

## Incidence, clinical profile and maternal-fetal mortality in pregnancies complicated by obstructed labor

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### ABSTRACT

**Background:** Obstructed labour is a significant cause of maternal and fetal morbidity and mortality, particularly in low-resource settings. This study aimed to assess the incidence, clinical profile, and maternal-fetal outcomes in pregnancies complicated by obstructed labour.

**Methods:** This cross-sectional prospective study was conducted in the Department of Obstetrics and Gynaecology, Sher-e-Bangla Medical College Hospital, Barisal, Bangladesh, from July 2008 to June 2009. This study included 100 patients admitted with obstructed labour across all units of the Obstetrics and Gynaecology Department at Sher-e-Bangla Medical College Hospital.

**Results:** Most patients were aged 21–30 years (54%) and primigravida (62%). Cephalopelvic disproportion (42%) and persistent occipito-posterior position (28%) were the main causes of obstruction. At admission, 72% were in the second stage of labour, and 54% had labour lasting 25–48 hours. Caesarean section was the predominant mode of delivery (85%). Hypertonic uterine contractions were noted in 46%. Clinically, 59% had raised temperature, 66% had moderate anaemia, and 56% had moderate dehydration. Fetal assessment revealed abnormal or absent heart sounds in 86%, and 91% had meconium-stained liquor. At birth, 43% were stillborn, 38% asphyxiated, and 19% healthy. Genital tract injuries occurred in 27%, predominantly vaginal lacerations (14%). Wound infection (37%), pyrexia (32%), and postpartum haemorrhage (26%) were the main maternal morbidities. Maternal mortality was 3%, while 44% were healthy at follow-up.

**Conclusions:** Obstructed labour is associated with substantial maternal and fetal morbidity and mortality. Early recognition, timely referral, and appropriate obstetric intervention are essential to improve outcomes.

**Keywords:** Obstructed labour, Maternal morbidity, Fetal outcome, Uterine contraction

### INTRODUCTION

Each year, approximately 210 million women become pregnant, of whom 20 million experience pregnancy-related complications, and around 500,000 women die due to complications of pregnancy or childbirth.<sup>1</sup> In 1987, the World Health Organization (WHO) launched the Safe

Motherhood Initiative with the goal of reducing maternal morbidity and mortality by 50% by the year 2000. Although the initiative did not achieve this target, maternal health remains a major focus of WHO efforts. The current WHO objective is to reduce maternal mortality to 75% of the 1990 level by 2015, which requires effective management of conditions such as obstructed labor.<sup>1</sup>

Maternal mortality continues to be a significant global health issue, with an estimated 287,000 maternal deaths reported in 2020.<sup>2</sup> While the global maternal mortality ratio (MMR) has declined from 385 to 223 per 100,000 live births between 1990 and 2020, progress remains uneven.<sup>2,3</sup> Women in low-income countries bear a disproportionate burden, accounting for more than 60% of maternal deaths, whereas high-income countries with timely access to quality obstetric care experience far fewer maternal fatalities.<sup>2-5</sup>

Obstructed labor is a common complication in developing countries and is a major contributor to maternal death, as well as short- and long-term morbidity.<sup>1</sup> It is especially prevalent in communities where mechanical problems during labor are common, and access to functioning health services is limited. Obstructed labor is one of the five leading causes of maternal mortality in developing countries, with maternal deaths resulting from obstructed labor or uterine rupture ranging from 4% to 70%, corresponding to maternal mortality rates as high as 410 per 100,000 live births.<sup>1</sup> Despite advances in maternal care, the burden of maternal mortality due to obstructed labor remains significant in many countries, similar to levels observed three decades ago.<sup>1</sup>

Obstructed labor occurs when the fetal presenting part fails to descend despite adequate uterine contractions.<sup>1-6</sup> It results from mechanical problems such as fetopelvic disproportion, malpresentation, malposition, or the presence of tumors obstructing the lower uterine segment.<sup>1-6</sup> Prolonged labor leads to ischemia, necrosis, and severe complications including uterine rupture, postpartum hemorrhage, sepsis, fistula formation, stillbirth, and neonatal death.<sup>6,7</sup> The most common cause is disproportion between the fetal size and the maternal pelvis, although obstruction can also arise from malpresentation, malposition, or fetal abnormalities, particularly in home births attended by untrained personnel.<sup>8</sup> Maternal mortality from obstructed labor primarily results from uterine rupture or puerperal infection, while perinatal mortality is largely due to birth asphyxia. Significant maternal morbidity is associated with prolonged labor, including increased risk of postpartum hemorrhage, infection, and obstetric fistulas.<sup>9</sup>

