

Perinatal Outcome in High-Risk & Severe-Risk Pregnancy- A Study in a Tertiary Care Hospital

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Abstract

Introduction: High-risk & severe-risk pregnancies are characterized by increased risks of complications for both the mother and the fetus, which can result from several factors such as maternal age, medical situations, lifestyle habits, and previous pregnancies. These complications are a major concern, mostly in developing countries like Bangladesh, where maternal and infant mortality rates remain high. Maternal complications associated with high-risk and severe-risk pregnancies may include maternal death, severe bleeding, sepsis, and hypertensive disorders, while fetal complications may include preterm delivery, fetal growth restriction, and stillbirth. The objective of this study was to investigate the perinatal outcomes of high-risk and severe-risk pregnancies. **Methods:** This prospective purposive study was carried out on the admitted patients in the Department of Obstetrics and Gynaecology, Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka from July 2007 to December 2007. Total hundreds of risk groups pregnant women (N=100) were enrolled in the study among them eighty-five (n=85) scoring 3-6 included as high risk pregnancy and fifteen (n=15) scoring 7 or more included as severe-risk pregnancy. All relevant data were recorded for each individual study subject on predesigned data collection sheet. All collected data were compiled and analyzed by computer-based statistical software (Instat). Chi-square tests were performed to compare the prevalence of study variables where, $p < 0.05$ considered the level of significance with 95% CI. Ethical clearance of this study was obtained from the Institutional Review Board (IRB) of BSMMU, Dhaka, Bangladesh. **Results:** In the high-risk group (n=85), around one-fourth of the patients (22,25.9%) and in a severe-risk group (n=15), one patient (1,6.7%) underwent vaginal delivery, Caesarean section was done in sixty-three patients (63,74.1%) in high-risk pregnant women and fourteen patients (14,93.3%) in severe-risk pregnant women respectively. The distribution of risk group and mode of delivery is statistically highly significant ($P < 0.001$). Out of sixty-three patients (n1=63), nineteen (19, 30.2%) were required to be delivered by caesarean section for fetal distress and fifteen (15, 30.16%) were malpresentation. Out of forty-one patients (n2=14), the most common indications were a history of previous caesarean section with multiple risk factors in eight patients (8, 57.1%). Birth asphyxia was present in nine neonates (9, 13.6%) in a high-risk group (n = 65) and a severe-risk group (n2=14), and birth asphyxia was present in five neonates (5, 35.7%). Based on the outcome, in high-risk pregnancy (n=85), four neonates (4, 4.5%) died and in severe-risk pregnancy (n=15), one (1, 6.3%) died. **Conclusion:** The study found various obstetric complications and outcomes associated with high-risk and severe-risk pregnancies. The results indicated a significantly higher proportion of caesarean sections performed in severe-risk pregnancies compared to high-risk pregnancies. Moreover, the overall outcome was favorable, with only five neonatal deaths reported among the one hundred maternal risk groups.

Keywords: High-Risk & Severe-Risk Pregnancies, Complications, Perinatal Outcome.

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INTRODUCTION

High-risk pregnancies are those in which both mothers and fetuses are at higher possibility of

complications due to various factors including maternal age, medical conditions, lifestyle habits, and previous pregnancy history [1]. Maternal and neonatal outcomes in high-risk & severe risk pregnancies are of great

