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Impact of Repeat Cesarean Sections on Perinatal Outcomes: Morbidity and Mortality Risk Assessment

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Abstract
Introduction: *Cesarean section (C/S) is a common surgical procedure used to deliver a baby when vaginal delivery is not possible or poses risks to the mother or baby. With the rising rates of C/S globally, there is growing concern about the impact of repeat C-sections on perinatal outcomes.*
Methods: *This observational cross-sectional study was conducted Department of Obstetrics & Gynaecology, Chittagong Medical College & Hospital, from December 16-June'17. All the pregnant women who underwent repeat Caesarean section in Chittagong Medical College Hospital, Chittagong during the study period were considered as the study population. A total of 100 study subjects were selected by consecutive convenient sampling techniques. Data analysis was done by SPSS (Statistical Package for Social Sciences) 16. In all cases, p-value <05 was considered significant.*
Result: *The results indicate that perinatal morbidity was significantly higher in women with three previous cesarean sections, with increased rates of respiratory distress syndrome (28.6%) and umbilical sepsis (42.9%). In contrast, birth asphyxia (11.6%) and prematurity (8.7%) were more prevalent in women with only one prior C-section. No significant correlation was found between the number of previous cesarean sections and perinatal mortality. Neonatal death rates were higher in women with two previous C-sections (20.8%) compared to those with one (11.6%), but no deaths occurred in those with three prior C-sections.*
Conclusion: *This study concludes that perinatal morbidity increases significantly with a history of more than two cesarean sections, particularly with respiratory distress syndrome and umbilical sepsis. Birth asphyxia and prematurity were more common in those with only one previous C-section. However, no significant association between perinatal mortality and the number of previous C-sections was found.*
Keywords: *Perinatal Outcomes, Cesarean Sections, Birth asphyxia, Prematurity*

I. INTRODUCTION

A cesarean section (C/S) is defined as the delivery of a baby through an abdominal and uterine incision once the fetus reaches the age of viability [1]. Over the past three decades, the incidence of primary C/S has been increasing globally, reaching nearly one-third of all births in some countries [2,3]. This rise is driven by various factors, though the reasons are not entirely clear [4]. Contributing elements include changes in maternal characteristics, evolving medical practices, heightened malpractice concerns, as well as economic, organizational, social, and cultural factors [5,6]. Additionally, there are concerns about disparities in C/S use both between and within countries and about the financial strain unnecessary cesareans place on healthcare systems [7,8]. Improved safety in anesthesia, antibiotics, blood product availability, and enhanced pre-and post-operative care have also contributed to the increasing trend [9,10]. Since 1985, the international healthcare community has recommended that the ideal C/S rate should be between 10% and 15%, indicating that exceeding this range offers no additional benefits for pregnancy outcomes [11]. However, the global C/S rate has continued to rise, with significant regional variations [12]. According to a study by Betrán et al., the global average C/S rate is 18.6%, ranging from 6.0% in less developed regions to 27.2% in more developed areas. Africa has the lowest rate at 7.3%, while South America has the highest at 42.9% [8]. The C/S rate in Southeast Asia follows a similar pattern, with research by Neuman

et al. showing institutional delivery rates ranging from 21% in rural India to 90% in urban India. In private and charitable facilities, C/S rates are as high as 73% in Bangladesh, 30% in rural Nepal, 18% in urban India, and 5% in rural India, with repeat cesareans making up 30% of all C/S procedures [13]. Although maternal death from C/S is now rare, the long- and short-term impacts of the rising C/S rates on maternal and neonatal health remain unclear [14,15]. It is also uncertain whether the increase in C/S has improved fetal outcomes [8]. While C/S is a critical procedure for saving the lives of mothers and babies in distress, it is not without risks. The ongoing debate surrounding the benefits and complications of repeat C/S is fueled by evidence showing that the risk of maternal complications rises with the number of C/S procedures, mainly due to dense intra-abdominal adhesions and abnormal placentation [16-18]. Unplanned peripartum hysterectomies are sometimes performed as a last resort to control life-threatening hemorrhage, often caused by placenta previa, placenta accreta, uterine atony, or uterine rupture [1,19-20]. Other intraoperative complications, such as excessive bleeding and injury to the bowel or bladder, are not uncommon. Post-operative complications can include wound infections, postpartum hemorrhage, urinary tract infections, and, in rare cases, death [1,20]. This study aimed to evaluate the impact of repeat cesarean sections on perinatal outcomes.

