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Assessment of Caesarean Section Outcomes for Preterm Pregnancies in a Tertiary Care Hospital in Bangladesh

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Abstract

A cross-sectional, observational study was conducted in the Department of Obstetrics and Gynaecology at Community Based Medical College, Bangladesh (CBMC,B), Mymensingh, Bangladesh, to evaluate the indications and feto-maternal outcomes of Caesarean section operation among preterm pregnant women. A total of 120 patients were enrolled between January and December of 2023. Data collection involved a structured questionnaire, file review, historical inquiry, and monitoring of mother and baby. Most individuals were aged 15-20 (37.50%) and had tertiary education (75.00%). Majority were from poor socio-economic backgrounds (76.67%) and rural areas (70%). Primigravida cases were predominant (65.00%), and multiparous accounted for 36.67%. Eclampsia (21.67%) and preeclampsia (20.83%) were common indications for cesarean section. Most procedures were emergency (93.33%). Maternal complications were low, with 64.17% having none. Most infants had low birth weight (62.50%) and experienced live births (91.67%), with a notable stillbirth rate (8.33%). Fetal complications included low birth weight (88.33%) and prematurity (20%). No complications were noted in 31.67% of cases. The study examined the complexities of Cesarean section (CS) for preterm births, highlighting maternal-fetal factors, varied indications, and outcomes, urging tailored interventions.

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Introduction

Preterm labor is characterized by the onset of labor before the completion of 37 weeks of gestation, starting from the point of fetal viability (currently recognized as 24 completed weeks of gestational age based on the date of the last menstrual cycle in the UK, or 22 completed weeks from the date of conception if accurately known).[1] Preventing preterm delivery (PD) is a significant public health concern worldwide. Annually, approximately 15.0 million babies are born prematurely globally, with 13.3% of these occurrences reported in South Asia.[2,3] Each year, globally, 35% of neonatal deaths are attributed to preterm conditions. The majority of PD cases experience lifelong complications, including learning disabilities, hearing impairments, sensory deficits, respiratory illnesses, diabetes,

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and cardiovascular and renal diseases in adulthood.[2,4,5]

The ideal method of delivery for women suspected to be in preterm labor remains a topic of debate. Cesarean section (CS) is notably more prevalent in the delivery of preterm neonates compared to full-term neonates.[6] A cesarean section is a surgical procedure performed to safeguard the well-being of both mother and child in situations where vaginal delivery is not feasible (emergency CS), or when healthcare providers determine that the potential risks of vaginal delivery pose greater dangers to the mother and baby compared to the risks associated with a cesarean section (planned CS).[7] Latin America and the Caribbean region have the highest Caesarean section rate (40.5%), followed by Northern America (32.3%), Oceania (31.1%), Europe (25%), Asia (19.2%), and Africa (7.3%).[8] Nevertheless, there has been a notable increase in the rate of elective cesarean deliveries for preterm infants over recent decades. This underscores the importance of investigating whether this practice of elective cesarean deliveries is warranted for potentially improved infant outcomes, despite the potential risks of serious morbidities for the mothers.[9,10] The most prevalent indications for cesarean section in women with preterm pregnancies currently include eclampsia, preeclampsia, antepartum hemorrhage, fetal distress during labor, premature rupture of membranes with chorioamnionitis, preterm labor in the presence of a prior cesarean section, malpresentation with cord prolapse, multiple pregnancies, and diabetes mellitus accompanied by polyhydramnios.[11] Women who have previously undergone preterm birth face an increased risk of experiencing it again in subsequent pregnancies, as do those expecting twins or triplets. Additionally, infection, smoking, and cocaine use have been linked to preterm labor. Rates of preterm birth are on the rise among babies delivered via cesarean section. Preterm infants exhibit poorer tolerance to hypoxia compared to full-term infants, emphasizing the importance of timely intervention upon the earliest signs of fetal distress to prevent significant damage.[12] In this context, this study aims to evaluate the indications and feto-maternal outcomes of caesarean section among preterm pregnant patients. By analyzing a cohort of preterm deliveries, we seek to gain insights into the clinical factors driving the decision for caesarean delivery, as well as the associated maternal and neonatal outcomes. Such insights are crucial for informing clinical practice guidelines and optimizing care protocols to enhance the health outcomes of both mothers and their preterm infants.

Methods

This cross-sectional, observational study was carried out in the Department of Obstetrics and Gynaecology at Community Base Medical College, Bangladesh (CBMC,B), Mymensingh, Bangladesh, from January to December of 2023.

Inclusion criteria: This study included all pregnant women who underwent a caesarean section and were identified as preterm.

Exclusion criteria: Women with full-term pregnancies who underwent a caesarean section were excluded from the study, as well as pregnant women who expressed unwillingness to participate.

