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Original Research Article

FAILED INDUCTION OF LABOR AND ASSOCIATED RISK FACTORS AMONG WOMEN UNDERGOING INDUCTION

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Abstract: *Induction of labor is a standard obstetric procedure aimed at initiating uterine contractions before the spontaneous onset of labor. While it is a critical intervention to prevent maternal and fetal complications, failed induction remains a significant challenge, often leading to cesarean deliveries and adverse maternal outcomes. Identifying the frequency and associated risk factors for failed induction is crucial for optimizing perinatal care and improving maternal and fetal outcomes.* ***Objective:*** *To determine the frequency of failed inductions of labor and identify the associated risk factors in pregnant women undergoing induction at a tertiary care public hospital in Islamabad.* ***Methods:*** *A cross-sectional study was conducted at the Gynecology & Obstetrics Department, Federal Government Poly Clinic Hospital, Islamabad, from May 16, 2023, to November 15, 2023. One hundred ninety-six pregnant women undergoing induction of labor were included in the study. Patients were followed up until delivery to assess the success or failure of induction, and the reasons for failed induction were recorded. Data were analyzed using the **Statistical Package for Social Sciences (SPSS) version 16**, with results presented as mean ± standard deviation (SD) and frequencies.* ***Results:*** *The mean age of participants was 27.2 ± 4.7 years, with an age range of 18–40 years. The overall success rate of induction of labor was 72.4% (n = 142), while 27.6% (n = 54) of inductions failed. The most common risk factor for failed induction was a low Bishop score, observed in **17.9% (n = 35) of cases, followed by pre-eclampsia, present in 15.8% (n = 31) of cases.* ***Conclusion:*** *Failed induction of labor remains a prevalent issue, with low Bishop score and pre-eclampsia emerging as the most significant risk factors. Early identification and management of these factors may improve induction outcomes and reduce maternal and fetal complications. Further research is warranted to develop targeted interventions for optimizing labor induction success rates.*

Keywords: Caesarean-Section, Labor, Pre-eclampsia, Pregnancy

Introduction

Induction of labor is the artificial stimulation of the uterus before the beginning of natural labor using utero-tonic drugs. Labor induction helps to improve feto-maternal outcomes and shall be done for medical, obstetrical, or other indications (1). Induction of labor has two outcomes: failure or success (2). The majority of studies define failed induction of labor (FIOL) as the inability to get adequate uterine contraction and poor cervical changes even after 6-8 hours of administration of the drug with the use of a maximum dose and drops for at least one hour (3).

FIOL is challenging in obstetric care, which is being given worldwide, including in developed countries. Most of the studies have found that there is a 2-fold increased risk for cesarean deliveries with induction of labor compared to spontaneous labor (4). Cesarean birth carries the risk of negative maternal outcomes after delivery, like maternal mortality, severe morbidity, anomalies of the placenta, urine incontinence, postpartum depression, and poor newborn outcomes (5, 6).

Unfavorable Bishop Score and primiparous were significantly associated with failed induction. Besides this, health professionals shall be aware of the relevance of cervical ripening for intermediate and unfavorable Bishop Score for pregnant women before induction of labor.7 According to studies around the globe, the prevalence of failed induction was 13% to 25%.8 According to research, maternal age, gestational age, parity, bishop score, PROM, post-term, previous obstetric complications, and birth weight are the most common contributing factors for failed induction (9).

Tadesse T et al. recently determined the frequency of FIOL and found that failed induction was noticed in 24.4% of patients. They further evaluated the risk factors associated with failed induction. They noted that 34.4% of low birth weight (<2.5Kg) females had failed induction, and pre-induction BISHOP score of <5 had 37.4% failed induction. In contrast, females with premature membrane rupture, intrauterine growth restriction, oligohydramnios, and pre-eclampsia showed 22.4%, 25.7%,25.4%, and 20% failed induction, respectively (10).

Methodology

This cross-sectional study was conducted in the Gynae and Obs. department of Poly Clinic Hospital, Islamabad, from May 16, 2023, to November 15, 2023, with over 196 patients.

The sample size would be N=196, calculated using the prevalence of failed induction at 24.4%10 and 95% confidence level and using 6% precision under WHO software for sample size determination.

Ethical approval was attained from an ethical board review. Women who were admitted to ER and OPD. All the females who presented to the hospital with a gestational age of >36 weeks and failed to achieve regular (e.g., every 3 min)

uterine contractions and cervical change (i.e., labor) after at least 6-8 hours of the insertion of two vaginal PGE2 tablets or maintenance dose of oxytocin infusion, or using balloon catheter were included in the study. Data was collected using a pretested and validated structured questionnaire. The researcher checked a thorough physical examination and clinical record. Bishop scores were calculated for all the participants. Necessary laboratory examinations, like blood CP, LFT, RFT, etc., were performed from the hospital laboratory. An ultrasonic examination was performed, and findings were noted.

