

# Frequency and Indications of Cesarean Section in Females Undergoing Induction of Labor: A Cross-sectional Study at a Tertiary Care Hospital

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## ABSTRACT

**Background:** Induction of labour is a method to increase the vaginal delivery rate in women in whom the spontaneous onset of labor does not occur or they need to be delivered before the estimated date of delivery. However, in literature, the frequency of cesarean section is reported to be high after induction and not much work has been done especially in local settings. So we conducted this study to attain the current extent of cesarean section after induction and its most common indications. This study determined the frequency of cesarean sections and identified their indications in females undergoing induction of labor.

**Patients and methods:** This descriptive cross-sectional study was done in the Department of Obstetrics and Gynecology, Central Park Teaching Hospital, Lahore from March to September 2021. After IRB approval 100 females were included in the study who were induced with Prostaglandin E2. Informed consent was taken and mode of delivery was observed. In cases of cesarean section, indications were noted in proforma.

**Results:** In this study, 40% of women had cesarean section and 60% underwent normal delivery. The most frequent indication was fetal distress (32.50%) followed by refusal for further dose (25%), failed induction (22.50%) and prolonged or obstructed labor (20%). The frequency of cesarean section was higher in younger primiparous (55%) and obese women (42.5%).

**Conclusion:** This study concluded that the frequency of cesarean section is higher in women undergoing induction of labour. The most frequent indication was fetal distress followed by refusal for further dose and failed induction.

## Keywords:

Cesarean section, Induction, Labor, Failed induction, Fetal distress, Failed induction

## INTRODUCTION

Cesarean Section rates have been on the rise globally with a significant proportion of surgeries being performed on women undergoing induction of labour. In obstetrics, induction of labor is one of the most frequent techniques approximately done in one out of five pregnancies either due to maternal or fetal indication<sup>1</sup> and contributing to an increasing number of caesarean sections. Finding those risk variables that raise the likelihood of a caesarean section has become significantly necessary so that patients can be selected for induction with reduced risk of cesarean section<sup>2</sup>.

It is believed that having labour induction increases the risk of having a caesarean delivery.

Consequently, it would be useful to understand which factors are related to a cesarean delivery after induction of labor<sup>3</sup>.

Rising caesarean delivery rates continue to be a major concern for obstetricians, health policy experts, administrators, and medical professional associations.<sup>4</sup> The impact of elective induction of labour at term on the increasing caesarean section rate is unclear.<sup>5</sup> There is a little information on caesarean section rates, its causes, and health outcomes among tribal populations in Asian countries, even though that is a part of complete obstetric and newborn care for lowering maternal or neonatal mortality.<sup>6</sup>

Numerous documented factors make caesarean sections medically essential including fetal distress, failed progress of labour, failed descent of fetal head and repeat caesarean section. However, there has been a rise in maternal request in Pakistan as a sign that induction of labour should be performed with careful selection.<sup>7</sup>

It has been reported in a study that the frequency of cesarean section was 19% among females who underwent induction of labor. The most common

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indication of the cesarean section after induction of labor was fetal distress (29.3%) and failed induction (22.2%).<sup>8</sup> Another study found that failed induction occurred in 33.3% of cases who underwent cesarean section after induction of labour, while fetal distress was noted in 43% cases.<sup>9</sup>

This study will determine the frequency and indications of the cesarean section after induction of labor in our local settings to develop safe practicing guidelines for induction of labour and reduce cesarean sections and its associated complications.

## PATIENTS AND METHODS

This Descriptive cross-sectional study was conducted from 15<sup>th</sup> March to 15<sup>th</sup> September 2021 in Obstetrics and Gynecology Department, Central Park Teaching Hospital, Lahore. A sample size of 100 females was determined based on a 95% confidence interval, a 5% margin of error, and a permissible limit of 10% derived from the outcome reported by the World Health Organization (2021).

Females of age 18-40 years, parity<5, presenting at gestational age >37 weeks (by LMP) and were admitted for induction of labor were included in the study. Females with placenta previa, accreta, abruption, multiple fetuses, fetal anomaly or intrauterine fetal death (on ultrasound) and Females with previous cesarean section, hypertension (BP≥140/90mmHg) or diabetes were excluded.