A total of 120 patients were enrolled finally in this study. Data collection utilized a structured questionnaire encompassing all pertinent variables. Initially, patient selection involved reviewing files in the post-operative ward. The causes of caesarean section in preterm patients were determined through historical inquiry and record review. Subsequently, both mother and baby were monitored throughout their hospitalization. A structured data sheet was then compiled to summarize all gathered information. Data were inputted and organized using SPSS (IBM version 20) software. Statistical analysis was conducted utilizing SPSS (version 26.0), with results presented in frequencies and percentages in tabulated form.

This study was approved by the Ethical Review Committee of Community Based Medical College, Bangladesh (CBMC,B), Mymensingh, Bangladesh,

Results

Among 120 patients, the majority of individuals fell within the age range of 15-20 years (37.50%), 21.67% of cases were between 21-25 years old, followed by 17.50% between 26-30 years, 13.33% between 31-35 years, and 10.00% over 36 years old. Regarding educational qualifications, 75.00% had attained tertiary education, 21.67% had completed secondary education, and 2.50% had only primary education. Regarding socio-economic status, most participants (76.67%) were categorized as poor, and only 1.67% belonged to the upper class. Almost 70% of the cases were from rural areas, and the rest of 30% were from urban areas (Table-I). Based on gravida status, most cases, comprising 65.00% of the total, were primigravida individuals 16.67% were secundigravida (second pregnancy), followed by 10.00% who were tertigravida (third pregnancy), 5.83% were quadragravida (fourth pregnancy). According to parity status, a higher number of participants were multiparous (36.67%), nulliparous (31.67%), and primiparous (28.33%) (Table-II). Eclampsia was the most common indication in 21.67% of the total cases, and preeclampsia was the second most common indication (20.83%). Other common indications were APH, PROM, PROM with chorioamnionitis, preterm labour with caesarean section, fetal distress with labour pain etc. (Table-III). More than 75% of the cesarean cases had used spinal anesthesia, and the rest, 24.17%, had used general anesthesia. A significant proportion (93.33%) was categorized as emergency procedures (Table-IV). The maternal complication is shown in Table 5, where most of 77(64.17%) cases had no complication, 14(11.67%) cases had wound infection, 10(8.33%) cases had PPH, and only 5.00% death occurred (Table-V). Based on infant characteristics in the study cases, 75(62.50%) infants had a birth weight under 2-3 kg, 34(28.33%) infants were weighed less than 2 kg and only 11(9.17%) infants were weighed more than 3 kg. Regarding perinatal outcomes, most births (91.67%) resulted in live births. 8.33% of births were classified as stillbirths. Furthermore, 17.50% of newborns experienced neonatal death, indicating death within the first 28 days of life (Table-VI). Among fetal complications, low birth weight (LBW) was the most frequent complication, accounting for 88.33% of the total. Following closely is prematurity with associated other diseases, with 24 cases constituting 20% of the total. Perinatal asphyxia and neonatal death both shows a frequency of 21(17.50%) cases

each, and stillbirths are the least frequent complication (8.33%). Interestingly, 31.67% of cases indicate no complications (Table-VII).

Table-I: Demographical characteristics of the study population (N=120)

Variables	Frequency	Percentage
Age in years		
15-20	45	37.50
21-25	26	21.67
26-30	21	17.50
31-35	16	13.33
>36	12	10.00
Educational qualification		
Primary	3	2.50
Secondary	26	21.67
Tertiary	90	75.00
Non-formal	1	0.83
Socio-economic status		
Poor	92	76.67
lower middle class	26	21.67
Upper class	2	1.67
Living area		
Rural	37	30.83
Urban	83	69.17

Table-II: Gravida and parity status of the study population (N=120)

Variables	Frequency	Percentage
Gravida		
1	78	65.00
2	20	16.67
3	12	10.00
4	7	5.83
5	2	1.67
6	1	0.83
Parity		
Nulliparous	38	31.67
Primiparous	34	28.33
Multiparous	44	36.67
Grand-multiparous	4	3.33

Table-III: Indications of preterm Caesarean section (N=120)

Indication	Frequency	Percentage
Eclampsia	26	21.67
Preeclampsia	25	20.83
APH	9	7.50
PROM	18	15.00
PROM with chorioamnionitis	6	5.00
Preterm labour with previous caesarean section	10	8.33
Fetal distress with labour pain	17	14.17
Malpresentation with cord prolapse	1	0.83
DM with polyhydramnios	4	3.33
Multiple pregnancy	4	3.33

Table-IV: Factors associated with caesarean procedure (N=120)

Variables	Frequency	Percentage
Type of anesthesia		
Spinal anesthesia	91	75.83
General anesthesia	29	24.17
Nature of caesarean section		
Emergency	112	93.33
Elective	8	6.66

Table-V: Maternal complications in preterm Caesarean section

Maternal complications	Frequency	Percentage
No complication	77	64.17
Pulmonary oedema	7	5.83
PPH	10	8.33
Wound infection	14	11.67
UTI	6	5.00
Death	6	5.00
Total	120	100.00

