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Cesarean section in postdated pregnancies: Evidence from a hospital-based cross-sectional study in Bangladesh

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Abstract

Background: Postdated pregnancies pose maternal and fetal risks, often leading to increased rates of cesarean section (CS). Cesarean sections are performed without medical necessity in some cases, thereby increasing both risks and healthcare costs. The study aimed to assess the indications and fetomaternal outcomes of CS in postdated pregnancies.

Methodology: This cross-sectional study was carried out at a specialized hospital in Dhaka. It analyzed 59 postdated pregnancies undergoing cesarean section from May to December 2020. Fetomaternal characteristics and outcomes were descriptively analyzed, and cases were also categorized using the Robson Classification and analyzed descriptively to understand cesarean section rates among different obstetric groups and to identify intervention areas.

Results: Most women were 20–30 years old (72.9%), with 22% exceeding 42 weeks gestation. 72% of postdated primigravida had CS, comprising 64.4% of all cases. Half of the women received antenatal care (ANC) irregularly. Maternal outcomes were mostly uneventful (83%); while 17% experienced postpartum hemorrhage. Of the babies, 15.3% had low birth weight (<2.5 kg), and 23.7% had low APGAR scores at 1 minute. Major CS indications included fetal distress (67.8%), failed induction (16.9%), and failure to labour progress (15.3%). The Robson Classification system found Group 2 accounted for 64% of all CSs. Higher cesarean section rates were also observed within various groups, particularly in Groups 5 and 6.

Conclusion: This study found a higher cesarean section rate among postdated primigravida, with fetal distress being the most common indication. Using the Robson classification could reduce unnecessary cesarean deliveries in this group.

Keywords: Postdated Pregnancy; Robson Classification; Unnecessary Cesarean Section; Fetomaternal Outcome.

1. Introduction

Postdated pregnancy, often referred to as "late-term" pregnancy, extends beyond the expected date of delivery, commonly exceeding 40 weeks (>280 days) from the first day of the last menstrual period. Conversely, post-term pregnancy is a distinct term, indicating pregnancy that persists beyond 42 weeks (>294 days) of gestation [1]. The prevalence of postdated pregnancy varies among different populations, ranging from 3% to 17% of all pregnancies [2,3].

The exact causes of postdated pregnancy remain largely unknown. However, there are some recognized associated factors, including incorrect calculation of the Expected Date of Delivery (EDD), hereditary influences, maternal factors

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such as primiparity, history of prolonged pregnancy, sedentary habit, advanced maternal age (elderly multiparae), and fetal factors like congenital anomalies [4].

Postdated pregnancy carries increased maternal and fetal risks, including placental insufficiency, fetal hypoxia, fetal distress, macrosomia, birth trauma, and an increased risk of stillbirth. These pregnancies often result in an increased likelihood of induction, instrumental deliveries, and cesarean sections [4]. Cesarean section is vital for saving lives in situations where vaginal delivery is at risk, such as during prolonged or obstructed labour, multiple pregnancies, and fetal distress. However, they carry inherent risks like other surgical procedures. Globally, cesarean section rates have risen to 21%, a significant increase from around 7% in 1990, exceeding the World Health Organization's recommended ideal rate of 10%–15% [5]. The Bangladesh Demographic and Health Survey 2022 has also reported a sharp increase in Bangladesh's cesarean section rates, rising from 17.7% in 2012 to 45% in 2022. Cesarean sections are often performed without medical necessity, increasing the risk of maternal and fetal outcomes and imposing financial burdens on families and health systems [6, 7]. The rising rates emphasize the need for a thorough assessment of the indications for cesarean section in different clinical scenarios.

A critical aspect of managing postdated pregnancies involves determining the appropriate timing for cesarean sections. The decision to perform a cesarean section is multifaceted, influenced by various maternal and fetal factors. Despite the rising rates of cesarean sections globally, including in Bangladesh, understanding the indications for cesarean sections in the group of postdated pregnancies remains limited. A thorough review of cesarean sections in postdated pregnancies can help in identifying situations where surgical intervention could be avoided, thereby reducing associated risks and healthcare costs. This study aimed to provide a deeper understanding of these indications for healthcare providers to make informed decisions and minimize unnecessary cesarean sections, thus increasing the well-being of both mothers and babies in postdated pregnancies.

