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Original Research Article

Indications and Outcomes of Induction of Labour among Pregnant Women: A Prospective Observational Study from a Tertiary Care Hospital

Khushnaveed Maqbool[1], Shylla Mir[2], Benish Bashir[3], Sakeena Bano[4], Najmul Saher Shariq[5], Tabinda Ashraf[6]

[1,2,3,4,5,6]**The Postgraduate Department of Obstetrics and Gynaecology, Government Lala Ded Hospital, Government Medical College, Srinagar**

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Corresponding author: Dr. Shylla Mir
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Abstract

Background: Induction of labour (IOL) is a widely practiced obstetric intervention aimed at reducing maternal and fetal complications by initiating timely delivery. While it plays a pivotal role in improving outcomes, the success of IOL depends on maternal, fetal, and clinical factors. This study was conducted to evaluate the demographic profile, common indications, and outcomes of induction of labour in a defined patient population.

Methods: A total of 350 women admitted for induction of labour were included in this observational study. Demographic characteristics, parity, indications for induction, and outcomes were systematically recorded and analyzed using descriptive statistics.

Results: The mean age of participants was 29.1 ± 4.23 years (range: 20–44 years), with the majority in the 25–29 year age group (47.7%). Rural residents constituted 78.3% of the cohort, and 64.6% were primigravida. Pregnancy-induced hypertension (PIH) was the most frequent indication for IOL, accounting for 38.3% patients, followed by postdated pregnancy (20.6%), gestational diabetes mellitus (17.1%), full-term pregnancy (15.1%), and intrahepatic cholestasis of pregnancy (8.9%). Induction was successful in 72.3% (253 patients), while 27.7% (97 patients) experienced failed induction.

Conclusion: The study highlights that induction of labour is predominantly undertaken in younger women, rural populations, and primigravida patients. Hypertensive disorders and postdated pregnancy remain the leading indications for induction. The overall success rate was favorable, though a significant proportion experienced failed induction, underscoring the need for careful patient selection, adherence to evidence-based protocols, and vigilant intrapartum monitoring to optimize outcomes.

Keywords: Induction of Labour; Pregnancy-Induced Hypertension; Postdated Pregnancy; Gestational Diabetes Mellitus; Intrahepatic Cholestasis of Pregnancy; Obstetric Outcomes; Prospective Study.

Introduction

Induction of labour is one of the most frequently performed interventions in obstetrics, aimed at initiating uterine contractions before their spontaneous onset to achieve vaginal delivery. It is indicated when the risks of continuing pregnancy outweigh those of delivery, thereby safeguarding maternal and fetal health. [1]

Worldwide, induction rates range between 10% and 30%, reflecting its widespread role in contemporary maternity care. [2-4] with advances in monitoring and induction techniques, its application has become increasingly common, making it a cornerstone in modern obstetric management. The indications for induction of labour encompass maternal, fetal, and obstetric causes. Maternal conditions such as hypertensive disorders of pregnancy, gestational diabetes, and medical comorbidities necessitate timely intervention to prevent morbidity. [6,7] Fetal factors, including intrauterine growth restriction, oligohydramnios, and non-reassuring fetal surveillance, demand prompt delivery to avoid perinatal compromise. [7] Obstetric conditions like post-term pregnancy, premature rupture of membranes, and intrauterine fetal demise are also significant triggers for induction. Each indication is based on the principle of balancing maternal and neonatal safety with timely termination of pregnancy.

Induction of labour, while frequently used, is not without potential harm. It can give rise to iatrogenic complications such as excessive hemorrhage, uterine hyperstimulation, uterine rupture, and adverse perinatal outcomes. Evidence

regarding the balance of harms and benefits of induction in term pregnancies is mixed. A comprehensive Cochrane review of 34 randomized controlled trials involving over 21,500 low-risk women at or beyond 37 weeks demonstrated that induction compared with expectant management was associated with significantly fewer perinatal deaths and likely lowered caesarean section rates, while not increasing operative vaginal births. [8] Conversely, observational data from Victoria, Australia, offer a different perspective.