Table-VI: Fetal characteristics of the study cases

Variables	Frequency	Percentage
Birth weight (kg)		
<2	34	28.33
2-3	75	62.50
>3	11	9.17
Perinatal outcome		
Live birth	110	91.67
Still birth	10	8.33
Neonatal death	21	17.50

Table-VII: Fetal complications in preterm Caesarean section

Fetal complications	Frequency	Percentage
No complication	38	31.67
LBW	106	88.33
Perinatal asphyxia	21	17.50
Prematurity with associated other diseases	24	20.00
Neonatal death	21	17.50
Still birth	10	8.33

Discussion

Preterm infants exhibit poorer tolerance to hypoxia compared to full-term infants, and early intervention at the first signs of fetal distress could prevent significant damage.[13] Caesarean section (CS) is a potent intervention often perceived by parents as the optimal choice for delivering vulnerable preterm babies, particularly those in breech presentation.[14] CS rates have surged globally from 7% in 1990 to 21% presently, with projections indicating a further increase, reaching approximately 28.5% by 2030.[15] Our study, involving 120 preterm patients, aimed to identify the risk factors associated with CS delivery. Most patients (37.50%) were between 15 and 20 years old, while the lowest number was over 36 years old (10%). These findings closely align with those of Khasawneh *et al.*[16] CS was more prevalent among women with tertiary education (75%), followed by those with secondary education (21.67%), with a majority of women hailing from economically disadvantaged backgrounds (76.67%), consistent with previous research.[17,18]

The demographic profile of our study population indicates a predominantly rural setting with a primarily low to middle socio-economic status. Primigravidas constituted 65.00% of participants, with a significant proportion (36.67%) being multiparous, similar to findings by Chugh *et al.*[17,19] Notably, while primigravidas may have a lower risk of preterm CS delivery compared to multiparous women, other factors such as maternal age and medical history also influence the likelihood of preterm birth and CS delivery. In our study, the primary indications for CS among preterm patients were eclampsia (21.67%), preeclampsia (20.83%), premature rupture of membranes (PROM) (15%), antepartum hemorrhage (APH) (7.50%), fetal distress with labor pain (14.17%), and malpresentation with cord prolapse (0.83%). Previous studies have identified fetal distress, excessive bleeding, and placenta previa as common causes of APH and fetal distress as the most common cause of PROM.[20,21] Study showed that the predominant indication for CS in our Bangladeshi hospital was eclampsia (23%),[22] while a similar study done in Nigeria reported preeclampsia (31%) and APH (28%) as the principal indications.[23] This variation may stem from differences in sample size and etiology. Spinal anesthesia was predominantly used (75.83%) in our study, offering advantages such as mitigating the stress response to trauma,

minimal fetal respiratory depression, maternal consciousness during delivery, and early breastfeeding.[24] Emergency CS accounted for 93.33% of cases, consistent with findings by Darnal and Dangal.[25] Maternal morbidity in our study was attributed to pulmonary edema (5.83%), post-partum hemorrhage (8.33%), wound infection (11.67%), and urinary tract infection (5.00%), reflecting the diverse indications for CS. Similar studies in our local hospital and Nigeria reported comparable rates of maternal morbidity.[26,27] Regarding birth weight, most preterm babies in our study weighed between 2 and 3 kg, consistent with findings from Bangladesh and Nigeria.[23,27] The technical proficiency of surgeons performing CS significantly influences morbidity rates. Our study demonstrated a live birth rate of 91.67%, with neonatal deaths accounting for 17.50% and stillbirths for 8.33%. Perinatal mortality primarily resulted from prematurity, eclampsia, cord prolapse, and multiple pregnancies. In contrast, studies in Western countries reported lower perinatal mortality rates, with perinatal mortality rates for eclampsia ranging from 29.79% to 38.6%.[28-31] Our study's perinatal mortality rate exceeded more than 25%, mainly due to eclampsia and other causes, possibly influenced by sample size, etiology, and management practices.

Retrospective studies are susceptible to biases and inaccuracies in data recording, potentially leading to incomplete or inconsistent data. Additionally, the study's focus on a single tertiary care hospital may limit the generalizability of its findings to broader populations. Moreover, the study's sample size of 120 cases may not adequately represent the diverse range of preterm pregnancies and cesarean section outcomes, potentially affecting the robustness and reliability of the results.

Conclusion

In conclusion, our study sheds light on the complexities surrounding cesarean section (CS) deliveries for preterm pregnancies. The findings underscore the multifaceted nature of maternal and fetal factors influencing the decision-making process for CS, with notable variations in demographics, indications, and outcomes. Eclampsia emerged as a prominent indication for CS, emphasizing the critical need for effective management strategies. Maternal morbidity rates, though consistent with previous studies, highlight ongoing challenges in optimizing maternal health during CS procedures. Despite advancements, neonatal outcomes remain a concern, with significant perinatal mortality attributed to prematurity and eclampsia. Addressing these challenges demands tailored interventions informed by comprehensive data analysis and collaborative efforts across healthcare disciplines.

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