II. METHODS

This observational cross-sectional study was conducted Department of Obstetrics & Gynaecology, Chittagong Medical College & Hospital, from December 16-June'17. All the pregnant women who underwent repeat Caesarean section in Chittagong Medical College Hospital, Chittagong during the study period were considered as the study population. A total of 100 study subjects were selected by consecutive convenient sampling techniques. Written informed consent was taken from every patient. Following admission, a physical examination and all routine investigations were performed. As mothers are subject to prone to developing complications they were quickly assessed and made ready for Caesarean section. All the data were checked and edited after collection. Then data were entered in SPSS 16 for the Windows 10 program version. An analysis plan was developed keeping the objectives of the study in mind. Frequency distribution and normal distribution of all continuous variables were calculated and expressed as Mean ± SD. Further associations were done by the chi-square test. In all cases, p-value <05 was considered significant. Ethical clearance was taken from the ethical review committee of the Chittagong Medical College for conducting the study.

Inclusion criteria:

- Pregnant women with gestational age >28 weeks to 40+ weeks with a history of one or more previous Caesarean sections.
- Emergency cases of repeat C/S are included during the study period.
- Patients with co-morbid disease (HTN, Heart disease) are also included.

Exclusion criteria:

- Pregnant women who will be unwilling to participate.
- Patients undergoing hysterotomy (Caesarean delivery before 28 weeks of gestation).

III. RESULTS

Table 1: Socio-demographic profile of study subjects (N=100)

Variables	n	%
Age group		
<26	42	42.0
26-30	38	38.0
>30	20	20.0
Residence		
Rural	80	80.0
Urban	20	20.0
Level of Education		
Illiterate	10	10.0
Primary	13	13.0
Upto SSC	21	21.0
SSC	22	22.0
HSC	18	18.0
Graduate and above	16	16.0
Occupation		
Housewife	90	90.0
Service Holder	06	6.0
Business	04	4.0
Income (BDT)		
<10000	19	19.0

10000 to 20000	40	40.0
>20000	41	41.0

The mean age of the population was 26.18±5.01. The maximum age was 37 years and the minimum age was 19 years. 42% of mother had their age less than 25 years. 38% of mothers were aged between 26 to 30 years and 20% of patients were aged more than 30 years. Among 100 cases majority came from rural areas (80%). The rest of the mothers were staying in urban areas (20%). The majority of the mothers had education up to SSC (22%). 41% of the patients in this study had a family income of more than 20000 taka. 90% were housewives. [Table 1]

Table 2: Obstetric profile of the study subjects (N=100)

Variables	n	%
Parity		
One	60	60.0
Two or more	40	40.0
Gravida		
2nd	43	43.0
>2	57	57.0
Gestational age at the time of surgery		
<34 weeks	05	5.0
34 to 36 weeks	20	20.0
37 to 40 weeks	71	71.0
>40 weeks	04	4.0

Out of 100 mothers, 60 had one previous pregnancy, and 57 were gravid for more than 2 times. 43 mothers were gravid for the 2nd time. 71 of the pregnant women in this study had gestational age between 37 to 40 weeks at presentation. 20 mothers had gestational age between 34 to 36 weeks. 5 pregnant women had <34 weeks and 4 had more than 40 weeks of gestational age. See Table 2 for details. [Table 2]

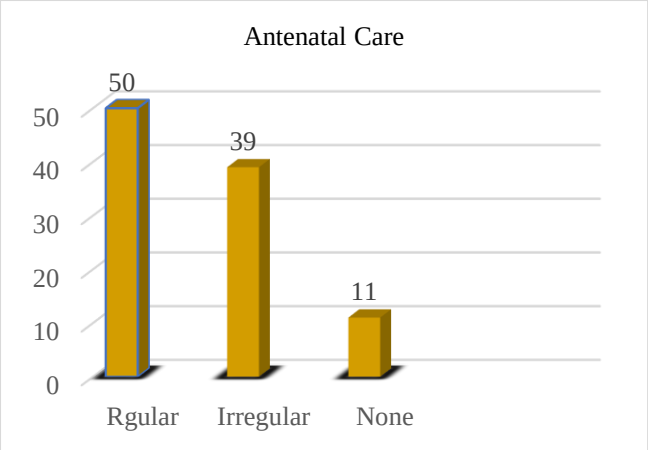

Figure 1: Distribution of study subjects according to attendance at antenatal checkup (N=100)

50 out of 100 study cases took regular antenatal care. 39 women were irregular in the check-up. 11 patients did not take any antenatal checkup.

