

Sociodemographic Determinants and Clinical Indications of Emergency Caesarean Section: A Prospective Study

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Abstract

Background: Emergency caesarean section (EmCS) is a life-saving obstetric procedure carried out in emergencies due to maternal or foetal reasons. The purpose of this study was to identify the sociodemographic factors and clinical features associated with emergency caesarean section at a tertiary care hospital in Bangladesh.

Methods: This prospective observational study was conducted at Department of Obstetrics and Gynaecology, Bangladesh Medical University, Dhaka, from March to September 2016, on 100 women who had emergency caesarean section. Sociodemographic data (age, socioeconomic status), obstetric data (gestational age, antenatal care status, maternal weight) and clinical indications were collected. Data were entered and analyzed on SPSS version 26.

Results: Most participants were between 21 and 30 years old (66%), and the mean age was 24.8 ± 4.8 years. The majority were from the lower socio-economic class (70.0%). The most common clinical indications were failed induction (22%) and postdated pregnancy (20%). Lower socioeconomic status (OR = 3.90; 95% CI: 1.48-10.27; $p = 0.005$), irregular or absent antenatal care (OR = 3.32; 95% CI: 1.31-8.45; $p = 0.016$), and preterm or postdated gestational age (OR = 2.67; 95% CI: 1.18-6.01; $p = 0.027$) were significantly associated with labour-related EmCS indications.

Conclusions: Socio-economic deprivation and poor antenatal care are important factors associated with emergency caesarean section in Bangladesh. Prevention of modifiable risk factors is crucial and requires strengthening of antenatal care services and targeting low-income populations with preventive obstetric interventions.

Keywords: Emergency caesarean section, sociodemographic determinants, antenatal care, clinical indications, Bangladesh

I. INTRODUCTION

Caesarean section (CS) is one of the most commonly performed major surgical procedures in the world, and the rate of CS has increased dramatically over the last 20 years. Emergency caesarean section (EmCS) is defined as an unplanned surgical delivery that is required due to acute compromise of the mother or fetus, and is different from elective caesarean section ⁽¹⁾. EmCS is a life-saving intervention when needed, but its prevalence in low and middle-income countries (LMICs), including Bangladesh, is a major concern about resource allocation, maternal morbidity, and healthcare quality ⁽²⁾. The worldwide caesarean rate has grown from around 7% in 1990 to more than 21% in 2021, with large regional variations; the caesarean rate has surged in South Asia, mostly due to emergency indications ⁽³⁾. The rates of CS have increased rapidly in both public and private health sectors in Bangladesh, and studies have shown that more than 30% of all hospital births in tertiary care hospitals are performed by CS ⁽⁴⁾. A significant percentage of these, however, are carried out as emergency procedures, reflecting the burden of intrapartum complications and the importance of preventive antenatal strategies. Maternal age, socioeconomic status, education level, and antenatal care (ANC) utilisation have been consistently linked to obstetric outcomes such as operative delivery ⁽⁵⁾. Adolescent pregnancy is a risk factor for cephalopelvic disproportion (CPD) and obstructed labour, which are well-known indications for EmCS ⁽⁶⁾. Likewise, women in lower socioeconomic groups are at higher risk of having poor ANC, nutritional deficiencies, and delayed detection of obstetric complications, which are all risk factors for emergency operative delivery ⁽⁷⁾. Antenatal care is a

fundamental component of safe motherhood, which provides an opportunity to stratify risk, identify pregnancy complications early, and refer patients in time. The lack of or irregular ANC is a strong risk factor for intrapartum emergencies that may necessitate a caesarean section⁽⁸⁾. Access to ANC is still a significant challenge in resource-constrained countries such as Bangladesh due to financial constraints, transport difficulties, and low health literacy⁽⁹⁾. The clinical indications for EmCS are wide-ranging and include failed induction of labour, foetal distress, malpresentation, antepartum haemorrhage, hypertensive disorders of pregnancy, cephalopelvic disproportion, and others⁽¹⁰⁾. Knowing the distribution of these indications locally is crucial to inform clinical practice and policy in a specific healthcare setting. Prospective studies that also examine sociodemographic risk factors and clinical signs provide a more complete profile of the pathways to emergency operative delivery⁽¹¹⁾. Although clinically relevant, there is limited data from prospective studies that investigate the interaction between sociodemographic factors and clinical factors for EmCS in the context of tertiary care in Bangladesh. This study was thus undertaken to assess the sociodemographic characteristics, obstetric profiles, and clinical indications of women undergoing EmCS and to assess the relationship between these determinants and labour-related EmCS indications.