Every pregnancy carries risk and requires careful supervision supported by accessible health facilities to prevent maternal and fetal complications. In Bangladesh, where 80% of the population resides in rural areas, most deliveries (approximately 80%) are conducted at home by untrained personnel, and only 20% are attended by trained professionals.<sup>9</sup> Maternal mortality and morbidity are often the outcome of unsafe pregnancies and deliveries, influenced by social, cultural, and economic factors. Obstructed labor also has a profound impact on fetal outcomes, often leading to in utero death or severe birth asphyxia, particularly in settings lacking neonatal resuscitation facilities. Perinatal mortality remains high in Bangladesh (52 per 1,000 births), with birth asphyxia

being a leading cause.<sup>9</sup> To improve maternal and neonatal outcomes, community-based services, research, and proactive interventions are essential. Initiatives such as mother and baby care packages are being promoted to reduce maternal and perinatal mortality and morbidity.<sup>9</sup>

Globally, obstructed labor accounts for about 8% of maternal deaths.<sup>1-10</sup> In Bangladesh, the maternal mortality rate is 1.94 per 1,000 live births.<sup>9</sup> Despite improvements in maternal mortality, obstructed labor continues to pose a major challenge due to delayed management, weak referral systems, and limited emergency obstetric services.<sup>10-13</sup> Addressing these gaps through better referral pathways, enhanced surgical capacity, increased antenatal care, and community education could significantly reduce maternal and neonatal mortality.

Therefore, this study aimed to assess the incidence, clinical profile, and maternal-fetal outcomes in pregnancies complicated by obstructed labour.

## METHODS

This cross-sectional prospective study was conducted in the Department of Obstetrics and Gynaecology, Sher-e-Bangla Medical College Hospital, Barisal, Bangladesh, from July 2008 to June 2009. In this study, we included 100 patients admitted with obstructed labour across all units of the Obstetrics and Gynaecology Department at Sher-e-Bangla Medical College Hospital.

These were the following criteria for eligibility as study participants:

### ***Inclusion criteria***

Patients with term pregnancy ( $\geq 37$  weeks of gestation) presenting with features of obstructed labour; malpresentation associated with obstructed labour; contracted pelvis with features of obstructed labour; malposition of the fetal head with features of obstructed labour; fetal congenital anomalies or cephalopelvic disproportion presenting with obstructed labour were included.

### ***Exclusion criteria***

Prolonged labour without features of obstruction; obstructed labour associated with PET, eclampsia, APH, or medical comorbidities such as heart disease, jaundice, lung disease, or thyroid disorders; obstructed labour in twin pregnancies were excluded.

### ***Data collection procedure***

Patients presenting with obstructed labour at the study center were consecutively enrolled over the study period. After obtaining informed consent, detailed demographic and obstetric information was collected using a structured data collection form. Information included age, parity,

antenatal care history, previous oxytocin use, and presenting complaints. Clinical assessment at admission encompassed stage and duration of labour, uterine contraction patterns, vital signs, and fetal status including heart sound and liquor characteristics. Maternal condition was evaluated through examination and laboratory investigations for anaemia, dehydration, blood pressure, pulse, and urine analysis. Mode of delivery, presence of genital tract injuries, and maternal morbidities were recorded during and after delivery. Fetal outcomes at birth, including status (healthy, asphyxiated, stillborn), were documented. Follow-up visits were conducted to assess maternal recovery and detect chronic morbidities such as vesicovaginal fistula, rectovaginal fistula, or vaginal stenosis. All data were anonymized to ensure patient confidentiality.

### Data analysis

All data were recorded systematically in a pre-formatted data collection form. Descriptive statistics were employed to summarize the findings. Categorical variables, including demographic characteristics, causes of obstructed labour, maternal and fetal outcomes, were presented as frequencies and percentages. Continuous variables, such as duration of labour, were summarized using means and ranges where appropriate. Collected data were entered and analyzed using SPSS 23 (Statistical Package for Social Sciences) for Windows version 10. This study was ethically approved by the Institutional Review Committee of Sher-e-Bangla Medical College Hospital.

