection and success of labor induction methods, offering implications for clinical practice and further research in the field of obstetrics and gynecology.

Keywords: Maternal height, induction of labour, success rate, etc.

1. Introduction

Labor induction, involving the artificial initiation of labor for expedited delivery, is commonly indicated in cases of prolonged pregnancy, fetal compromise, maternal medical conditions, and obstetric complications (Farah et al., 2023; Myers et al., 2002). Its significance lies in preventing adverse outcomes associated with prolonged pregnancy, such as stillbirth and maternal complications like preeclampsia (Beshir et al., 2021; Rydahl et al., 2019). An essential aspect of maternal and fetal health is the overview of labor induction, a critical intervention in obstetric care (Tsakiridis et al., 2020; Lawani et al., 2014).

The decision to induce labor requires thorough evaluation of maternal and fetal conditions, gestational age, cervical status, and obstetric history. Maternal factors, including BMI and age can impact induction efficacy, with obesity associated with higher cesarean and instrumental delivery likelihood (Heslehurst et al., 2008). The Bishop Score, assessing cervical ripening, is a predictor of induction success (Kolkman et al. 2013).

Existing studies indicate a correlation between maternal height and outcomes like cesarean section rates. Understanding how height influences the efficacy of different induction methods could enhance obstetric decision-making and personalized care.

Maternal height may indirectly impact cervical anatomy and uterine dynamics, potentially affecting the response to induction agents (Mogren et al. 2018). Exploring these relationships could refine method selection and dosing strategies for diverse maternal anthropometric characteristics.

Studies highlight associations between maternal height and risks of failed induction or labor

dystocia (Place et al. 2019). Investigating this relationship further could aid in identifying high- risk populations, facilitating proactive management approaches.

Tailoring induction strategies based on maternal height might optimize success rates (Verhoeven et al. 2013). Researching these associations could contribute to personalized obstetric care plans, potentially improving maternal and neonatal outcomes.

This underscores the necessity for comprehensive, prospective studies examining the direct and indirect effects of maternal height on labor induction outcomes. Such research can refine clinical protocols and foster personalized obstetric practices.

Background:

In resource-poor settings, labor induction plays a crucial role in managing obstetric complications and improving outcomes (Lawani et al. 2014). Understanding induction mechanisms is essential for optimizing methods, including pharmacological and non- pharmacological approaches (Irani & Foster 2015; Schoen et al. 2018; Aregeb et al. 2021; Soni et al. 2021).

Decision-making for labor induction is influenced by clinical guidelines, patient perspectives, and healthcare system factors, guided by evidence-based practices (Tsakiridis et al. 2020; O'Rourke et al. 2011). The closure of rural obstetrical services impacts labor patterns, emphasizing the role of healthcare service delivery frameworks in obstetric outcomes (Kozhimannil et al. 2018; Pearson et al. 2018). Comparisons of cesarean section rates in elective induction versus spontaneous labor highlight the need to assess different initiation approaches on maternal and neonatal health (Beigh et al. 2021).

The impact of maternal height on labor induction, success rate, and cesarean section is a complex interplay of various factors. Maternal height has been inversely correlated with the risk of cesarean delivery for labor arrest (Chan & Lao 2009). Additionally, a retrospective cohort study found that maternal height < 160 cm was associated with an increased risk for repeat cesarean section (Place et al. 2019). Predictive models have also identified maternal height as a factor associated with an increased risk of cesarean delivery after induction of labor among nulliparous women at term (Tolcher et al. 2015; Zhou et al. 2022). Furthermore, a study on antepartum factors resulting in failed labor induction in nulliparous term pregnancies highlighted the belief that higher maternal height promotes labor induction success (Shirazi et al. 2021). Additionally, a retrospective cohort study examined the effects of maternal age on the mode of delivery following induction of labor in nulliparous term pregnancies, indicating a significant relationship between maternal height and the methods of labor induction (Sharami et al. 2022). Moreover, a study on the timing of delivery and pregnancy outcomes in women with gestational diabetes examined the relationship between induction of labor, gestational age, and the rate of cesarean delivery, shedding light on the multifaceted nature of these factors (Feghali et al. 2016). Moreover, Chan & Lao's (2009) retrospective study revealed insights into the relationship between maternal height and intrapartum operative delivery, shedding light on the impact of maternal stature on delivery mode. Roos et al. (2010) explored the interplay between maternal height, postterm pregnancy, and labor induction outcomes, contributing to the understanding of associated risk factors. Place et al. (2019) demonstrated the clinical relevance of maternal stature in the context of trial of labor after cesarean (TOLAC), emphasizing its implications for obstetric decision-making. Collectively, these findings underscore the significance of maternal height as a predictive factor for various obstetric outcomes and its relevance to clinical management.

The Cochrane review by de Vaan et al. (2019) offers a comprehensive analysis of mechanical methods for labor induction, including catheterization and oxytocin, providing insights into their efficacy and safety. Dowswell et al. (2010) conducted a systematic review on different methods for the induction of labor in outpatient settings, shedding light on the effectiveness of various approaches. Prager et al. (2008) conducted a randomized controlled trial comparing the efficacy of different pharmacological methods for labor induction, providing valuable insights into the comparative effectiveness of intravaginal dinoprostone, intravaginal misoprostol, and transcervical

balloon catheter. Additionally, Han et al. (2016) developed a prediction model for the risk of cesarean delivery after labor induction in twin gestations based on clinical and ultrasound parameters, offering insights into the predictive factors for cesarean delivery following labor induction in twin pregnancies.