concern, mostly in developing countries such as Bangladesh, where maternal and infant mortality rates are still high [2]. Bangladesh play significant progress in reducing maternal mortality, however, the country still has a long way to go to attain the Sustainable Development Goals (SDGs) target of less than 70 maternal deaths per 100,000 live births by 2030 [3]. According to World Health Organization, the maternal mortality ratio was 196 deaths per 100,000 live births in 2017, which is the maximum than the global average of 211 deaths per 100,000 live births [4]. In Bangladesh fetal mortality remains a significant concern, with an estimated fetal death rate of 28 per 1,000 live births in 2019 [5]. The maternal mortality rate for 2021 was 32.9 deaths per 100,000 live births, in contrast with a rate of 23.8 in 2020 and 20.1 in 2019 [6]. Global maternal deaths were heavily concentrated in sub-Saharan Africa, accounting for 70% of all maternal deaths in 2020, with a rate of 545 maternal deaths per 100,000 live births [7]. Maternal complications of high-risk pregnancy & severe risk pregnancies can include maternal death, severe bleeding, sepsis, and hypertensive disorders [8]. Hypertensive disorders, such as preeclampsia and eclampsia, are among the leading causes of maternal morbidity and mortality worldwide, particularly in LMICs. These disorders can lead to seizures, stroke, and organ failure, which can be life-threatening for both the mother and the fetus [9]. In LMICs, high-risk & severe risk pregnancies are often associated with social, economic, and environmental factors such as poverty, lack of education, limited access to healthcare services, and poor nutrition. These factors contribute to an increased risk of maternal and fetal complications and make it more challenging to manage high-risk pregnancies [10]. Fetal complications of high-risk & severe risk pregnancies can include preterm delivery, fetal growth restriction, and stillbirth. Preterm birth, defined as delivery before 37 weeks of gestation, is a significant contributor to neonatal mortality and morbidity worldwide. Babies born preterm are at increased risk of respiratory distress syndrome, intraventricular haemorrhage, and long-term neurodevelopmental problems [11]. Management of high-risk pregnancy & severe risk requires a multidisciplinary approach, involving close monitoring of the mother and fetus, timely diagnosis and treatment of complications, and appropriate interventions to improve outcomes. In LMICs, however, access to these interventions is often limited, resulting in poor maternal and fetal outcomes [12]. To improve maternal and fetal outcomes in high-risk & severe risk pregnancies it is crucial to strengthen health systems and increase access to quality maternal and child health services. This study aimed to identify perinatal outcomes in high-risk & severe risk pregnancies.

OBJECTIVE

To determine the perinatal outcome of high-risk pregnant patients and their comparison with the normal pregnant women.

METHODOLOGY

This prospective purposive study was carried out on the admitted patients in the Department of Obstetrics and Gynaecology, Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka from July 2007 to December 2007. A total of hundreds of risk groups of pregnant women (N=100) were enrolled in the study among them eighty-five (n=85) scoring 3-6 included as high-risk pregnancy and fifteen (n=15) scoring 7 or more included as severe-risk pregnancy. All relevant data were recorded for each study subject on a predesigned data collection sheet. Using a proforma, to avoid biases, all events like the 1st stage, 2nd stage and 3rd stage of labour, LSCS, were collected from the records of the patients. All types of abnormalities or complications like prolonged 1st stage, 2nd stage, APH, PPH and all types of operative and non-operative interventions were recorded to correlate with perinatal mortality, morbidity and maternal morbidity. Each patient was followed up to discharge from the hospital and abnormalities important for the study were recorded. For the study, perinatal death was defined as intrapartum stillbirth or neonatal death after 28 weeks of pregnancy to the first week after birth and perinatal mortality rate was defined as perinatal death per 1000 total birth. Maternal complications were defined as complications that arouse during delivery (either normal or Caesarean section) or postpartum period up to their discharge from the hospital. All collected data were compiled and analyzed by computer-based statistical software (Instat). Chi-square tests were performed to compare the prevalence of study variables where, $p < 0.05$ considered the level of significance with 95% CI. Ethical clearance of this study was obtained from the Institutional Review Board (IRB) of BSMMU, Dhaka, Bangladesh.

Inclusion Criteria

- Pregnant women who are willing to participate in the study.

Exclusion Criteria

- Risk factor like any abnormal past obstetric history, such as history of previous caesarean section, infertility, etc. and having risk score 1 or 2, and also history of medical diseases, such as diabetes mellitus, hypertension etc. and risk score 1 or 2 were excluded from the study.

RESULT

In the high-risk group (n=85), around one-fourth of the patients (22,25.9%) and in a severe-risk group (n=15), one patient (1,6.7%) underwent vaginal delivery, Caesarean section was done in sixty-three patients (63,74.1%) in high-risk pregnant women and fourteen patients (14,93.3%) in severe-risk pregnant women respectively. The distribution of risk group and mode of delivery is statistically highly significant ($P < 0.001$) [Table 1]. Among the total number of birth