Among 42,950 uncomplicated term first births, induction especially elective was associated with more than a doubling of emergency caesarean section risk (26.5% vs 12.5%; adjusted OR ≈2.5), without any reduction in perinatal mortality. [9] Studying the indications and outcomes of induction of labour is particularly important in institutional and regional contexts. Variations in maternal demographics, prevalence of high-risk pregnancies, and clinical protocols significantly influence both the decision to induce and the likelihood of success. In resource-limited settings, failed inductions can impose additional burdens on healthcare infrastructure and adversely affect maternal-fetal health. Conversely, judicious and evidence-based induction practices can optimize resource use while improving maternal and neonatal outcomes. Evaluating local patterns helps to identify whether current practices align with international guidelines and where improvements in clinical decision-making are required. This study therefore aims to assess the common indications for induction of labour among pregnant women in our setting and to analyze its outcomes in terms of success or failure.

Methodology

This prospective observational study was conducted in the Postgraduate Department of Gynaecology and Obstetrics, Lal Ded Hospital, Government Medical College Srinagar, over a period of 18 months. Ethical clearance was obtained from the Institutional Ethical Committee prior to the commencement of the study, and informed written consent was taken from all participants. A total of 350 pregnant women at ≥37 weeks of gestation admitted to the labour room for induction of labour formed the study population. Only those fulfilling the inclusion criteria and providing consent were enrolled.

Inclusion Criteria: Pregnant women at ≥37 weeks of gestation with an indication for induction of labour and willing to participate.

Exclusion Criteria: The exclusion criteria for the present study included women with a gestational age of less than 37 weeks and those with a previous uterine scar. Patients with cephalopelvic disproportion or an estimated fetal weight greater than 3.5 kg were also excluded. Similarly, cases complicated by antepartum haemorrhage, malpresentation, or abnormal cervical anatomy were not considered for induction. In addition, women who underwent caesarean section following induction of labour due to fetal distress were excluded from the analysis.

Before induction, each patient underwent an assessment of pelvis and cervix using the Bishop's score. Induction was initiated using an intracervical Foley's catheter (22–24 G) under aseptic technique, combined with dinoprostone (Cerviprim) 0.5 mg placed in the posterior fornix. The dose of Cerviprim was repeated after 6 hours if the response was inadequate, with a maximum of three doses administered within 24 hours. Oxytocin administration was withheld until at least 6 hours after the last dose of dinoprostone. Augmentation with oxytocin was carried out in women with inadequate progress. In primigravidae, oxytocin infusion was started with 2.5 units in 1 liter of Ringer's lactate at 10 drops per minute, and the rate was escalated every 30 minutes by 10 drops until adequate uterine contractions were achieved. Following induction, all patients were monitored closely. Adequate contractions were defined as lasting approximately 30 seconds each within a 10-minute period. Uterine activity was assessed every 30 minutes, and fetal heart rate (FHR) was auscultated for 1 minute following contractions and subsequently every 30 minutes. FHR was required to remain reassuring throughout labour. In addition, a partogram was maintained for each patient, and cardiotocography (CTG) was performed 1–2 hours after induction.

Definition of outcome: Patients were labelled as having a failed induction if the above induction protocol did not result in entry into the active phase of labour within 24 hours of the last dose of Cerviprim.

Statistical Analysis: All recorded data were compiled in Microsoft Excel and analyzed using SPSS version 20.0 (SPSS Inc., Chicago, Illinois, USA). Continuous variables were expressed as mean ± standard deviation (SD), while categorical variables were presented as frequencies and percentages. Graphical representation was carried out using bar and pie diagrams.

Comparison of categorical variables between groups was performed using the Chi-square test or Fisher's exact test, as appropriate. To determine independent risk factors for failed induction, multivariate logistic regression analysis was employed. A p-value of <0.05 was considered statistically significant.