2. Methods

This observational cross-sectional study was conducted at the Center for Woman and Child Health (CWCH) in Dhaka, a non-profit 100-bed multidisciplinary hospital specializing in obstetric and gynecological care, training, and research. The hospital emphasizes the judicious use of cesarean section, offers Trial of Labour After Cesarean (TOLAC), and conducts Cardiotocography (CTG) for all patients upon admission. During the study period, the obstetrics and gynecology department of the hospital was managed by 11 consultants, 13 medical officers, and 20 nursing staff. Data were collected from various hospital records, including indoor registers, patient admission sheets, follow-up sheets, operation registers, and notes. Gestational age was determined either from the date of the last menstrual period (LMP) using Naegle's rule for regular cycles or from the 1st-trimester ultrasonography for those with irregular cycles or the exact LMP was unavailable.

Among 1,567 obstetric cases recorded between May and December 2020, a total of 112 were identified as postdated pregnancies, of which 59 were delivered by cesarean section and included in the study. We processed and analyzed the data descriptively using the Statistical Package for Social Science (SPSS) computer software.

3. Results

A total of 59 women with postdated pregnancies who underwent cesarean section were examined. Women's characteristics are outlined in Table 1. The mean age was 22.7 years (SD=4.5). Nearly three-fourths (72.9%) of the women were 20 to 30 years old. Notably, 22.0% had gestational ages beyond 42 weeks, indicating a significant number of post-term pregnancies. Of the 59 cesarean section cases, 64.4% were primiparous. On the other hand, 72% of primiparous postdated women underwent cesarean section. Half of the mothers (50.8%) received irregular antenatal care, indicating potential gaps in healthcare access. A small proportion of women (3.4%) had a bad obstetric history. Regarding maternal outcomes, the majority (83%) experienced uneventful deliveries, and 17% encountered postpartum hemorrhage (PPH).

Table 1 Maternal Characteristics and Outcome

Parameters	No. of postdated women (n=112)	No. of CS (%) (n=59)
Maternal age (years)		
<20	15	12 (20.3 %)
20 to 30	83	43 (72.9 %)
>30	14	4 (6.8%)
Mean (SD)	24 years (7.0)	22.7 years (4.5)
Gestational age (weeks)		
40W to 40W6D	49	28 (47.5 %)
41W to 41W6D	39	18 (30.5 %)
≥42W	24	13 (22.0 %)
Gravidity		
Primigravida	53	38 (64.4 %)
Multigravida	59	21 (35.6 %)
Antenatal care		
Regular	60	29 (49.2 %)
Irregular	52	30 (50.8 %)
Any bad obstetric history		
Yes	11	2 (3.4 %)
No	101	57 (96.6 %)
Maternal outcome		
Uneventful	88	49 (83.0 %)
Postpartum hemorrhage	15	10 (17.0 %)
Perineal tear	8	0 (0.0 %)
Death	1	0 (0.0 %)

Table 2 gives an overview of neonatal characteristics and outcomes. Of the babies, 15.3% had low birth weight (<2.5 kg), while 84.7% had birth weights between 2.5 and 4.0 kg. APGAR scores below 7 at 1 minute and 5 minutes after birth were observed in 23.7% and 5.1% of the babies, respectively. Regarding neonatal outcomes, the majority (78%) were healthy, 17% were sick, and congenital anomalies, stillbirth, and neonatal death each accounted for one case (1.7%).

Table 2 Neonatal Characteristics and Outcome (n=59)

Parameters	Frequency	Percentage
Birth weight (kg)		
<2.5	9	15.3
2.5-4.0	50	84.7
APGAR score at 1 minute		
<7	14	23.7

≥7	45	76.3
APGAR score at 5 minutes		
<7	3	5.1
≥7	56	94.9
Outcome		
Healthy	46	78.0
Sick baby	10	16.9
Stillbirth	1	1.7
Neonatal death	1	1.7
Congenital Anomaly	1	1.7

Table 3 presents the indications for cesarean sections in postdated pregnancies. Fetal distress was the primary indication (67.8%), followed by failed induction (16.9%), failure to progress in labour (15.3%), previous cesarean sections (13.6%), intrauterine growth retardation (IUGR) (10.2%). Prolonged labour and preeclampsia/eclampsia (each 6.8%), and the maternal desire and valuable pregnancy each representing 5.1%.