Inductions were given to the patients as advised by the consultant gynecologist with at least three years of teaching experience. After 6 to 8 hours of induction, patients were observed. Induction is considered successful if the patient is delivered vaginally and failed if it ended up in cesarean section. Pregnancy-associated risk factors: were defined in terms of pre-eclampsia, low BISHOP score, premature rupture of membrane, oligohydramnios, intra-uterine growth retardation, and low birth weight.

Inclusion Criteria: Women with a singleton pregnancy who are admitted for induction of labor with Gestational age >32 weeks and Cephalic presentation of the fetus.

Exclusion Criteria: Women with previous uterine scar, estimated fetal weight (EFW)>4500grn, Placenta Previa, abnormal cervical anatomy. Cervical cerclage, congenital malformations, or chromosomal abnormalities were excluded.

The patient's clinical findings, demographic details, and study findings will be recorded in the prescribed proforma.

SPSS software version 16 was used for data entry and analysis. A chi-square test was applied, and statistical significance was considered at a p-value <0.05.

Results

A total of 196 patients presenting with term pregnancy after induction of labor were included in the study.

The average age of the patients was 27.2 years+4.7SD, with a range of 18-40 years. The patient's age was divided into three categories, out of which the most common age group for presenting with term pregnancy was 26-35 years. 85(43.36%) patients were aged less than 25 years, 101 (51.5%) were of the age range 26-35 years, and 10(5.1%) presented at age more than 36 years.

Tablets were the leading mode for induction of labor, followed by IV infusion, while only 32(16.33%) patients used catheters for induction of labor. Fig I

Labor induction was successful in 142(72.4%), while failure was observed in 54(27.6%). The most common factor was low bishop score which was observed in 35(17.9%) patients followed by 31(15.8%) pre-eclampsia, 17(8.7%) premature rupture of membrane, 14(7.1%) intrauterine growth retardation, 24(12.2%) low birth weight, and oligohydramnios was noted in 17(8.7%) patients. Table I

Age-wise distribution of induction status shows successful induction of labor was found in the majority of young patients compared to the elder age group. Still, statistically, it shows insignificance with p-value=0.618. The patients in the age groups of less than 25 years and 26-35 years of age showed 71.8% and 74.3% success rates respectively, while a 60% success rate was observed in patients over 35 years. Similarly, the success rate was high in patients with a gestation age of more than 37 weeks and a BMI of less than 26kg/m2. Also, patients with multiparous and IV infusion show a high successful rate, although statistically found insignificant. Table II.

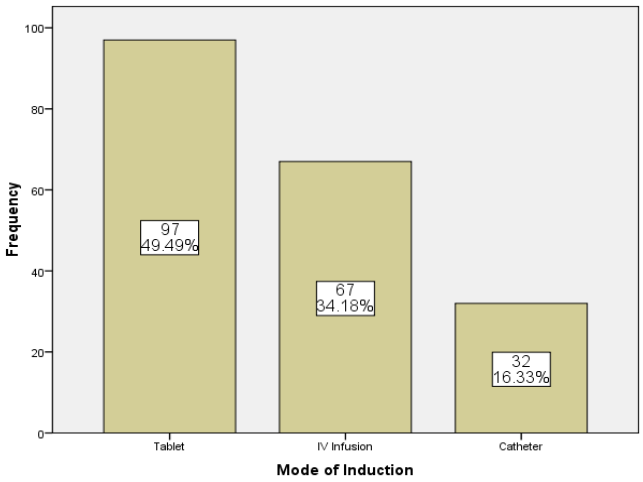

Fig- 1 Mode of Induction for Labour

Table 1: FAILED INDUCTION OF LABOUR AND ASSOCIATED RISK FACTORS (n=196)

		Count	%
Induction Status	Successful	142	72.4%
	Failed	54	27.6%
Low Bishop Score	Yes	35	17.9%
	No	161	82.1%
Pre-eclampsia	Yes	31	15.8%
	No	165	84.2%
Premature Rupture of Membrane	Yes	17	8.7%
	No	179	91.3%
Oligohydramnios	Yes	17	8.7%
	No	179	91.3%
Intrauterine Growth Retardation	Yes	14	7.1%
	No	182	92.9%
Low Birth Weight	Yes	24	12.2%
	No	172	87.8%

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Table 2: COMPARISON OF INDUCTION STATUS OVER DIFFERENT FACTORS (n=196)