Results

Table 1: Age distribution of study patients

Age group (years)	Number of patients	Percentage (%)
20–24	45	12.9
25–29	167	47.7
30–34	112	32.0
≥35	26	7.4
Total	**350**	**100.0**
Mean ± SD (Range) = 29.1 ± 4.23 (20–44 years)		

In the present study, the age of the participants ranged from 20 to 44 years, with a mean age of 29.1 ± 4.23 years.

The majority of the patients belonged to the age group of 25–29 years, accounting for 47.7% (167 patients), followed by 32.0% (112 patients) in the 30–34 years age group. Women aged 20–24 years constituted 12.9% (45 patients), while only 7.4% (26 patients) were aged 35 years or above.

Thus, most of the study population was concentrated in the younger reproductive age group of 25–34 years.

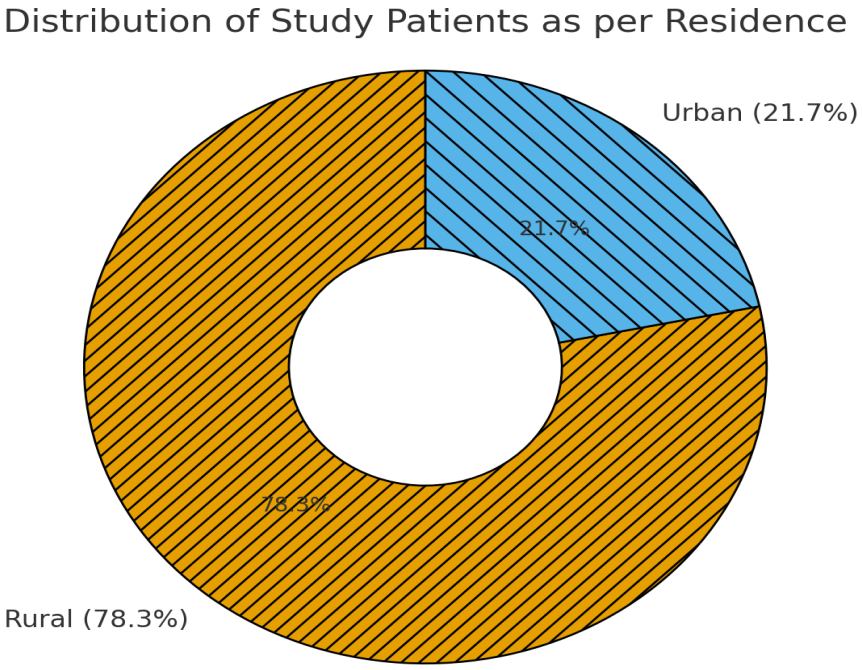

Figure 1: Distribution of study patients as per residence

In this study, the majority of the participants were from rural areas, comprising 78.3% (274 patients) of the total study population, while 21.7% (76 patients) belonged to urban areas. This indicates a predominantly rural representation among the study patients.

Table 2: Parity of study patients

Parity	Number of patients	Percentage (%)
Primigravida	226	64.6
Multigravida	124	35.4
Total	**350**	**100.0**

We observed that most of the participants were primigravida, accounting for 64.6% (226 patients), while multigravida women constituted 35.4% (124 patients). This reflects a predominance of primigravida women in the study population.

Table 3: Indications for induction of labour among study patients

Indications for induction of labour	Number of patients	Percentage (%)
PIH (Pregnancy-induced hypertension)	134	38.3
Postdated pregnancy	72	20.6
GDM (Gestational diabetes mellitus)	60	17.1
Full-term pregnancy	53	15.1
IHCP (Intrahepatic cholestasis of pregnancy)	31	8.9
Total	**350**	**100.0**

In the present study, pregnancy-induced hypertension (PIH) emerged as the most common indication for induction of labour, observed in 38.3% (134 patients). This was followed by postdated pregnancy in 20.6% (72 patients) and gestational diabetes mellitus (GDM) in 17.1% (60 patients). Induction was also performed for full-term pregnancy in 15.1% (53 patients) and for intrahepatic cholestasis of pregnancy (IHCP) in 8.9% (31 patients).