(n=104), in the high-risk group (n=88)^a, ten of the neonates (10, 11.4%) and in the severe-risk group (n=16)^b, seven of the neonates (7, 43.8%) had Apgar score <7 at 5 minutes respectively, which is highly significantly distributed ($P < 0.001$). In the severe-risk group, (n=16)^b eight of the babies (8, 50, 0%) had birth weight <2.5kg, which is higher than the high pregnancy group (n=88)^a, i.e. twenty-five (25, 28.41%). [Table 2]. Based on the indications for lower segment caesarean section (LSCS) in a high-risk group (score 3-6), out of sixty-three patients (n₁=63), nineteen (19, 30.2%) required to be delivered by caesarean section for fetal distress and fifteen (15, 30.16%) were malpresentation. Other causes were unfavorable cervix (8, 12.7%), placenta praevia (5, 7.9%), and history of previous caesarean section with scar tenderness (5, 7.9%), severe PE (4, 6.3%) and others (1, 1.6%). In this group, out of forty-one patients (n₂=14), the most common indications were a history of previous caesarean section with multiple risk factors in eight patients (8, 57.1%), followed by two patients (2, 14.3%)

due to impending eclampsia and two patients (2, 14.3%) due to malpresentation, and one each (1, 7.1%) due to heart disease with unfavorable cervix and antepartum haemorrhage due to placenta praevia [Table 3]. In high-risk pregnancy (n₁=63), the most common complication is postpartum haemorrhage (PPH) (8, 12.7%), and urinary tract infections (UTIs) were the second most common complication (2, 3.2%). In severe risk pregnancy, (n₂=14), the most common complication was postpartum haemorrhage (PPH) (2, 14.3%), followed by urinary tract infections (UTIs) (1, 7.1%) and wound infection (1, 7.1%). Neonatal jaundice was present in ten (10, 15.4%) cases in high-risk pregnancy (n = 65)^a. Birth asphyxia was present in nine neonates (9, 13.6%) in a high-risk group (n = 65)^a and in severe-risk group (n₂=14), birth asphyxia was present in five neonates (5, 35.7%) [Table 4]. Based on the outcome, in high-risk pregnancy (n=85), four neonates (4, 4.5%) died and in severe-risk pregnancy (n=15), one (1, 6.3%) died [Table 5].

Table 1: Distribution of the pregnant women based on mode of delivery in relation to maternal risk groups (N=100).

Risk groups (N=100)	Total (N=100)	Normal Vaginal Delivery	Lower segment caesarean section
High risk pregnancy	85,85.0%	22,25.9%	63,74.1%
Severe risk pregnancy	15,15.0%	1,6.7%	14,93.3%
Total	100,100.0%	23,23.0%	77,77.0%

Chi-square test: $X^2 = 26.045$, $df = 2$, $P < 0.001$ (significant)

Table 2: Apgar score < 7 at 5 minutes and low birth weight of neonates in relation to Total number of birth(n=104).

Total number of birth(n=104)	Apgar score < 7 at 5 minutes	Birth weight <2.5kg
Total number of birth in high risk pregnancy (n=88) ^a	10,11.4%	25,28.4%
Total number of birth in severe risk pregnancy (n=16) ^b	7,43.8%	8,50.0%

Chi-square test: $X^2 = 33.299$, $df = 2$, $P < 0.001$ (significant)

a Includes 3 twins

b Includes 1 twin

Table 3: Indications for Caesarean section in high-risk and severe risk pregnancy group (score 3-6).

Indications	High risk pregnancy (n ₁ = 63)
Fetal distress	19,30.2%
Malpresentation	15,23.8%
Unfavorable cervix	8,12.7%
Cephalopelvic disproportion (CPD)	6,9.5%
Placenta praevia	5,7.9%
History of previous Caesarean section with scar tenderness	5,7.9%
Severe preeclampsia (PE)	4,6.3%
Others	1,1.6%
Indications	Severe risk pregnancy (n ₂ =14)
History of previous caesarean section with multiple risk factors	8,57.1%
Severe PE	2,14.3%
Malpresentation	2,14.3%
Heart disease with unfavorable cervix	1,7.1%
Antepartum haemorrhage (APH) due to placenta praevia	1,7.1%

Table 4: Maternal and neonatal complications following LSCS delivery in maternal risk groups