		Induction Status				
		Successful		Failed		
		Count	Row %	Count	Row %	p-value
Age(in years)	<= 25.00	61	71.8%	24	28.2%	0.618
	26.00 - 35.00	75	74.3%	26	25.7%	
	36.00+	6	60.0%	4	40.0%	
Gestational Age(in weeks)	< 37.00	69	70.4%	29	29.6%	0.316
	37.00+	73	74.5%	25	25.5%	
BMI(Kg/m)	<= 26.00	87	73.7%	31	26.3%	0.622
	27.00+	55	70.5%	23	29.5%	
Residence	Urban	83	72.8%	31	27.2%	0.895
	Rural	59	72.0%	23	28.0%	
Parity	Nulliparous	27	69.2%	12	30.8%	0.615
	Multiparous	115	73.2%	42	26.8%	
Mode of Induction	Tablet	67	69.1%	30	30.9%	0.574
	IV Infusion	51	76.1%	16	23.9%	
	Catheter	24	75.0%	8	25.0%	

Discussion

Labor induction is a common practice in every labor room, contributing significantly to all labor room procedures. The advent of inducing agents has eased the delivery process immensely by reducing the duration of labor. The practice of induction, its procedure, agents, and indication have changed dramatically over the decade. The indication of induction has changed from fetal death to elective induction to meet the convenience of physicians and patients. The incidence of induction varies from setting to setting, ranging from 5% to 22% of all labor room admissions (11, 12).

While cesarean section rates range between 12-86% across studies done in developed countries, the rate in developing countries varies between 2 and 39% (12, 13). Recent reports showed that population-based CSR exceeding the WHO threshold of 15% is more common in private than public hospitals (13). Other reasons are fear of being sued, the health insurance system, C-section by choice, lack of midwifery support, an increased proportion of breech deliveries by C-section, poor implementation of active management of labor, and differences in clinical practices (14).

The failure rate of 27.6 % in this study is not supported by D J Rouse, who claimed 61% of cesarean delivery with a latent phase duration of 12 hours after induction.15 Similarly, Rouse DJ and Hauth J revealed an 87% cesarean rate after induction compared to 41% in Simon and Grobmans' study. (16) as these studies were performed in a very local setup with fewer facilities and no control over the comorbidities.

The major reasons for cesarean were failed induction by non-progress of labor, fetal distress, CPD, and meconium staining liquor. The other predicting factors for cesarean section were gravida, number of doses, and Bishop Score. Meanwhile, N B Khan reported nulliparity, Bishop score, and prolonged latent stage of labor as major factors for failed induction17, which aligns with our study result.

A recent summary of eight observational studies found that vaginal delivery was less likely in a woman with previous Caesarean delivery when cervical ripening was performed with PGE2 compared to spontaneous labor (OR = 0.45, 95% CI 0.40-0.50).135 Also, a lower rate of vaginal delivery was noted when induction of labor was performed with oxytocin compared with spontaneous labor (OR=0.52, 95 % CI 0.46-0.60) (18). A summary of 10 studies found that although there was no statistical difference in scar disruption rates between the prostaglandin E2 group (1.60%) and the spontaneous labor group (1.23%), there was a higher rate in the former group (OR = 1.46, 95% CI 0.96-2.22) (18-20).

One study quoted that fetal distress accounts for 14.4% of cesarean sections. Fetal distress, dystocia, and previous cesarean account for most cesarean sections, as is apparent from our study as well. Fetal distress was diagnosed by fetal heart rate and the presence of meconium. The diagnosis of fetal distress is often subjective and lacks standard clinical criteria in different health facilities (21, 22).

Pre-eclampsia of pregnancy accounted for 86.2% of caesareans in this study. These were for pre-eclamptic patients with poor bishop scores, severe pregnancy-induced hypertension, and intrauterine growth restriction. Good antenatal care can detect such problems earlier, and early management can prevent complications. As CS carries 8-fold higher mortality than vaginal delivery and 12 times higher morbidity, these high-risk cases should be assessed on the risk /benefit ratio. CS without obstetric indication should be reconsidered to lower segment cesarean section rate (23, 24).

Conclusion

The results imply that there is a need for timely and accurate screening of women during obstetric care, and the decision to perform a cesarean section should be based on clear, compelling, and well-supported justifications while treating the patients with pre-eclampsia, low BISHOP score, low birth weight, premature rupture of membrane, etc. In addition, training hospital staff, healthcare officers, midwives, and health extension workers in emergency obstetric care and neonatal resuscitation skills for appropriate decisions to undertake CS is critical. Finally, ensuring access to life-saving drugs, supplies, and adequate blood for transfusion is necessary to reverse the current situation. Further research with robust methodology is needed to explore the quality of care provided and corroborate or refute the present findings.

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Declarations

Data Availability statement
All data generated or analyzed during the study are included in the manuscript.
Ethics approval and consent to participate
Approved by the department concerned.
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Conflict of interest

The authors declared the absence of a conflict of interest.

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