

A comparative study on the maternal and foetal outcome between normal and high risk pregnancy patient

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Abstract

Background Pregnancies and deliveries are potentially at risk. Well supervised antenatal, intranatal and postnatal care can reduce this risk to a minimal acceptable level.

Objective To find out perinatal outcome of high-risk pregnant patients in comparison with the normal pregnant women and to evaluate the utility of numerical scoring system in identifying high-risk pregnancy.

Methods 200 patients were selected from the admitted patients in the obstetric ward of Bangabandhu Sheikh Mujib Medical University, Dhaka. Study patients were divided into three groups: 100 patients (control group) were normal pregnancy (score 0-2), 85 patients were high-risk (score 3 – 6), and 15 patients were severe-risk (score 7 or more). Both case and control subjects were followed intranatally and postnatally up to the discharge from the above institutions. 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 in order 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. Neonatal morbidity was defined for surviving newborn by Apgar score <7 at 5 minutes or birth weight < 2.5 kg.

Results In normal pregnancy group, 43% needed to be delivered by caesarean section in comparison to 63 (74.1%) and 14 (93.33%) patients respectively in high-risk and severe-risk group ($P < 0.001$). Maternal complication following normal vaginal delivery was highest (100%) in severe-risk group, followed by high-risk group (36.36%) and normal pregnancy (19.30%). Complications following caesarean section were also highest in severe-risk group (28.47%), followed by normal pregnancy (25.59%) and high-risk pregnancy (20.63%). Neonatal complications in normal pregnancy group was 30.23% in comparison 38.46% in high risk group. 6 (6%) of neonates in the normal pregnancy group had Apgar score < 7 at 5 minutes and in high risk and severe-risk groups, 10 (11.76%) and 7 (43.75%) of the neonates respectively had Apgar score <7 at 5 minutes ($P < 0.001$). In the severe-risk group, 8 (50%) of the babies had birth weight <2.5kg, which is higher than high and normal pregnancy group, i.e. 25 (28.41%) and 3 (3%), respectively ($P < 0.001$). Higher perinatal deaths also occurred in high-risk and severe risk groups.

Conclusion It can be concluded that the perinatal morbidity, mortality and maternal morbidity are significantly higher in high-risk pregnancies. This group, though represent only 20-30 percent of all pregnant patients, is responsible for 70-80 percent of the perinatal morbidity and mortality.

Keywords High risk pregnancy, perinatal mortality, morbidity and maternal morbidity.

Introduction

All pregnancies and deliveries are potentially at risk. But well supervised antenatal, intranatal and postnatal care can reduce this risk to a minimal acceptable level. In the developed countries significant improvement has been achieved in the field of obstetrics care. Consequently, their maternal mortality has been brought down into desired minimal level, as such; they consider only perinatal morbidity and mortality in identifying high risk cases. But in the developing countries with a high maternal and perinatal mortality, the maternal factors should also be considered¹.

In our country, three Bangladeshi women die every hour of complications related to pregnancy and child birth. The current estimated maternal mortality rate (maternal death per 1000 live births) of 3.20 is the highest in the world². Same is true in the case of perinatal mortality. It is estimated that about 7.3 million perinatal deaths occur annually in the world, most of these in the developing countries³. Bangladesh is having very high infant mortality rate i.e. 52 per 1000 births⁴.

In our country, most of the deliveries (> 95%) occur at home and are not recorded; most of the women can not even mention their last menstrual period and do not go regularly for antenatal care (ANC)². One of the important purposes of the ANC is to identify the high-risk patients and to give more attention both antenatally and intranatally.

Many high risk cases remained undetected due to sub-optimal antenatal care. If we want to change the situation with a reasonable short period of time, we need some radical changes in antenatal and intranatal care. Bangladesh in one of the few countries that have very well-developed health infrastructure for delivery of healthcare to the vast majority of rural population, but still we have failed to reduce our maternal mortality, prerinatal mortality and morbidity to the expected rate.

Risk scoring may be defined as a formalized method of recognizing, documenting and cumulating antepartum and intrapartum factors, in order to predict later complication for mother, fetus and infant⁵. The system for scoring and identification of high-risk mothers was selected from well-accepted scoring systems developed by Nesbitt and Aubry⁶, Goodwin *et al.*⁷ and coopland *et al.*⁸. A study comprising the applicability of the

scoring system was done by Knox in New Zealand⁹. Das and Dutta¹⁰ of India adopted a more detailed scoring system covering age, parity, previous obstetric history, associated medical diseases and pregnancy complications.

In our country, there is no scoring system and antenatal care card which does not include all the factors responsible for the low obstetrical outcome. Moreover, we need a well-developed, appropriate and acceptable risk scoring system for proper care of the pregnant mothers and improvement of perinatal outcome and maternal morbidity.

It is important to mention that only risk identification is not sufficient to reduce perinatal outcome, along with this, a good referral system supported with transport and first referral institution are necessary as a part of primary healthcare if perinatal mortality and maternal mortality rates are to be reduced.

The main aim of the present study was to determine the extent of the association of high-risk pregnancies with perinatal mortality, morbidity and maternal morbidity. The risk scoring system was selected for this study was developed by Coopland *et al.*⁸.