II. METHODS

This prospective observational study was conducted at Department of Obstetrics and Gynaecology, Bangladesh Medical University, Dhaka, from March to September 2016. The study included 100 women who had an emergency caesarean section (EmCS) during the data collection period. Those who were included were pregnant women of any gestation who had an unplanned caesarean section for acute obstetric indications and agreed to participate in the study. Women who had an elective or planned caesarean section, and those with missing data or who refused consent, were excluded. The study variables included sociodemographic parameters (age group, socioeconomic status), obstetric and antenatal characteristics (gestational age, antenatal care utilisation pattern), maternal anthropometry (maternal weight), clinical indications for EmCS (failed induction, postdated pregnancy, cephalopelvic disproportion, antepartum haemorrhage, hypertensive disorders of pregnancy, premature rupture of membranes, foetal distress, obstructed labour, malpresentation or malposition, Rh-negative status, scar tenderness, gestational diabetes mellitus, intrauterine growth restriction, oligohydramnios, bad obstetric history, prolonged second stage of labour). Household income and occupation were used to determine socioeconomic status as lower, middle, and upper. Antenatal care was classified as regular (four or more ANC visits), irregular (one to three visits), or none. Data were entered using a data collection sheet followed by data analysis using SPSS version 26. Crude odds ratios (OR) with 95% confidence intervals (CI) were used to assess associations between selected determinants and labour-related EmCS indications. A p-value of < 0.05 was considered statistically significant.

III. RESULTS

Table 1: Sociodemographic characteristics of the study participants, N=100

Variable	Category	n (%)
Age group, years	≤20	24 (24.0)
	21-30	66 (66.0)
	31-40	10 (10.0)
Age, years	Mean ± SD	24.8 ± 4.8
	Range	18-41
Socioeconomic status	Lower class	70 (70.0)
	Middle class	19 (19.0)
	Upper class	11 (11.0)

The sociodemographic profile of the study participants is shown in Table 1. The majority were aged 21-30 years (66%), followed by those aged ≤20 years (24%), with a mean age of 24.8 ± 4.8 years and a range of 18-41 years. In terms of socioeconomic status, 70% were from the lower class, 19.0% from the middle class, and 11% from the upper class.

Table 2: Obstetric and antenatal characteristics of the study participants, N=100

Variable	Category	n (%)
Gestational age	Preterm, ≤36 weeks	29 (29.0)
	Term, 37-40 weeks	51 (51.0)
	Postdated, >40 weeks	20 (20.0)
Gestational age, weeks	Mean ± SD	37.7 ± 3.4
	Range	28-42
Antenatal care status	Regular ANC	31 (31.0)
	Irregular ANC	53 (53.0)
	No ANC	16 (16.0)

Table 2 shows the obstetric and antenatal characteristics of participants. Term gestational age (37-40 weeks) was observed in 51%, preterm (≤ 36 weeks) in 29%, and postdated (>40 weeks) in 20%, with a mean gestational age of 37.7 ± 3.4 weeks. 53% of women received irregular antenatal care, 31 percent received regular antenatal care, and 16 percent received no antenatal care.

Table 3: Maternal weight distribution among the study participants, N=100

Variable	Category	n (%)
Maternal weight, kg	40-49	31 (31.0)
	50-59	51 (51.0)
	60-69	14 (14.0)
	≥ 70	4 (4.0)
Maternal weight, kg	Mean $\pm$ SD	53.2 ± 7.1
	Range	40-80

The characteristics of the mothers in the study are described in Table 3. The most common weight category was 50-59 kg (51%), followed by 40-49 kg (31%), 60-69 kg (14%), and ≥ 70 kg (4%). Maternal weight ranged from 40 to 80 kg, and the mean maternal weight was 53.2 ± 7.1 kg.