Maternal complications	High risk pregnancy (n ₁ = 63)	Severe risk pregnancy(n ₂ =14)
With complications		
Postpartum haemorrhage (PPH)	8,12.7%	2,14.3%
Urinary tract infection (UTI)	2,3.2%	1,7.1%
Wound infections	1,1.6%	1,7.1%
Breast complications	1,1.6%	0,0.0%
Others	2,3.2%	0,0.0%
Without complications	49,77.7%	10,71.4%
Neonatal complications	High risk pregnancy (n = 65) ^a	Severe risk pregnancy(n ₂ =14)
With complications		
Birth asphyxia	9,13.8%	5,35.7%
Neonatal jaundice	10,15.4%	0,0.0%
Respiratory distress syndrome (RDS)	2,3.1%	0,0.0%
Sepsis	1,1.5%	0,0.0%
Feeding problem	2,3.1%	
Others	1,1.5%	1,7.1%
Without complications	40,61.5%	8,57.1%

^a Includes 2 twins**Table 5: Fetal outcome in high-risk and severe risk pregnancy group (N=100).**

Risk groups (N=100)	Total neonatal death
High risk pregnancy (n=85)	4,4.5%
Severe risk pregnancy(n=15)	1,6.3%
Total (100)	5,4.8%

DISCUSSION

High-risk pregnancies were associated with overall perinatal outcomes with increased threat of perinatal morbidities and mortalities. This prospective purposive study was conducted on the admitted patients in the Department of Obstetrics and Gynaecology, Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka. The given data suggested that in both the high-risk and severe-risk groups of pregnant women, vaginal delivery is less common compared to Caesarean section. This finding is consistent with many other studies that have investigated the association between risk group and mode of delivery. A systematic review and meta-analysis compared maternal and neonatal outcomes of planned caesarean section versus planned vaginal delivery for women with a high-risk pregnancy. The study found that in high-risk pregnancies, planned caesarean section was associated with a lower risk of adverse neonatal outcomes, but a higher risk of maternal complications, such as postpartum hemorrhage and infection [13]. Similarly, another article found that in women with a high-risk pregnancy, the rate of Caesarean section was significantly higher than in low-risk pregnancies and that the rate of Caesarean section increased with the number of risk factors present [14]. The higher rate of Caesarean section in these groups may reflect the need to reduce potential risks and ensure the best possible outcomes for both mother and baby. The given data suggested that in both high-risk and severe-risk pregnancies, there was an increased risk of poor neonatal outcomes such as low Apgar scores and low birth weight. This finding was consistent with other

studies that investigated the association between risk groups and neonatal outcomes. A study conducted in Nigeria found that neonatal outcomes, including Apgar score and birth weight, were significantly worse in high-risk pregnancies compared to low-risk pregnancies. The study also found that the incidence of low Apgar scores and low birth weight was higher in high-risk pregnancies compared to low-risk pregnancies [15]. Another study carried out in India also found that there was a significant association between maternal risk factors and neonatal outcomes. The study found that neonatal outcomes, including Apgar score and birth weight, were significantly worse in high-risk pregnancies compared to low-risk pregnancies [16]. Based on the provided information, the most common indications for lower segment caesarean section (LSCS) in high-risk patients were fetal distress and malpresentation. Other causes included an unfavorable cervix, placenta praevia, scar tenderness, severe pre-eclampsia, and other factors. A systematic review and meta-analysis conducted in Sudan depicted that the most common indications for LSCS in high-risk patients were previous caesarean section, fetal distress, and malpresentation. In their study, previous caesarean section was the most common indication, accounting for 28.5% of cases, followed by fetal distress (22.5%) and malpresentation (21.5%). These findings were broadly consistent with the indications reported in the present study, although the relative frequencies of each indication may differ [17]. Another study examined the indications for LSCS in low- and middle-income countries, where access to emergency obstetric care might be limited. They found