Table 3 Indications of Cesarean Section (n=59)

Parameters	Frequency	Percentage
Fetal distress	40	67.8
Failed induction	10	16.9
Failure to progress in labour	9	15.3
Previous cesarean section	8	13.6
IUGR	6	10.2
Prolonged labour	4	6.8
Pre-eclampsia/ eclampsia	4	6.8
Maternal desire	3	5.1
Valuable pregnancy	3	5.1

*Total number varies due to multiple responses

Table 4 demonstrates the distribution of postdated women undergoing cesarean sections categorized by the Robson classification. Groups 2a and 2b collectively contributed the most cesarean sections (64%), followed by Group 5 (14%) and other groups with smaller numbers. Notably, all postdated women in Groups 2b, 4b, 6, and 7 underwent cesarean section, while a significant proportion in Groups 2a and 5 also underwent the procedure (68% and 73%, respectively).

Table 4 Distribution of Cesarean Sections According to the Robson Classification

Robson Group	Description	No. of postdated women in group (n=112)	No. of postdated women delivered by CS (Percentage) (n=59)
1	Nulliparous, single cephalic, ≥37 weeks, spontaneous labour	15 (13%)	1 (7%)
2a	Nulliparous, single cephalic, ≥37 weeks, labour induced	28 (25%)	19 (68%)

2b	Nulliparous, single, cephalic ≥ 37 weeks, pre-labour CS	19 (17%)	19 (100%)
3	Multiparous, without a previous CS, single cephalic, ≥ 37 weeks, spontaneous labour	20 (18%)	0 (0%)
4a	Multiparous, without a previous CS, single cephalic, ≥ 37 weeks, labour induced	11 (10%)	4 (36%)
4b	Multiparous, without a previous CS, single cephalic, ≥ 37 weeks, pre-labour CS	4 (4%)	4 (100%)
5	All multiparous with at least one previous CS, with a single cephalic, ≥ 37 weeks	11 (10%)	8 (73%)
6	Nulliparous, breeches	3 (3%)	3 (100%)
7	Multiparous, single breech including women with previous CS(s)	1 (1%)	1 (100%)
8	Multiple pregnancies including women with previous CS(s)	0 (0%)	0 (0%)
9	Single pregnancy with a transverse or oblique lie, including women with previous CS(s)	0 (0%)	0 (0%)
10	Single cephalic, < 37 weeks gestation, including women with previous CS(s)	0 (0%)	0 (0%)

4. Discussion

This study revealed that a significant portion (72.9%) of postdated women who underwent cesarean section were in the age group of 20-30 years. This finding closely matches with some previous studies conducted in Bangladesh and nearby regions, where the percentages have varied between 59% to 77% [8-11]. Studies on postdated pregnancies, irrespective of cesarean section status, also showed percentages in this age group ranging from 69.05% to 85% [12-14]. However, some studies reported increased cesarean section rates with increasing maternal age [15-17], which contrasts our findings. This difference may be due to the small sample size of our study compared to others. Furthermore, due to the location of the hospital, most of the women seeking maternity care were underage, with a significant number working in the ready-made garment industry.

In our study, 72% of postdated primigravida women underwent cesarean section, covering 64% of all cesarean sections. In various studies, cesarean section rates among primigravida women ranged from 19% to 37%, reflecting variability influenced by location and healthcare practices [9,10,18,19,20]. The significantly increased cesarean section rate among primigravida women in our study can be attributed to various factors, including obstetric conditions, such as unfavorable cervix, failed induction, and fetal distress, as well as maternal preferences for elective cesarean delivery. Moreover, we also found that nearly half of the women received Antenatal care (ANC) irregularly, suggesting potential gaps in access to ANC which may influence decisions for cesarean delivery (Table 1). It is also important to consider that the ongoing Coronavirus disease (COVID-19) pandemic during the study period may have influenced healthcare-seeking behavior and access to antenatal services.

In some other studies on postdated pregnancies, major maternal outcomes included diverse rates of prolonged labour (ranging from 10.71% to 68.27%) and postpartum hemorrhage (ranging from 5.95% to 40.94%), as well as other complications such as urinary tract infection, perineal, para-urethral, cervical tear, wound infection, and shoulder dystocia have also been reported [8,13,14,21,22]. Our study on postdated women undergoing cesarean section showed

mostly uneventful outcomes (83%), with notable occurrences of postpartum hemorrhage (17%). World Health Organization (WHO) stated that cesarean sections can lead to severe complications, disability, and even death, particularly in settings where safe surgery and effective management of surgical complications are not available (WHO statement, 2015). The American College of Obstetricians and Gynecologists (ACOG) reported that cesarean sections significantly increase pregnancy-related fatality risks when compared to vaginal deliveries. However, the low morbidity rate found in our study suggests that cesarean sections can reduce potential complications if a hospital has a skilled team capable of managing complications such as macrosomia, placental insufficiency, and uterine rupture.