Table 4: Clinical indications for emergency caesarean section, N=100

Clinical indication	Category	n (%)
Failed induction	Present	22 (22.0)
Postdated pregnancy	Present	20 (20.0)
Cephalopelvic disproportion	Present	16 (16.0)
Antepartum haemorrhage	Overall	12 (12.0)
	Placenta previa	2 (2.0)
	Low-lying placenta	8 (8.0)
	Other/unspecified APH	2 (2.0)
Hypertensive disorder of pregnancy	Overall	10 (10.0)
	Pre-eclampsia	8 (8.0)
	Eclampsia	2 (2.0)
Premature rupture of the membrane	Present	10 (10.0)
Fetal distress	Present	9 (9.0)
Obstructed labour	Present	9 (9.0)
Malpresentation or malposition	Overall	14 (14.0)
	Breech presentation	7 (7.0)
	Occipito-posterior position	7 (7.0)
Rh-negative mother	Present	6 (6.0)
Scar tenderness	Present	5 (5.0)
Gestational diabetes mellitus	Present	5 (5.0)
Intrauterine growth restriction	Present	5 (5.0)
Oligohydramnios	Present	4 (4.0)
Bad obstetric history	Present	2 (2.0)
Prolonged second stage of labour	Present	2 (2.0)

- There were multiple responses

Table 4 shows the clinical indications for EmCS. The most common indication was failed induction (22%), followed by postdated pregnancy (20%), malpresentation or malposition (14% each), and cephalopelvic disproportion (16%). Antepartum haemorrhage accounted for 12%, hypertensive disorders and premature rupture of membranes each for 10%, fetal distress and obstructed labour each for 9%, with less frequent indications Rh-negative status (6%), gestational diabetes mellitus (5%), scar tenderness (5%), intrauterine growth restriction (5%), oligohydramnios (4%) and bad obstetric history (2%) and prolonged second stage of labour (2%).

Table 5: Association of selected determinants with labour-related emergency caesarean section indications

Determinant	Category	Labour-related indication present, n (%)	Labour-related indication absent, n (%)	Crude OR	95% CI	p-value
Age group	21-30 years	26 (39.4)	40 (60.6)	-	-	-
	≤ 20 years	14 (58.3)	10 (41.7)	2.15	0.83-5.57	0.150
	≥ 31 years	5 (50.0)	5 (50.0)	1.54	0.41-5.84	0.732
Socioeconomic status	Middle/upper	7 (23.3)	23 (76.7)	-	-	-
	Lower	38 (54.3)	32 (45.7)	3.90	1.48-10.27	0.005
Antenatal care status	Regular ANC	8 (25.8)	23 (74.2)	-	-	-

	Irregular/no ANC	37 (53.6)	32 (46.4)	3.32	1.31-8.45	0.016
Gestational age	Term, 37-40 weeks	17 (33.3)	34 (66.7)	-	-	-
	Preterm or postdated	28 (57.1)	21 (42.9)	2.67	1.18-6.01	0.027
Maternal weight	≥50 kg	28 (40.6)	41 (59.4)	-	-	-
	<50 kg	17 (54.8)	14 (45.2)	1.78	0.76-4.18	0.200

Table 5 shows the relationship between selected determinants and labour-related EmCS indications. Lower socioeconomic status (OR = 3.90; 95% CI: 1.48-10.27; $p = 0.005$), irregular or absent ANC (OR = 3.32; 95% CI: 1.31-8.45; $p = 0.016$), and preterm or postdated gestational age (OR = 2.67; 95% CI: 1.18-6.01; $p = 0.027$) were statistically significant determinants, while age ≤ 20 years (OR = 2.15; $p = 0.150$) and maternal weight < 50 kg (OR = 1.78; $p = 0.200$) did not reach significance.