### RESULTS

Table 1 outlines the demographic and obstetric characteristics of the patients included in the study. Most patients (54%) were between 21–30 years of age, followed by 34% who were up to 20 years old, and 12% aged 31–40 years. Regarding parity, the majority were primigravida (62%), while 38% were multigravida. Antenatal care attendance varied, with 64% of patients having no antenatal checkup, 32% attending irregularly, and only 4% receiving regular antenatal care. Additionally, 61% of the patients had a history of oxytocin use prior to admission, whereas 39% had no such history.

Table 2 presents the various causes of obstructed labour observed among the study patients. Cephalopelvic disproportion was the most common aetiology, accounting for 42% of cases. This was followed by persistent occipito-posterior position (28%) and deep transverse arrest (12%). Less frequently reported causes included shoulder presentation (6%), face presentation (4%), brow presentation (1%), compound presentation (2%), hydrocephalus (3%), and cervical dystocia (2%).

Table 3 shows the labour characteristics of patients at admission (n=100), including stage of labour, duration of labour, and mode of delivery. The majority of patients (72%) were admitted in the second stage of labour, and most experienced labour lasting 25–48 hours (54%).

Caesarean section (LSCS) was the predominant mode of delivery, performed in 85% of cases, followed by craniotomy (7%), subtotal hysterectomy (6%), and repair of ruptured uterus (2%).

**Table 1: Demographic and obstetric characteristics of the patients.**

	Number	Percentage (%)
<b>Age of the patients (in years)</b>		
Up to 20 years	34	34
21-30 years	54	54
31-40 years	12	12
<b>Parity</b>		
Primi	62	62
Multi	38	38
<b>Antenatal checkup</b>		
No checkup	64	64
Irregular checkup	32	32
Regular checkup	04	04
<b>History of oxytocin use</b>		
Yes	61	61
No	39	39

**Table 2: Aetiology of obstructed labour in study patients.**

Causes	Number	Percentage (%)
<b>Cephalo pelvic disproportion</b>	42	42
<b>Persistent occipito-posterior</b>	28	28
<b>Deep transverse arrest</b>	12	12
<b>Shoulder presentation</b>	06	6
<b>Face presentation</b>	04	4
<b>Brow presentation</b>	01	1
<b>Compound presentation</b>	02	2
<b>Hydrocephalus</b>	03	3
<b>Cervical dystocia</b>	02	2

Table 4 shows uterine contraction patterns of patients at admission (n=100). Hypertonic contractions were the most common, observed in 46% of patients, followed by hypotonic contractions in 21%. Bandl's ring was present in 19% of cases, while normal uterine contractions were seen in 14% of patients.

Table 5 shows that among the patients, 59% had a raised temperature. Anaemia was predominantly moderate (66%), with mild and severe anaemia observed in 28% and 6% of cases, respectively. Dehydration was present in varying degrees: mild (32%), moderate (56%), and severe (12%). Most patients (96%) had diastolic blood pressure >50 mm Hg, while 4% had D.B.P <50 mm Hg. Pulse rates ranged from 80–89/min in 28%, 90–100/min in 51%, and >100/min in 21% of patients. Urine examination revealed

high-coloured urine in 74%, hematuria in 18%, and normal-coloured urine in 8% of cases.

**Table 3: Labour characteristics of study patients (n=100).**

Stage of labour at admission	Number	Percentage (%)
First stage	28	28
Second stage	72	72
<b>Duration of labour</b>		
12-24 hours	29	29
25-48 hours	54	54
49-72 hours	16	16
> 72 hours	01	1
<b>Mode of delivery</b>		
LSCS	85	85
Craniotomy	07	07
<b>Repair of ruptured uterus</b>	02	02
<b>Subtotal hysterectomy</b>	06	06

**Table 4: Uterine contraction patterns of patients at admission (n=100).**

Uterine contraction	Number	Percentage (%)
<b>Hypertonic</b>	46	46
<b>Hypotonic</b>	21	21
<b>Bandl's ring</b>	19	19
<b>Normal</b>	14	14

