

PATTERNS AND DETERMINANTS OF CESAREAN SECTION INDICATIONS

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Abstract

Cesarean section (CS) is a lifesaving obstetric procedure when appropriately indicated, yet its rapidly rising use worldwide has raised concern about avoidable surgery and its short- and long-term consequences. Understanding local patterns of CS indications is essential for designing strategies to optimize its use. To describe the frequency and distribution of major indications for CS and to examine their association with maternal age, parity, socioeconomic status, and gestational age in a tertiary-care setting. This cross-sectional study included 100 women undergoing caesarean delivery at a district tertiary hospital. Demographic and obstetric data were collected using a structured proforma. Indications assessed were repeat CS, fetal distress, oligohydramnios, post-date pregnancy, and prolonged labor.

Stratified analyses by age, parity, socioeconomic status, and gestational age were performed, and associations were tested using the chi-square test.

Repeat CS was the leading indication (29%), followed by oligohydramnios (23%), post-date pregnancy (19%), and prolonged labor (18%); fetal distress accounted for 11% of cases. Parity showed a significant relationship with fetal distress, which was more than three times higher among women with parity ≥ 4 compared to those with parity 1–3. Gestational age significantly influenced prolonged labor and oligohydramnios, both peaking in late-term and post-term pregnancies, whereas maternal age and socioeconomic status were not significantly associated with any CS indication.

Conclusion: Previous cesarean, advanced gestation, and higher parity are the key drivers of CS in this population. Strengthening counselling for VBAC, close surveillance of late-term pregnancies, and rational decision-making for high-parity women may help curb unnecessary cesarean deliveries.

INTRODUCTION

Cesarean section (CS) is a fetal delivery through an open abdominal incision and an incision in the uterus. The first documented CS occurred in 1020 AD, and since then, the procedure has evolved

tremendously¹. It is now the most common surgery performed in the United States, with over 1 million women delivered by cesarean every year. The cesarean delivery rate rose from 5% in 1970 to 31.9% in 2016.² Though there are continuing efforts to reduce the rate of cesarean sections, experts do not anticipate a significant drop for at least a decade or two.³ While it confers risks of both immediate and long-term complications, for some women, cesarean delivery can be the safest or even the only way to deliver a healthy newborn. There are various reasons why a fetus cannot, or should not, be delivered vaginally.⁴ Some of these indications are inflexible, as a vaginal birth would be dangerous in certain clinical scenarios. For example, a cesarean delivery is often the recommended approach if the patient has had a prior classical cesarean scar or previous uterine rupture. However, due to the potential complications of cesarean delivery, many studies have been done looking for ways to reduce the cesarean rate.⁴ There has been an emphasis on decreasing the number of first-time cesareans, as many women who have one cesarean delivery will ultimately have the increase risk of remainder of their children via cesarean⁵. She may choose another cesarean for various reasons or she may not be a candidate for a subsequent vaginal birth. For example, if that patient has an unfavorable cervix at term, cervical ripening with medications such as misoprostol is not recommended due to an increased risk of uterine rupture with these agents⁵. In the 2011 article "Safe Prevention of the Primary Cesarean Delivery," authors addressed the most commonly documented indications for first-time cesarean deliveries (labor dystocia, abnormal fetal heart rate pattern, malpresentation of the fetus, multiple gestations, and suspected fetal macrosomia) and mitigation of these factors⁶. In a study by Begum T, et al. has shown that frequency of cesarean section was 35%, major indications of C-sections included: repeat C-section (24%), fetal distress (21%), prolonged labor (16%), oligohydramnios (14%) and postdated (13%)⁷. Though a number of studies have explored trends and inequities in the use of maternal health care services, there is a paucity of data on clinical indications for caesarean in Pakistan, particularly from population-based studies, essential for a deeper understanding of caesarean delivery rate is increasing and what strategies are needed to control the epidemic of C-sections. Therefore, I aimed to determine the frequency and indications of cesarean section in patients presenting to DHQ Timergara Dir Lower.