A high-risk pregnancy diagnosis shouldn't automatically have a negative connotation. With proper care, a majority of high-risk pregnancies produces healthy, viable babies. The earlier a problem is detected, the better the chances that both mother and baby will stay healthy. Regular supervised antenatal intranatal and postnatal care reduces the complication for mother and the baby.

Methods

This prospective comparative and 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. With approval from the hospital ethical committee and written informed consent, 100 high-risk pregnant women (case) and 100 normal pregnant women (control) were identified for the study on the basis of selected parameters. The patients were selected for the study by using numerical risk scoring system developed by Coopland *et al.* (1977). On the basis of this system 100 patients were selected randomly. Out of 100

cases, 85 with a risk score 3-6 were identified as high-risk group and 15 with a risk score 7 or above were identified as severe-risk group. Another 100 women (control) were selected using same scoring system and having score 0-2 as normal pregnancy group. Any 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 normal pregnancy group (control). Study patients were divided into three groups: Normal pregnancy (score 0-2), High-risk (score 3 – 6), and Severe-risk (score 7 or more). Both case and control subjects were followed intranatally and postnatally up to the discharge from the above institutions. Using a proforma, in order to avoid biasness, all events like 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 in order 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 purpose of the study, perinatal death was defined as intrapartum stillbirth or neonatal death after 28 weeks of pregnancy to first week after birth and perinatal mortality rate was defined as perinatal death per 1000 total birth. Neonatal morbidity was defined for surviving newborn by Apgar score <7 at 5 minutes or birth weight < 2.5 kg. Neonatal illnesses included in the study were those illnesses that developed by the study neonates during their presence in the obstetric units up to their discharge or referred to the paediatric unit.

Maternal morbidity was defined by the occurrence of primary or repeat Caesarean section or delivery by forceps or ventouse. In this study, none of the study subjects were delivered by forceps or

ventouse. Maternal complications were defined as complications that arouse during delivery (either normal or Caesarean section) or postpartum period up to their discharge from the hospitals.

All collected data were compiled and analyzed by using Unpaired 't' test, Chi-square (x²) or ANOVA as appropriate. Results were considered statistically significant if P value < 0.05.

Results

In normal pregnancy group, 57 patients(57%) had normal vaginal delivery and 43 (43%) needed to be delivered by Caesarean section. In high-risk group, 22 (25.88%) patients and 1 (6.67%) in severe-risk group of patients delivered vaginally, Caesarean section were done in 63 (74.1%) and 14 (93.33%) patients respectively(P<0.001). One (1%) neonate in the normal pregnancy group, 4 (4.54%) in high risk group and 1 (6.25%) in severe risk group died (Table-II). Higher perinatal deaths occurred in high-risk and severe risk groups. Table-III shows that 6 (6%) of neonates in the normal pregnancy group had Apgar score < 7 at 5 minutes and in high risk and severe-risk groups, 10 (11.76%) and 7 (43.75%) of the neonates respectively had Apgar score <7 at 5 minutes, which is highly significant (P < 0.001). Table-IV shows that in the severe-risk group, 8 (50%) of the babies had birth weight <2.5kg, which is higher than high risk and normal pregnancy group, i.e. 25 (28.41%) and 3 (3%), respectively(P<0.001). Maternal complication following normal vaginal delivery was highest (100%) in severe-risk group, followed by high-risk group (36.36%) and normal pregnancy (19.30%). Complications following caesarean section were highest in sever-risk group (28.47%), followed by normal pregnancy (25.59%) and high-risk pregnancy (20.63%). Table-VII shows neonatal complications of patients delivered by Caesarean section in relation to various risk groups. In normal pregnancy group, neonatal complication arose in 13 neonates (30.23%) in comparison to high-risk group in 25 (38.46%).

Table I Mode of delivery in relation to various maternal risk groups

Risk group	Total number of patients	Normal vaginal delivery		LSCS	
		No.	(%)	No.	(%)
Normal pregnancy	100	57	(57.00)	43	(43.00)
High risk pregnancy	85	22	(25.88)	63	(74.10)
Severe risk pregnancy	15	1	(6.67)	14	(93.53)
Total	200	80	(40.00)	120	(60.00)

Chi-square test: X² = 26.045, df = 2, P < 0.001 (significant)

Table II Perinatal mortality in relation to various maternal risk groups

Risk group	Total number	Total number	Total neonatal death	
	of patients	of birth	No.	(%)
Normal pregnancy	100	100	1	(1.00)
High-risk pregnancy	85	88(3 twins)	4	(4.54)
Severe risk pregnancy	15	16(1 twin)	1	(6.25)
Total	200	204	6	(2.94)

Chi-square test: $X^2 = 2.727$, $df = 2$, $P = 0.2556$ (not significant). One (1%) neonate in the normal pregnancy group, 4 (4.54%) in high risk group and 1 (6.25%) in severe risk group died (Table-II). Higher perinatal deaths occurred in high-risk and severe risk groups

Table III Apgar score < 7 at 5 minutes in relation to various maternal risk group

Risk group	Total number of patients	Total number of birth	Apgar score < 7 at 5 minutes	
			No.	(%)
Normal pregnancy	100	100	6	(6.00)
High-risk pregnancy	85	88(3 twins)	10	(11.76)
Severe risk pregnancy	15	16(1 twin)	7	(43.75)
Total	200	204	23	(11.27)

Chi-square test: $X^2 = 19.412$, $df = 2$, $P < 0.001$ (significant). 6 (6%) of neonates in the normal pregnancy group had Apgar score < 7 at 5 minutes and in high risk and severe-risk groups, 10 (11.76%) and 7 (43.75%) of the neonates respectively had Apgar score < 7 at 5 minutes.