**Table 5: Distribution of general condition of the patients on admission.**

Maternal condition	Number	Percentage (%)
<b>Temperature</b>		
Raised	59	59
Normal	41	41
<b>Anaemia</b>		
Mild	28	28
Moderate	66	66
Severe	06	06
<b>Dehydration</b>		
Mild	32	32
Moderate	56	56
Severe	12	12
<b>Blood pressure</b>		
D.B.P<50mm hg	04	04
D.B.P>50mm hg	96	96
<b>Pulse</b>		
80-89/min	28	28
90-100/min	51	51
>100/min	21	21
<b>Urine exam</b>		
High coloured	74	74
Normal coloured	08	08
<b>Hematuria</b>	18	18

Table 6 shows that abnormal or absent fetal heart sounds were observed in 44% and 42% of cases, respectively, while only 14% had normal heart sounds. Most fetuses (91%) had meconium-stained liquor, and 9% had unstained liquor. At birth, 43% of neonates were stillborn, 38% were asphyxiated, and 19% were healthy.

**Table 6: Fetal condition on admission (n=100).**

Fetal condition	Number	Percentage (%)
<b>Heart sound</b>		
Normal	14	14
Abnormal	44	44
Absent	42	42
<b>Liquor</b>		
Meconium stained	91	91
Unstained	09	09
<b>Fetal outcome at birth</b>		
Healthy	19	19
Asphyxiated	38	38
Stillborn	43	43

Table 7 shows that the majority of patients (73%) had no genital tract injury. Among those with injuries, vaginal lacerations were the most common (14%), followed by rupture of the uterus (8%), cervical tears (3%), and vesicovaginal fistula (V.V.F) in 2% of cases.

**Table 7: Genital tract injuries in mothers before or during delivery (n=100).**

Type of injury	Number	Percentage (%)
<b>Rupture of the uterus</b>	08	08
<b>Cervical tear</b>	03	03
<b>Vaginal laceration</b>	14	14
<b>VVF</b>	02	02
<b>No injury</b>	73	73

**Table 8: Distribution of maternal morbidities among patients.**

Maternal morbidities	Number	Percentage (%)
<b>Acute morbidities</b>		
Post-partum haemorrhage	26	26
Pyrexia	32	32
Paralytic ileus	02	02
Wound infection	37	37
Burst abdomen	01	01
Intestinal obstruction	02	02
<b>Chronic morbidities</b>		
VVF	02	2
RVF	0	0

Table 8 shows that among acute morbidities, wound infection was the most frequent (37%), followed by pyrexia (32%) and post-partum haemorrhage (26%). Less common acute complications included paralytic ileus and intestinal obstruction (2% each) and burst abdomen (1%). Regarding chronic morbidities, vesicovaginal fistula (VVF) occurred in 2% of cases, while rectovaginal fistula (RVF) was not observed.

Table 9 shows that among the mothers, 3% died, 47% experienced acute morbidities, 6% had chronic morbidities such as VVF, RVF, or vaginal stenosis, and 44% were healthy at follow-up. Regarding fetal outcomes, 43% were stillborn, 11% experienced early neonatal death, and 46% were born healthy.

**Table 9: Maternal and fetal outcomes of the study population.**

Maternal outcome	Number	Percentage (%)
Mortality	03	3
Acute morbidity	47	47
Morbidity (VVF, RVF, vaginal stenosis)	06	6
Healthy at follow up visit	44	44
<b>Fetal outcome</b>		
Stillbirth	43	43
Early neonatal death	11	11
Healthy baby	46	46

## DISCUSSION

In this study, the incidence of obstructed labour (OL) was 6.2%, which aligns with findings reported from similar tertiary care settings. Most affected women were aged 20–30 years (54%), consistent with other regional studies. In contrast, Teka et al. reported a lower prevalence of obstructed labour (0.38%), equivalent to 3.8 cases per 1000 deliveries out of 23,090 deliveries during their study period.<sup>14</sup>

Women with obstructed labour were more likely to be primiparous, younger than 20 years, with a BMI >25 kg/m<sup>2</sup>, higher educational attainment, and a fetal birthweight >3500 g. They were also more likely to experience maternal, fetal, or neonatal death, antepartum and postpartum hemorrhage, and maternal and neonatal infection.<sup>15</sup>

In the present study, the predominant causes of obstructed labour were cephalopelvic disproportion (CPD) and malpresentation, consistent with Teka et al, who identified CPD as the leading cause. Obstructed labor remains a major contributor to life-threatening complications, including uterine rupture, hemorrhage, anemia, and sepsis.<sup>14</sup>