Informed consent was obtained and demographic details (age, gestational age, parity, BMI) were noted. BMI was calculated using pre-pregnancy weight. All the participants were observed for mode of delivery who were induced with Prostaglandin E2. In the case of cesarean section, indications e.g. failed induction, fetal distress, prolonged or obstructed labor, refusal for further dose (or any other indication) were noted.

Data was entered and analyzed through SPSS version 21. Quantitative variables like age, gestational age and BMI was calculated as mean and SD. Cesarean section and indication of cesarean section were presented as frequency and percentages. Data was stratified with respect to age, gestational age, parity and BMI. Post-stratification, chi-square test was applied to compare frequency of cesarean section and indications in stratified groups. A p-values of 0.05 were considered as significant.

## RESULTS

Among all the participants, the mean age was around 31-34 years, the mean gestational age was

approximately 37-38 weeks, while BMI was between 26-30 kg/m<sup>2</sup> (Table 1).

Out of 100 enrolled participants, 40 women underwent cesarean section and 60 underwent normal vaginal delivery. The most frequent indication for cesarean section was fetal distress (32.50%) followed by refusal for further dose (25%), failed induction (22.50%), and the least was prolonged or obstructed labor (20%) (Table 1). No significant association was seen between the age of the woman and the mode of delivery. However, the highest frequency of cesarean section was observed in the age group 31-36 years (p-value=0.847). Gestational age and parity had no significant impact on the mode of delivery (p-value=0.841, Table 2).

However, a higher cesarean section rate was seen among primiparous women. i.e. (p-value=0.213). The larger number of cesarean sections was seen among women who were obese. No significant association was seen between BMI and mode of delivery (p-value=0.078, Table 2).

Age of women had no significant impact on indications for cesarean section i.e. (p-value=0.119). Gestational age had significant impact on indications for cesarean section. In almost all indications' frequency was significantly higher for women with gestational age 37-38 weeks. i.e. (p-value<0.001). Frequency of indications for cesarean section was significantly higher among primiparous women as compared to multiparous women (p-value=0.003, Table 3).

The highest frequency of fetal distress was seen in women who were obese. However, refusal for more doses was higher among women who were overweight. Indication for cesarean section showed a significant difference in relation to the body mass index of women.

**Table 1:** Distribution of Age, Gestational Age, BMI, Parity, Mode of delivery and Indication of Cesarean

Characteristics	Frequency (%) N =100
Age (years, mean ± SD)	31.28 ± 3.72
Gestational Age (mean ± SD)	37.59 ± 0.84
BMI (mean ± SD)	26.48 ± 4.62
Parity	
0	20 (20%)
1	46 (46%)
2	21 (21%)
3	13 (13%)
Mode of delivery	
Cesarean section	40 (40%)
Normal	60 (60%)
Indication for cesarean	
Prolonged or obstructed labor	8 (20%)
Failed Induction	9 (22.5%)
Refusal of further dose	10 (25%)
Fetal distress	13 (32.50%)

**Table 2: Mode of delivery in relation to age, gestational age and BMI**

Characteristics	Cesarean section	Normal delivery	p-value
Age groups			
24-30 years	21 (52.5%)	28 (46.7%)	0.84
31-36 years	15 (27.5%)	25 (41.7%)	
>36 years	4 (10%)	7 (11.7%)	
Gestational Age			
37-38 weeks	32 (80%)	47 (78.3%)	0.79
39-40 Weeks	8 (20%)	13 (21.7%)	
BMI			
Normal	9 (22.5%)	24 (40%)	0.07
Overweight	14 (35%)	22 (36.7%)	
Obese	17 (42.5%)	14 (23.3%)	

\*p-value less than or equal to 0.05 was considered as significant

**Table 3: Indication for cesarean section in relation to age, gestational age, and BMI**

Characteristics	Prolong labor (n = 8)	Failed labor (n = 9)	Refusal for dose (n = 10)	Fetal distress (n = 13)	p-value (0.05%)
Age groups					
24-30	4 (50%)	2 (22.2%)	6 (60%)	9 (69.2%)	0.119
31-36	4 (50%)	4 (44.4%)	3 (30%)	4 (30.8%)	
>36	0	3 (33.3%)	1 (10%)	0	
Gestational age (weeks)					
37-38	2 (25%)	8 (88.9%)	9 (90%)	13 (100%)	0.001
39-40	6 (75%)	1 (11.1%)	1 (10%)	0	
BMI					
Normal	1 (12.5%)	4 (44.4%)	3 (30%)	1 (7.7%)	0.013
Overweight	1 (12.5%)	4 (44.4%)	6 (60%)	3 (23.1%)	
Obese	6 (75%)	1 (11.1%)	1 (10%)	9 (69.2%)	