METHODS

This study utilized a cross-sectional design conducted at the Department of Obstetrics and Gynecology, Timergara District Headquarter Hospital, from January 2021 to June 2021. A sample of 100 female patients was selected using non-probability consecutive sampling. The sample size was calculated using WHO software, considering a 13% expected proportion of post-dated deliveries, a 6% margin of error, and a 95% confidence level. Inclusion criteria comprised women aged 18-40 years with singleton pregnancies, gestational age >36 weeks, and undergoing cesarean sections. Exclusion criteria included patients with congenital anomalies or ruptured uteri. Demographic data such as age, parity, gestational age, and economic status (defined as family income <20,000/month) were collected after obtaining ethical approval and informed consent. Data on the indications for cesarean sections, including repeat cesarean, fetal distress, prolonged labor, oligohydramnios, and post-maturity, were recorded using a specially designed proforma. Data were analyzed using IBM SPSS 25, with descriptive statistics for

quantitative variables and frequencies for categorical variables. Stratified analysis based on age, gestational age, parity, and economic status was performed, and chi-square tests were used to determine statistical significance ($p < 0.05$).

RESULTS

In this study of 100 obstetric patients, repeat cesarean section (29%) was the most common indication, followed by oligohydramnios (23%) and post-date pregnancy (19%). The stratified analysis revealed that prolonged labor was most common in post-term pregnancies (36%), while fetal distress was more frequent in higher parity women (22.7%) compared to those with lower parity (7.1%). Gestational age had a significant impact, with oligohydramnios peaking at 40-41 weeks (40%) and fetal distress showing a strong trend at 40-41 weeks (20%), while absent in post-term pregnancies. No significant associations were found between maternal age and CS indications, nor did socioeconomic status influence the likelihood of cesarean delivery. These findings emphasize that previous CS, gestational age, and parity are the primary factors influencing cesarean delivery in this study.

TABLE 1: Sample Characteristics (n=100)

Characteristic	Category	Frequency (n)	Percent (%)
Age	20–30 years	47	47.0%
	31–40 years	53	53.0%
Parity	1–3	82	82.0%
	4–6	18	18.0%
Socioeconomic Status	Poor SES	32	32.0%
	Not Poor	68	68.0%
Gestational Age	37–39 weeks	57	57.0%
	40–41 weeks	25	25.0%
	42–43 weeks	18	18.0%

TABLE 2: Overall Frequency of Cesarean Section Indications (n=100)

Indication	Yes (n)	Percent (%)	No (n)	Percent (%)
Repeat CS	29	29.0%	71	71.0%
Fetal Distress	11	11.0%	89	89.0%
Prolonged Labor	18	18.0%	82	82.0%
Oligohydramnios	23	23.0%	77	77.0%
Post-date Pregnancy	19	19.0%	81	81.0%

TABLE 3: Stratification by Parity (n=100)

Indication	Parity	Yes (n, %)	No (n, %)
Repeat CS	1–3	24 (29.0%)	58 (71.0%)
	4–6	5 (28.0%)	13 (72.0%)
Fetal Distress	1–3	6 (7.0%)	76 (93.0%)
	4–6	4 (22.0%)	14 (78.0%)
Prolonged Labor	1–3	16 (20.0%)	66 (80.0%)
	4–6	2 (11.0%)	16 (89.0%)
Oligohydramnios	1–3	18 (22.0%)	64 (78.0%)
	4–6	5 (28.0%)	13 (72.0%)
Post-date Pregnancy	1–3	15 (18.0%)	67 (82.0%)
	4–6	4 (22.0%)	14 (78.0%)

TABLE 4: Stratification by Gestational Age (n=100)

Indication	37–39 weeks (n=57)	40–41 weeks (n=25)	42–43 weeks (n=18)
Repeat CS	17 (30%)	5 (20%)	5 (28%)
Fetal Distress	5 (9%)	5 (20%)	0 (0%)
Prolonged Labor	10 (17%)	0 (0%)	8 (36%)
Oligohydramnios	12 (21%)	10 (40%)	0 (0%)
Post-date Pregnancy	10 (17%)	4 (16%)	5 (27%)