Caesarean section (LSCS) was the predominant mode of delivery in this cohort, performed in 85% of cases. Obstructed labour poses significant risks to maternal, fetal, and neonatal outcomes, and previous studies suggest that while vaginal delivery exacerbates adverse outcomes, cesarean delivery mitigates these risks, though not completely.<sup>15</sup>

Ruptured uterus occurred in 8% of cases, all among multiparous women. Among eight patients with uterine rupture, two were successfully repaired, while two of six undergoing subtotal hysterectomy died. Teka et al reported uterine rupture in 65% of OL cases, substantially higher than the 5–20% reported in other resource-poor countries.<sup>14,6,10,16</sup> For example, studies from southern Nigeria documented uterine rupture rates of 10–15%, whereas some South Asian studies report rates below 20%.<sup>18</sup>

Clinical features on presentation reflected the severity of obstructed labour: 59% had fever, 66% were moderately anemic, 74% had high-colored urine, and 18% had hematuria. Postpartum hemorrhage (PPH) and anemia were notably higher than in reports from other regions; studies from Tanzania and Malawi reported rates of 40–60%, lower than our findings.<sup>19,20</sup>

Postoperative complications in this study included wound infection (37%), PPH (26%), pyrexia (32%), paralytic ileus (2%), burst abdomen (1%), and intestinal obstruction (2%). Teka et al reported sepsis in 23% and obstetric fistula in 10% of obstructed labour cases, while sepsis rates in other low-resource settings range from 10–20%.<sup>1,14,21</sup> Harrison et al reported maternal and fetal sepsis rates of 1.4% and 11%, respectively, postpartum hemorrhage of 5.8%, and a maternal death ratio of 246/100,000 deliveries.<sup>15</sup> In Sudan, among 42 women with obstructed labour, sepsis occurred in 7.1%, PPH in 11.9%, maternal death in 4.8%, stillbirth in 26.2%, and early neonatal death in 9.5%.<sup>22</sup>

Maternal mortality in the present study was 3%, all occurring among grand multiparas, while perinatal outcomes were poor, with 43% stillbirth and 38% early neonatal death. A study from Nigeria evaluating 120 perinatal outcomes in OL reported a stillbirth rate of 23% and early neonatal death of 6.7%.<sup>23</sup> Harrison et al assessed over 29,000 labors complicated by obstructed labor / prolonged labor / failure to progress and found stillbirth and neonatal death rates of 46.8 and 44.2 per 1000 live births, respectively.<sup>15</sup> Teka et al reported 2 maternal deaths (2.41%) and 70% neonatal mortality.<sup>14</sup> Although the incidence of obstructed labour in this study is lower than in some resource-poor areas (1–5%), it remains a significant contributor to maternal and perinatal morbidity and mortality.<sup>16–18</sup>

These findings reinforce that obstructed labor remains a major cause of maternal and neonatal mortality in low-resource setting.<sup>10,13,24,25</sup> Efforts to improve outcomes should focus on community education about danger signs

of labor, timely antenatal care, and birth preparedness, which can facilitate earlier care-seeking and reduce the severity of complications at presentation.

### Limitations

The study was conducted at a single tertiary care center with a relatively small sample size, which may limit the generalizability of the findings. The descriptive design precluded analysis of causal relationships between risk factors and outcomes. Additionally, some data, such as prior oxytocin use and antenatal care history, relied on patient recall, which may introduce recall bias.

### CONCLUSION

The study findings show that obstructed labour continues to be a significant contributor to maternal and fetal morbidity and mortality, particularly among primigravida women with inadequate antenatal care. The study demonstrated that cephalopelvic disproportion and malpresentation are the leading causes of obstruction. Prolonged labour, abnormal uterine contractions, and delayed intervention were associated with adverse maternal and fetal outcomes, including genital tract injuries, infections, postpartum haemorrhage, and high rates of stillbirth and neonatal asphyxia. Early recognition, timely referral, and prompt obstetric interventions, including cesarean delivery when indicated, are essential to reduce both maternal and fetal complications.

### Recommendations

Further multicenter studies with larger sample sizes and analytic designs are recommended to better evaluate risk factors and optimize management strategies for obstructed labour.

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