IV. DISCUSSION

This study showed that most women were in their reproductive age (21-30 years), which is similar to the demographic profile of women in the South Asian populations, where early marriage and childbearing are common ⁽¹²⁾. The average maternal age of 24.8 years is comparable to other similar hospitals in Bangladesh and neighboring countries, which is considered a young obstetric population in tertiary referral hospitals ⁽¹³⁾. A remarkable result was the clustering of EmCS among women from the lower socioeconomic stratum (70%), and that lower socioeconomic status was associated with almost 4 times higher odds of labour-related EmCS indications (OR = 3.90; $p = 0.005$). This association highlights the strong relationship between poverty and poor perinatal outcomes. The nutritional deficiencies, poor access to skilled antenatal care, delayed detection of obstetric complications, and late presentation for hospital admission are disproportionately affecting women from lower socioeconomic backgrounds, which increases the risk of emergency operative intervention ⁽¹⁴⁾. These findings have been replicated in tertiary centers in LMICs, where socioeconomic differences remain a significant factor in the inequitable distribution of obstetric emergencies ⁽¹⁵⁾. The antenatal care utilization pattern in this study is of particular concern, as 53.0% of the participants had irregular ANC, and 16% had no ANC at all. Women who did not attend ANC had 3.32 times greater odds of having EmCS indications during labour ($p = 0.016$). This is in line with Tahmina et al., who reported that good ANC decreases intrapartum emergencies by early detection of risk factors, timely referral, and preventive measures ⁽¹⁶⁾. Despite the improvements, many systemic barriers remain to optimal utilization of ANC services in Bangladesh, such as transport cost, opportunity cost, cultural beliefs, and lack of skilled health care providers, especially in rural and economically marginalized populations ⁽¹⁷⁾. In this study, the most common clinical indications for EmCS were failed induction (22%) and postdated pregnancy (20%). Failed induction is a difficult clinical situation that frequently requires emergency operative delivery, especially if the cervix is not sufficiently ripened or if the mother or fetus becomes unstable during induction ⁽¹⁸⁾. Postdated pregnancy is strongly associated with placental insufficiency and foetal compromise, resulting in a substantial number of emergency interventions in poorly monitored pregnancies. The most common indications were cephalopelvic disproportion (16%) and malpresentation or malposition (14%), which were also the most common in similar settings in South Asia and Sub-Saharan Africa ⁽¹⁹⁾. Labour-related EmCS indications were independently associated with preterm or postdated gestational age (OR = 2.67; $p = 0.027$), indicating that pregnancies at the extremes of gestational age are vulnerable. Antepartum haemorrhage (12%) is mainly due to low-lying placenta and hypertensive disorders of pregnancy (10%), such as pre-eclampsia and eclampsia, which are life-threatening conditions that require emergency surgical delivery. The results highlight the need for third-trimester ultrasonographic monitoring and blood pressure monitoring in antenatal care programmes ⁽²⁰⁾. The clinical indications seen in this study are similar to those reported by Singh et al., where labour dystocia, malpresentation, foetal distress, and antepartum complications are the most common indications for EmCS procedures ⁽²¹⁾. The relatively high rates of obstructed labour (9%) and premature rupture of membranes (10%) further highlight the impact of suboptimal antenatal monitoring and delayed referral. The data, taken together, indicate that a substantial number of emergency cesarean sections in this context may be avoidable if access to ANC is improved, risk is identified early, and intrapartum monitoring systems are strengthened.

Limitations of the Study

The study was carried out in one tertiary care centre, and the sample size was small (100), which may restrict the generalizability of the results to other health care settings and geographic areas of Bangladesh. Also, being a hospital-based study, it could be subject to referral bias, which may over-represent complicated cases.

V. CONCLUSION

This study demonstrated that emergency caesarean section is mostly experienced by young women of low socio-economic status who do not utilize antenatal care. The most common clinical findings were failed induction and postdated pregnancy, which were the results of inadequate antenatal monitoring. Lower socioeconomic status, irregular or lack of antenatal care, and extremes of gestational age were identified as statistically significant determinants of labour-related emergency caesarean section indications. The results underscore the urgent need for targeted interventions to enhance the accessibility and quality of antenatal care services, especially for economically disadvantaged groups. Improving community-based antenatal outreach, tackling socioeconomic barriers to health care access, and improving intrapartum monitoring in tertiary centers are essential to reduce the burden of preventable emergency operative deliveries and improve maternal and neonatal outcomes in Bangladesh.

VI. RECOMMENDATIONS

Larger sample size multicenter prospective studies with urban and rural populations are recommended to get more representative data on the sociodemographic determinants and clinical indications of emergency caesarean section in Bangladesh. In addition, qualitative research on the barriers to antenatal care utilization of women from lower socioeconomic status would complement these findings and guide targeted policy interventions.

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