that obstructed labour, fetal distress, and malpresentation were the most common indications for LSCS, accounting for 41%, 21%, and 19% of cases, respectively. In contrast to the present study, scar tenderness and severe pre-eclampsia were not identified as significant indications for LSCS in another study [18]. The findings of the present study suggested that postpartum haemorrhage (PPH) is the most common complication in both high-risk and severe-risk pregnancies, followed by urinary tract infections (UTIs) in high-risk pregnancies and wound infections in severe-risk pregnancies. Neonatal jaundice and birth asphyxia were also common complications in high-risk pregnancies, with 15.4% and 13.6% of neonates affected, respectively. In severe-risk pregnancies, the incidence of birth asphyxia was much higher, affecting 35.7% of neonates. The incidence of PPH reported in this study was consistent with the findings of other studies. A systematic review and meta-analysis found that PPH was the most common maternal complication of caesarean section, with an overall incidence of 6.4%. The incidence of PPH was higher in women with previous caesarean section, multiple gestations, and other high-risk factors [19]. Urinary tract infections (UTIs) were also a known complication of caesarean section, with an incidence ranging from 1% to 10% [20]. The incidence of UTIs reported in the present study falls within this range. The incidence of neonatal jaundice and birth asphyxia reported in the present study was higher than what has been reported in some other studies. For example, a retrospective study found that the incidence of neonatal jaundice following caesarean section was 1.5%, and the incidence of birth asphyxia was 2.4% [21]. However, it was important to note that the definition of high-risk pregnancy and the criteria for identifying complications might vary across studies, which might contribute to differences in reported incidence rates. Overall, the present study provided important insights into the complications associated with caesarean section in high-risk and severe-risk pregnancies. The findings were consistent with previous studies, although the incidence of some complications appears to be higher than what has been reported in other studies. Further research was needed to better understand the risk factors and predictors of complications in this population and to develop strategies for preventing and managing these complications. The present study reported that in high-risk pregnancies (n=85), four neonates (4.5%) died, while in severe-risk pregnancies (n=15), one neonate (6.3%) died. While any neonatal death was a serious event, the incidence reported in this study was consistent with what has been reported in other studies. A systematic review and meta-analysis found that the overall neonatal mortality rate following caesarean section was 2.3 per 1,000 live births [22]. The study found that the risk of neonatal mortality was higher in low- and middle-income countries compared to high-income countries, and higher in emergency caesarean sections compared to elective caesarean sections. The

incidence of neonatal mortality reported in the present study was higher than what has been reported in some other studies. For example, a retrospective cohort study carried out in Tanzania found a neonatal mortality rate of 2.3% following caesarean section [23]. However, it was important to note that the definition of high-risk pregnancy and the criteria for identifying complications can vary across studies, which may contribute to differences in reported incidence rates. It is crucial to note that the causes of neonatal death are multifactorial and can be related to various factors, including maternal and neonatal health, access to quality healthcare, and socioeconomic status. Therefore, it is essential to identify high-risk pregnancies, provide adequate antenatal care, and ensure prompt and effective management of complications during and after delivery to reduce neonatal mortality. Overall, the findings of the present study underscored the importance of identifying and managing high-risk pregnancies, as well as the need for further research to better understand the risk factors and predictors of adverse neonatal outcomes following caesarean section.

CONCLUSION

The study provided insights into the several obstetric complications and consequences of both high-risk and severe-risk pregnancies. The findings suggested that the rate of caesarean section was significantly higher in severe-risk pregnancies than in high-risk pregnancies. Additionally, the prevalence of low Apgar scores at 5 minutes and low birth weight was higher in severe-risk pregnancies compared to high-risk pregnancies. The most common indications for caesarean section in high-risk pregnancies were fetal distress and malpresentation. Postpartum haemorrhage was the most common complication in both high-risk and severe-risk pregnancies. Overall the outcome was satisfied, among one hundred maternal risk groups, only five neonates died.

RECOMMENDATIONS

In high-risk pregnancies, a Caesarean section is the preferred mode of delivery, as it appears to be associated with better outcomes for both the mother and the baby. Close monitoring during labour and delivery is recommended, especially for high-risk pregnancies, to ensure that any potential complications are identified and addressed promptly. Providers should be aware of the indications for Caesarean section and be prepared to perform one if necessary. In high-risk pregnancies, it is important to address any potential complications promptly, including postpartum haemorrhage, urinary tract infections, and neonatal jaundice. Neonates born to high-risk and severe-risk pregnancies should be closely monitored for birth asphyxia, and appropriate interventions should be taken to prevent this complication. Further research is needed to identify additional risk factors associated with high-risk and severe-risk pregnancies and to develop more effective

interventions to improve outcomes for both the mother and the baby.

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