Thus, hypertensive disorders and postdated pregnancies together constituted the leading indications for induction in the study population.

Table 4: Outcome of induction of labour among study patients

Outcome	Number of patients	Percentage (%)
Successful induction	253	72.3
Failed induction	97	27.7
Total	**350**	**100.0**

In the present study, induction of labour was successful in the majority of patients, with 72.3% (253 women) achieving favourable outcomes. However, 27.7% (97 women) experienced failed induction despite standard protocols. This indicates that while induction of labour was largely effective in the study population, nearly one-fourth of the cases did not progress successfully.

Discussion

Induction of labour is an integral component of obstetric care, undertaken to reduce maternal and perinatal risks when continuation of pregnancy is no longer advisable. Advances in induction methods and cervical ripening agents have improved safety and success rates; however, failed induction remains a significant challenge, often resulting in prolonged labour, increased operative interventions, and psychological distress for the mother. These concerns underscore the need to critically evaluate the clinical indications for induction and assess its outcomes in real-world settings. The aim was to assess the common indications for induction of labour and to evaluate its outcomes in terms of successful or failed induction. In the present study a total of 350 eligible patients were included. The age distribution of women undergoing induction of labour in the present study revealed that the majority belonged to the age group of 25–29 years (47.7%), followed by those aged 30–34 years (32.0%). A smaller proportion was observed in the younger age group of 20–24 years (12.9%), while women aged ≥35 years constituted only 7.4% of the study population. This trend is consistent with findings from earlier studies, where women in their late twenties and early thirties were the most common age group undergoing induction. Tanwar et al. reported that 40.36% of induced women were between 26–30 years, while Ejigu et al. noted that 43.3% fell in the 24–28 years range, with a mean age of 25.8 years. [10,11] Similarly, Nour et al. observed that 41.5% of women undergoing induction were 25–29 years old, with an average age of 25.2 years. [12] These findings suggest that women in their mid to late twenties are more likely to undergo induction, possibly due to higher fertility rates, greater parity, and the increased occurrence of pregnancy-related complications in this reproductive age group.

In terms of residence, our study population was predominantly rural, with 78.3% of participants hailing from rural areas compared to 21.7% from urban settings. This finding is in line with the report by Beshir et al., where 64.7% of women undergoing induction resided in rural areas. [13] However, Ejigu et al. documented a reverse trend, with 56% of their patients belonging to urban areas and 44% to rural areas. [11] Such discrepancies across studies may be explained by regional differences in healthcare infrastructure, socioeconomic status, and accessibility of antenatal and intrapartum services. In rural populations, limited access to specialized obstetric care and delayed referrals often necessitate higher rates of labour induction in tertiary care hospitals. This highlights the influence of demographic and healthcare accessibility factors in shaping the population profile of women undergoing induction of labour.

In our cohort, primigravida women comprised 64.6% of those who underwent induction of labour, compared to 35.4% multigravida. This marked predominance of primigravidae aligns with findings from several regional and international studies. For instance, a tertiary care series in India by Yadav et al., reported that 57.78% of induced labor cases were primigravida, with the remainder being multigravida. [14] Similarly, research by Chapagain R et al., from a rural Nepalese hospital found that 53.4% of women undergoing induction were primigravidae. [15] This consistency across settings suggests a broader obstetric trend: primigravida women are more frequently subjected to induction compared to their multigravida counterparts. Several plausible explanations underpin this pattern. First, primigravidae often present for induction due to conditions such as pregnancy-induced hypertension (PIH), which is known to be more prevalent in first-time pregnancies and was a leading indication in our sample. [16] Additionally, first-time mothers may experience longer or more protracted latent phases, leading clinicians to favor timely induction in the interest of maternal and fetal safety.