This study found that while most (84.7%) of neonates had birth weights within the healthy range, a significant proportion were low-birth-weight (15.3%). On the APGAR score, at 1-minute after birth, 23.7% of neonates scored below 7, indicating a need for immediate medical interventions for a substantial fraction of newborns immediately after birth. However, at 5 minutes after birth, the majority (94.9%) of neonates had APGAR scores of 7 or higher, indicating the effective resuscitative measures taken by the hospital. In some studies on postdated pregnancies, major neonatal complications included varying rates of meconium aspiration syndrome (MAS) ranging from 7% to 70.12%, respiratory distress syndrome (RDS) from 3.57% to 64.93%, and neonatal asphyxia from 9.52% to 32.46% while minor findings such as intrauterine fetal death (IUID), hyperbilirubinemia, and neonatal death were also prevalent [8,14,21], all posing challenges in managing postdated pregnancies. In our study focused on postdated women undergoing cesarean section, the majority (78%) of neonates were healthy. However, a small yet notable percentage of cases (22%) experienced adverse events, suggesting the necessity for comprehensive obstetric and early neonatal care.

In some studies, conducted on postdated pregnancies in India and Bangladesh, major indications for cesarean section included fetal distress (9.1%-48.15%), failed induction (16.9%-75.8%), non-progression of labour (NPOL) (4%-25.3%), and previous cesarean section (10%-19.17%) [8,13,14,21, 23, 24]. Other findings such as cephalopelvic disproportion (CPD) and obstructed labour (10%-31.25%), and oligohydramnios (6.85%-22%), were also observed. In our study on postdated women delivered by cesarean section, we found that fetal distress was the major indication (67.8%), followed by failed induction (16.9%), NPOL (15.3%), and previous cesarean section (13.6%). The higher incidence of fetal distress in our study could be due to a significant proportion of women (22%) being in the gestational age group of ≥ 42 weeks, where fetal distress is more prone to occur due to placental insufficiency. Additionally, home trials during the COVID-19 pandemic could have contributed to this situation. These findings emphasize the importance of early recognition and management of fetal distress. The indication 'Previous cesarean section' was relatively low in our hospital, possibly due to the hospital's practice of TOLAC. Other indications noted in this study, such as IUGR, prolonged labour, eclampsia, maternal desire, and valuable pregnancy highlight the complexity of managing postdated pregnancies and the need for focused approaches to care.

In this study, we categorized postdated women who had cesarean sections according to the Robson Classification system also known as the Ten-Group Classification System. Although the Robson Classification applies to all women giving birth in a hospital, we specifically used it for postdated women to identify the groups that contribute most to cesarean section rates. Among the 59 cases, Group 2 (nulliparous with a singleton pregnancy in cephalic presentation at term) accounted for the highest proportions of overall cesarean section rates (64%). Analyzing the proportion of cesarean sections within each group, we found that in Groups 2b, 4b, 6, and 7, all postdated women underwent cesarean sections. Additionally, a significant portion of postdated cases in Groups 5 and 2a also underwent cesarean sections. These findings suggest that a significant number of cesarean sections performed in postdated women, particularly in Group 2b, 4b, and 5, could be avoided by implementing various interventions. These may include the appropriate selection of mothers for labor induction, improved induction success through effective monitoring and labor support, comprehensive counseling to reduce cesarean sections upon maternal request, and encouragement for the trial of labor whenever feasible, as well as organizational support to foster a supportive environment for promoting natural births and reducing cesarean section rates [25].

Our study had some limitations. It was conducted in a single hospital with a small sample; thus, the results should be interpreted with caution to understand obstetric practice across different settings. We also didn't fully analyze cesarean section indications with Bishop scores and CTG results. Moreover, our exclusive use of the Robson classification particularly for postdated women might limit broader applicability.

5. Conclusion

This study found an increased rate of cesarean section among primigravida pregnancies. Although both maternal and neonatal outcomes were generally found well, fetal distress remains a major indication for cesarean delivery, highlighting the need for targeted obstetric and neonatal care. The application of the Robson Classification can assist in identifying specific groups for focused interventions aimed at reducing cesarean rates.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

Author's contributions

All authors contributed equally to the conception and development of the work.

Statement of informed consent

No informed consent was required as the study did not involve direct human participation.

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