Table 3: Distribution of study population according to the number of previous history of caesarian section (N=100)

Number of cesarean sections	n	%
One	69	69.0
Two	24	24.0
Three	07	7.0

69% of mothers had a previous history of one caesarian section. 24% of mothers had two and 7% had three previous caesarian sections. [Table 3]

Table 4: Past medical history of study subjects (n=57)

Past Medical History	n	%
Hypertension	09	9.0
Diabetes Mellitus	20	20.0
Hypothyroidism	6	6.0
Bronchial Asthma	9	9.0
Heart disease	2	2.0
HTN + DM	5	5.0
DM + Hypothyroidism	6	6.0
Total	57	57.0

57% of pregnant women had a significant history of previous medical illness. 20% had a history of diabetes mellitus, 9% had HTN, another 9% had Bronchial Asthma, 6% had hypothyroidism and 2% patients had heart disease. A total of 11 women had two diseases; 5 women had DM with HTN and 6 women had DM with Hypothyroidism. [Table 4]

Table 5: Past obstetric history of study subjects (n=26)

Past Obstetric History	n	%
Pregnancy-induced hypertension	7	7.0
Miscarriage	5	5.0
Antepartum haemorrhage	5	5.0
Preterm delivery	5	5.0
Intrauterine death	4	4.0
Total	26	4.0

26 patients had significant past obstetric history, 7% had a history of pregnancy-induced hypertension, 5% had a history of miscarriage, another 5% had a history of antepartum hemorrhage, 5% had a history of preterm delivery and 4% patients had a history of inter-uterine death. [Table 5]

Table 6: Distribution of patients according to indication of repeated Caesarian Section (N=100)

Indication of repeated caesarian section	n	%
H/O At Least 2 Previous C/S or More	31	31
Fetal Distress	30	30
PROM	11	11
Placenta Previa	3	3
Breech Presentation	6	6
Severe PE	5	5
Ante Partum Haemorrhage	4	4
Intra-Uterine Growth Retardation	2	2
Eclampsia	2	2
Heart Disease	2	2
Cephalo-Pelvic Disproportion	2	2
Shoulder Presentation	1	1

The most common indication for the repeated caesarian section was a history of 2 or more C/S (31% of patients). The second common indication was fetal distress (30% of patients). [Table 6]

Table 7: Relationship of perinatal morbidity and mortality with the number of previous caesarian sections (N=100)

Perinatal Morbidity*	One (n=69)		Two (n=24)		Three (n=7)	
	N	%	N	%	N	%
Birth Asphyxia	8	11.60%	0	0.00%	0	0.00%
Prematurity	6	8.70%	0	0.00%	0	0.00%
Respiratory Distress Syndrome	0	0.00%	1	4.20%	2	28.60%
Umbilical sepsis	2	2.90%	0	0.00%	3	42.90%
Hyperbilirubinaemia	2	2.90%	6	25.00%	0	0.00%
None	51	73.90%	17	70.80%	2	28.60%
Perinatal Mortality**						
Neonatal Death	8	11.6%	5	20.8%	0	0.0%
Alive	61	88.4%	19	79.2%	7	100.0%
Chi-square test was done *p-value of <0.001 **p-value 0.291						

Significantly high overall perinatal morbidity was noted in pregnant women who had a history of more than three previous history of C/S. However, the incidence of birth asphyxia and prematurity was higher in patients with one previous c/s. No significant relationship between perinatal mortality and the previous number of C/S was noted.