In the present study, pregnancy-induced hypertension (PIH) emerged as the leading indication for induction of labour, observed in 38.3% of cases. This finding is consistent with contemporary evidence. For instance, Swift et al., in a 20-year population-based cohort, demonstrated that hypertensive disorders and prolonged pregnancy remain the most prevalent triggers for induction in modern obstetric practice. [17] Similarly, Papalia and collegues emphasized that hypertensive disorders, gestational diabetes, and intrahepatic cholestasis of pregnancy (IHCP) are recurrently reported indications across diverse populations. [18] Our findings also resonate with those of Alzharani et al., who identified PIH as the most common indication for induction of labour (34.65%), while Yousef et al. reported a parallel trend, with PIH accounting for 41.7% of inductions. [19,20] Following PIH, postdated pregnancy was the second most common indication, noted in 20.6% of cases. This is comparable to the results of Alzharani et al. (18.9%) and Yousef et al. (18.3%). [19,20] However, regional variations are evident, as Chawla and Singh (2017) reported postdated pregnancy as the single most common indication (61.6%), followed by hypertensive disorders and GDM. [21] Such variability underscores the influence of local clinical protocols, maternal demographics, and healthcare-seeking behaviors on induction practices. Gestational diabetes mellitus (GDM) accounted for 17.1% of cases in our study, closely reflecting trends in global literature. [22] Growing evidence supports induction at 38–39 weeks in women with GDM, particularly when glycemic control is suboptimal or fetal macrosomia is suspected, as this strategy has been shown to reduce cesarean delivery rates and hypertensive complications. [22] Although GDM is not always the leading indication for induction, it represents a clinically significant factor that warrants timely intervention. Full-term pregnancy was identified as an indication in 15.1% of cases. This finding is consistent with broader clinical practice, where induction at or shortly beyond 40 weeks is employed to minimize the risks of post-term gestation, including stillbirth and perinatal morbidity, a recommendation also supported by evidence reviews. [23] Finally, IHCP accounted for 8.9% of inductions in our cohort. Although less frequent compared to PIH and postdatism, IHCP is a critical condition due to its strong association with adverse fetal outcomes such as stillbirth and preterm distress. Its recognition as a clear indication for induction in our study reflects adherence to evidence-based safety protocols in obstetric care.

In our cohort, induction of labour was successful in 72.3% of women, while 27.7% experienced failed induction. This success rate is consistent with both regional and international findings. For example, Alayu et al. reported a failed induction rate of 24.39% (success rate ~75.6%), closely mirroring our results. [24] Similarly, Ayele et al., in a systematic review and meta-analysis of Ethiopian studies, documented a pooled failed induction prevalence of 22.39%, corresponding to a success rate of 77.6%, which is akin to our study. [25] These outcomes, together with our findings, highlight a consistent pattern across diverse clinical settings. Further supporting this trend, Lueth et al. observed a 76% success rate, closely comparable to the 72.3% success achieved in our study. However, it is noteworthy that the failed induction rate in our study was lower than that reported in other studies, including 42.1% by Abdulkadir Y et al. and 43.6% by Devarasetty S et al. [27,28] Such variation may be attributed to differences in induction protocols, methods of cervical ripening, patient selection criteria, and the baseline Bishop scores of study populations. Additionally, regional disparities in healthcare infrastructure, provider expertise, and thresholds for diagnosing failed induction could further explain the higher rates observed in these settings compared to ours.

Conclusion

The findings of the present study demonstrated that induction was most frequently undertaken among women in their prime reproductive years, with a predominance of rural residents and primigravida patients. Hypertensive disorders and postdated pregnancies emerged as the principal indications, reflecting well-recognized contributors to maternal and fetal risk worldwide. The overall success rate

of induction was satisfactory, reaffirming its effectiveness as a cornerstone of obstetric practice, though a subset of women experienced failed induction despite adherence to standard protocols. These observations underscore the importance of individualized case selection, vigilant intrapartum monitoring, and adherence to evidence-based guidelines to maximize the benefits of induction while minimizing associated risks.

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