These references collectively provide insights into the relationship between maternal height and the process of labor induction, success rate of labor induction, and the rate of cesarean section, considering various factors and outcomes.

Impact of maternal height on cephalopelvic disproportion and its implications for labor induction:

Maternal height is a significant factor in the assessment of cephalopelvic disproportion (CPD), a condition where the fetal head is too large to pass through the maternal pelvis during labor (Benjamin et al. 2012). Several studies have investigated the relationship between maternal height and the risk of CPD, highlighting its importance in obstetric care.

Extensive research has investigated the association between maternal height and cephalopelvic disproportion (CPD). Liselele et al. (2000) in a cohort study of nulliparous African women found maternal height less than 150 cm strongly linked to CPD, emphasizing its predictive role and implications for intrapartum management. Kawakita et al. (2016) reported an increased risk of cesarean delivery in nulliparous women with shorter stature, highlighting clinical relevance in the context of CPD. Fawole et al. (2012) emphasized the multifactorial nature of CPD, suggesting anthropometric measurements alone cannot predict it. Place et al. (2019) observed a significant relationship between maternal height and methods of labor induction, underscoring the influence of maternal stature on labor management.

Risk Factors for Cesarean Delivery in Induced Labor at Term

Numerous studies have identified independent risk factors associated with cesarean delivery in induced labor, including older maternal age, shorter maternal height, higher body mass index, increased weight gain during pregnancy, advanced gestational age, hypertension, diabetes mellitus, and initial cervical dilation <3 cm (Tolcher et al. 2015).

Previous Cesarean Section and Labor Induction Success

Research on labor induction success in women with a history of previous cesarean section has focused on elucidating the impact of maternal height and anthropometric measurements. Lawani et al. (2014) found a 75.9% success rate in a health resource-poor setting, emphasizing the need to understand factors influencing induction success in this population. Additionally, Dujardin et al.'s (1996) meta-analysis revealed maternal height as a predictor of dystocia, contributing insights into factors affecting induction success in women with varying statures. Okewole et al. (2011) demonstrated a significant correlation between maternal height and the likelihood of cesarean delivery post-labor induction, underscoring the clinical relevance of considering maternal stature in obstetric decision making.

Prediction Models for Cesarean Delivery Following Labor Induction:

Grobman & Caughey (2019) compared elective induction of labor with expectant management, revealing that labor induction in women with an unfavorable score resulted in fewer cesarean deliveries than expectant management. Similarly, Tolcher et al. (2015) identified independent risk factors for cesarean delivery after labor induction and developed a nomogram for predicting cesarean delivery among nulliparous women at term. Moreover, Rossi et al. (2020) developed a risk calculator utilizing antenatal factors from U.S. live-birth records to predict cesarean delivery among women undergoing labor induction. Additionally, Levine et al. (2018) derived and validated a prediction model for cesarean after induction with an unfavorable cervix and

developed a web-based calculator to aid in patient counseling. Whereas, Nwabuobi et al. (2020) designed and validated a prediction model using antenatal and intrapartum variables known at the time of labor induction to identify pregnancies at increased risk of cesarean delivery. These studies collectively contribute to the understanding of prediction models for emergency cesarean delivery following labor induction (Grobman & Caughey 2019; Tolcher et al. 2015; Levine et al. 2018).

While the provided paragraph doesn't explicitly mention maternal height, it underscores the importance of various factors in predicting and understanding cesarean deliveries following labor induction. Examining maternal height in this context could contribute valuable insights to enhance the comprehensiveness of prediction models for emergency cesarean deliveries.

9. Discussion:

The exploration of the association between maternal height and the process of labor induction constitutes a notable focus within obstetric research, elucidating its implications on induction outcomes, delivery modes, and overall obstetric scenarios. The pivotal role of maternal height in influencing cesarean delivery risk subsequent to labor induction has been underscored by the findings of Khan et al. (2022), wherein it was identified as an independent risk factor, thereby accentuating its substantive clinical relevance. In parallel, the study conducted by Crane et al. (2006) has contributed to this discourse by revealing an association between maternal height and the success of labor induction, with taller women exhibiting higher rates of success.

Moreover, beyond the immediate outcomes of labor induction, investigations into the intricate correlation between maternal height and labor-related complications, including dystocia and cesarean deliveries, have provided valuable insights into the nuanced dynamics of this relationship. The study conducted by Marbaniang et al. (2022) is emblematic of these endeavors, shedding light on the multifaceted nature of the interplay between maternal height and adverse labor outcomes.

In light of these findings, it becomes evident that maternal height serves as a pertinent variable in the obstetric landscape, exerting influence not only on the success of labor induction but also on the subsequent risk profile for cesarean deliveries. The integration of maternal height into predictive models and risk assessment frameworks may, therefore, enhance the precision and individualisation of clinical decision making. Furthermore, the comprehensive understanding of maternal height's role in the multifactorial landscape of labor outcomes can inform targeted interventions and counseling strategies, contributing to the optimization of obstetric care. As the discourse continues to evolve, future research endeavors should aim to elucidate the underlying mechanisms of the observed associations and explore potential avenues for interventions tailored to women with distinct maternal height characteristics. This nuanced understanding is imperative for advancing obstetric knowledge and refining clinical approaches to labor induction and cesarean delivery risk assessment.

Conclusion:

The impact of maternal height on labor induction warrants further research in obstetrics, given its substantial implications for clinical practice. Understanding this influence is vital for optimizing obstetric care, prompting healthcare providers to acknowledge maternal height as a potential risk factor. This recognition can contribute to refining clinical guidelines and ultimately improving maternal and neonatal outcomes.

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