## DISCUSSION

In this study, 40% of women had cesarean section and 60% delivered vaginally. The most frequent indication for cesarean section was fetal distress (32.50%) followed by refusal for further dose (25%), failed induction (22.50%), and prolonged or obstructed labor. The frequency of cesarean section was higher in younger age groups, females with gestational 37-38 weeks (80%), primiparous females (55%) and women who were obese (42.5%). Age (higher cesarean section rate among younger age group: 52.5%) and body mass index (higher cesarean section rate among obese women: 42.5%) had no significant impact on the type of delivery.

Foyez Ahmed et al. reported that the frequency of cesarean section was 24% among females in Bangladesh and the common indication of cesarean section were fetal malpresentation (28.29%), failed progress of labor (14.38%) and 9.3% on maternal wish as compared to current pregnancy that found the fetal distress as most common cause (13%) while cesarean section on maternal wish was in line (10%).<sup>10</sup>

Verhoeven CJ in his study found that failed induction occurred in 33.3% cases who underwent cesarean section after induction of labor, while fetal distress was noted in 43% cases. However fetal distress in this study was 32.50% which was lower as that of reported by Verhoeven CJ. Gomathy Ethiraj in his study

reported the cesarean section rate as 24.1% among women.<sup>11</sup>

However frequency of cesarean section in this study was a bit higher. Another local study from Pakistan reported higher cesarean section rate as 45.6% after induction of labor as that of this study<sup>12</sup>. Another study from Ethiopia reported cesarean section rate as 28.1% among women who underwent induction of labor. In same study failed induction (64.5%) and fetal distress (41.1%) were the most frequent factors leading to caesarean section.<sup>13</sup>

However, frequency of these both factors in this study was lower. This difference was due to difference in sample size, other methodological considerations or difference in definition of induction adopted by different studies.

Prolonged labor is among the factors contributed for the rising cesarean section rate in other studies, with frequency as high as 30.0%.<sup>14</sup> However, in this study only 20% of the women underwent cesarean section due to prolonged labor. Active treatment of the second stage of labor with augmentation was found to be helpful for controlling prolonged labor without resulting in a severe birth asphyxia.<sup>3,15</sup> But, over-reporting of prolonged labor as indication of cesarean section could be avoided if the failed induction of the labor is separately reported.

However, if the unsuccessful attempt to induce labour is reported separately, over reporting of protracted labour as a sign of caesarean delivery could be avoided.

The prevalence of caesarean sections has increased during the last few decades. Evidence-based guidelines on how to treat issues like abnormal foetal positioning, significant placental abruption, placenta previa, and prolapsed cord have contributed to this increase. However, it is primarily a result of an increase in the number of women who appear with uterine scars during childbirth, deliver their babies at older ages, or require surgical delivery. Induction of labour appears to have contributed to current trends in Cesarean section rates, despite the fact that obstetric interventions have become more common.<sup>16</sup>

Obstetric interventions are found suitable when the advantages of an early delivery outweigh those of a caesarean section. Without any such established indicators, there is evidence of an increase in the frequency of labour inductions. Regarding the geographical region and hospital protocols for inducing patients, there is a lot of variation.<sup>17</sup>

## CONCLUSION

This study concluded that cesarean section is significantly higher in women undergoing induction of labour, especially in Primigravida, age between 37-38 weeks and obesity were among the factors that lead to cesarean sections along with other factors such as fetal distress and refusal for further induction. It is highly recommended that there should be regular audits of cesarean section rates and indications and national guidelines for induction of labour and cesarean sections should be developed and enforced. There should be public awareness campaigns on safe motherhood and childbirth options to avoid cesarean section due to refusal for trial of labour. Prospective cohort studies are needed to investigate the causal relationship between induction of labour and the caesarian section.

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