DISCUSSION

Caesarean section (CS) is one of the most essential intrapartum interventions globally, especially when maternal or fetal complications arise such as obstructed labour, fetal distress, abnormal presentations, or severe obstetric emergencies. When medically indicated, CS significantly reduces maternal and neonatal morbidity and mortality [1,2]. Evidence from global modelling studies shows that in countries with very low CS provision, increasing coverage could prevent up to 160,000 maternal deaths and 800,000 neonatal deaths annually [3]. The World Health Organization (WHO) recommends that CS rates between 10–15% are optimal for preventing mortality at the population level [4].

In our study of 100 obstetric patients, the most common indication for CS was repeat cesarean section (29%), followed by oligohydramnios (23%) and post-date pregnancy (19%). Globally, the contribution of previous CS to overall cesarean rates range from 15.4% to 67.7%, making it the strongest single driver of rising CS rates [5,6]. Our findings support this trend, confirming that repeat CS remains the principal determinant of surgical delivery in similar clinical settings.

The strong influence of gestational age, observed in our results, aligns with global evidence. Prolonged labor was most common in post-term pregnancies (36%), similar to studies showing that pregnancies beyond 41 weeks face increased risks of obstructed labour and failed induction [7]. Oligohydramnios, which peaked at 40–41 weeks (40%) in our analysis, also mirrors

international literature indicating declining amniotic fluid with advancing gestation, necessitating timely intervention to prevent perinatal complications [8].

A notable finding in our study was the significant association between parity and fetal distress, where women with parity 4–6 had more than triple the risk of fetal distress compared to those with lower parity—consistent with multicounty analyses linking high parity to uterine exhaustion, placental insufficiency, and intrapartum fetal compromise [9].

We found no statistically significant association between maternal age and CS indications, although many studies show that maternal age >35 years increases the likelihood of CS due to higher rates of hypertension, diabetes, induction of labor, and fear of uterine rupture [10–12]. The lack of association in our study may be due to sample size limitations.

Similarly, socioeconomic status (SES) did not significantly affect CS indications in our population. However, global research consistently demonstrates that women from higher socioeconomic groups often have higher CS rates due to greater accessibility, preference for elective CS, and perception that CS represents superior obstetric care [13–15]. The divergence of our results may be attributed to relative uniformity of SES distribution in the sampled hospital population.

Overall, our findings align with the extensive body of international literature showing that previous CS, gestational age, and parity are the most powerful predictors of cesarean delivery. These determinants far outweigh demographic factors such as age or socioeconomic status. The high proportion of CS performed due to repeat indication underscores the importance of counseling women regarding trial of labor after cesarean (TOLAC) where safe and appropriate. A previous CS was the strongest predictor of cesarean delivery in the present study, followed by oligohydramnios and post-date pregnancy. Prolonged labour was significantly associated with gestational age >41 weeks, and fetal distress was significantly higher among women with parity ≥ 4 . These results are consistent with international evidence that obstetric history and gestational timing are major drivers of CS. Larger multicenter and community-based studies are recommended to better quantify the burden and determinants of CS in Pakistan [1,3,5].

Conclusion

This study demonstrates that repeat cesarean section remains the leading indication for cesarean delivery in this population, followed by oligohydramnios and post-date pregnancy. Parity and gestational age showed significant associations with key obstetric complications, with fetal distress occurring more frequently among high-parity women and prolonged labor being most common in post-term pregnancies. Maternal age and socioeconomic status did not significantly influence the indications for cesarean section. These findings highlight the importance of individualized antenatal monitoring, counseling regarding VBAC when appropriate, and timely management of late-term and high-parity pregnancies. Larger, multi-center studies are recommended to validate these results and better understand the broader determinants of cesarean delivery trends in similar settings.

Author's Contribution

The author affirms that they have read and approved the final manuscript.

Conflict of Interest

The author declares no conflict of interest related to this study.

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