IV. DISCUSSION

The mean age of the women was 26.18 +5.01. The maximum age was 37 years and the minimum age was 19 years. 42% of mother had their age less than 25 years. 38% of patients had aged between 26 to 30 years and 20% of mothers had aged more than 30 years. The findings are similar to the finding by Nahar K et al. [21] But different findings are noted in multiple studies like Ghazala A et al. [22] and Sobande A et al. [23]. This could be probably due to geographical variation and cultural effects of marriage and childbearing. Out of 100 women, 60 mothers had one previous pregnancy. 40 mothers had two or more previous childbirth and 57 were gravid for more than 2 times., 43 women were gravid for the 2nd time. Nahar K et al. [21] showed that all of the study population were multigravida. Among the study group, 69 patients had a previous history of one caesarian section, 24% of patients had two, and 7% of patients had three previous caesarian sections. Different findings were noted in different studies. For example, Nahar Ket al. [21] showed 88% of patients had one & 12% had two previous sections. The study entitled 'The Effects of Repeated Caesarean Sections on Maternal and Fetal Outcomes by Ghazala A. et al. evidenced 157 had undergone two previous C/Ss,49 women had three previous C/Ss, 16 with four previous C/Ss, 2 with five previous C/Ss among 224 women [22]. Juntunen K et al. [24] also reported the highest number of repeated cesarean sections (4-10). These variations can be explained by the geographical variations of contraceptive programs and cultural practices. Study participants were also analyzed based on the indication of this cesarean section. The most frequent cause of CS is repeat CS which is 2 or more C/S (31% patients). The second common indication was fetal distress (30% of patients). Other common indications of repeated cesarean section were PROM (11%), placenta praevia (3%), Heart disease (2%), Breech presentation (6%), severe PE (5%), and APH (4%). In addition, IUGR, Eclampsia, and cephalo-pelvic disproportions were 2% in each case. Several studies showed different findings from this study for example, a study conducted by Yousuf et al. showed that 20% of patients underwent repeated CS due to fetal distress. He also showed other common indications for repeat cesarean section were impending rupture 11% and PROM 7% which is different from the study. [25]. Out of 100 newborn children, 30% had complications after birth. The most common causes of perinatal morbidity were hyperbilirubinemia (8%) and birth asphyxia (8%). Other less frequent causes were prematurity (6%), respiratory distress syndrome (3%) and umbilical sepsis (5%). Results of the study by Nur J et al. [26] revealed a little difference and they presented that hyperbilirumeia was 3%, birth asphyxia was 8%, prematurity was 11%, RDS 2%, and. Moreover, they found 2% of cases of congenital anomalies, which was not found in this study. Among all deliveries total of 13 deliveries had culminated in death, all of them died due to complications after delivery. Nur J et al. [26] showed less fetal death among the mothers who underwent repeated C/S and showed the number of live births in that study was 95%, stillborn was 3% and early neonatal death was 25%. Nevertheless, this dissimilarity cannot be explained by the number of repeated C/S rather than individual effects. Significantly, high overall perinatal morbidity was noted in pregnant women who had a history of more than three previous history of C/S. However, the incidence of birth asphyxia and prematurity were higher in mothers with one previous C/S. Further analysis showed that significant morbidity was associated with an increased number of C/S (p-value 001<.05) but there was no significant relationship between perinatal mortality and the previous number of C/S noted (p-value 245>.05).

Limitations of The Study

The study was conducted in a single hospital with a small sample size. So, the results may not represent the whole community. Moreover, a Study of fetal scalp blood p^H to monitor fetal distress was not done due to resource constraints.

V. CONCLUSION

This study concludes that perinatal morbidity increases significantly with a history of more than two cesarean sections, particularly with respiratory distress syndrome and umbilical sepsis. Birth asphyxia and prematurity were more common in those with only one previous C-section. However, no significant association between perinatal mortality and the number of previous C-sections was found.

VI. RECOMMENDATION

Depending upon the study findings, the following recommendations are suggested.

- Vaginal delivery should be promoted in all women unless contraindicated.

- Women should be made aware of the complications of repeated cesarean section.
- Women who already had one or more cesarean sections should be monitored carefully.
- The antenatal and postnatal checkups should be done with an emphasis on women who had a history of cesarean section.
- Mothers should be aware of possible fetal complications.

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