Table IV Low birth weight babies in relation to various maternal risk factors

Risk group	Total number of patients	Total number of birth	Birth weight < 2.5kg	
			No.	(%)
Normal pregnancy	100	100	3	(3.00)
High-risk pregnancy	85	88(3 twins)	25	(28.41)
Severe risk pregnancy	15	16(1 twin)	8	(50.00)
Total	200	204	23	(11.27)

Chi-square test: $X^2 = 33.299$, $df = 2$, $P < 0.001$ (significant). In the severe-risk group, 8 (50%) of the babies had birth weight < 2.5kg, which is higher than high risk and normal pregnancy group, i.e. 25 (28.41%) and 3 (3%) respectively.

Table V Maternal complications following normal vaginal delivery in various risk groups

Maternal complications	Normal pregnancy (n = 43)		High-risk pregnancy (n = 63)		Sever-risk pregnancy (n = 14)	
	No.	(%)	No.	(%).	No.	(%)
Without complications	46	(80.70)	14	(63.64)	0	
With complications	11	(19.30)	8	(36.36)	1	(100.00)
Postpartum haemorrhage (PPH)	6	(54.55)	4	(50.00)	1	(100.00)
Perineal tear	3	(27.27)	3	(13.64)	0	
Urinary retention	1	(9.09)	1	(12.50)	0	
Urinary incontinence	1	(9.09)	1	(12.50)	0	

Maternal complication following normal vaginal delivery was highest (100%) in severe-risk group, followed by high-risk group (36.36%) and normal pregnancy (19.30%).

Table VI Maternal complications following LSCS delivery in various risk groups

Maternal complications	Normal pregnancy (n = 43)		High-risk pregnancy (n = 63)		Sever-risk pregnancy (n = 14)	
	No.	(%)	No.	(%).	No.	(%)
	Without complications	32	(74.41)	49	(79.37)	10
With complications	11	(25.59)	14	(20.63)	4	(28.57)
Postpartum haemorrhage (PPH)	6	(54.55)	8	(57.14)	2	(50.00)
Urinary tract Infection (UTI)	1	(9.09)	2	(14.28)	1	(25.00)
Wound infections	2	(18.18)	1	(7.14)	1	(25.00)
Breast complications	0		1	(7.14)	0	
Others	2	(18.18)	2	(14.28)	0	

Complications were highest in sever-risk group (28.47%), followed by normal pregnancy (25.59%) and high-risk pregnancy (20.63%).

Table VII Neonatal complications among caesarean deliveries in relation to various maternal risk groups

Complications	Normal pregnancy (n = 43)		High-risk pregnancy (n = 65) ^a		Sever-risk pregnancy (n = 14)	
	No.	(%)	No.	(%).	No.	(%)
	Without complications	30	(69.77)	40	(61.54)	8
With complications	13	(30.23)	25	(38.46)	6	(42.86)
Birth asphyxia	2	(4.65)	9	(13.85)	5	(35.71)
Neonatal jaundice	5	(11.63)	10	(15.38)	0	
Respiratory distress syndrome (RDS)	1	(2.33)	2	(3.08)	0	
Sepsis	1	(2.33)	1	(1.53)	0	
Feeding problem	0		2	(3.08)	0	
Others	4	(9.30)	1	(1.53)	1	(7.14)

In normal pregnancy group, neonatal complication arose in 13 neonates (30.23%) in comparison to high-risk group in 25 (38.46%).

Discussion

This study was aimed to determine the extent of association of high-risk pregnancies with perinatal morbidity, mortality and maternal morbidity and was to test a simplified antepartum numerical risk scoring system. This well accepted risk scoring system was developed by Coopland in 1977. The incidence of maternal morbidity was significantly higher in high-risk and sever-risk groups ($P < 0.001$). It was about 93.53% in sever-risk group, 74.10% in high-risk and 43% in normal pregnancy group. This is comparable with that of Datta et al.¹³ who showed incidence of maternal morbidity in high-risk group as 50% ($P < 0.001$).

The Table-II shows out of 6 perinatal deaths, one (16.67%) occurred in normal pregnancy group,

83.33% occurred in high-risk and sever-risk groups. This is comparable with that of Thakur *et al.*¹¹, 77.7%. In present study, the perinatal mortality was relatively low. This is due to the fact that almost all admitted patients had regular or at least one or two antenatal check-up, in this institution. Besides patients receive appropriate intranatal care and any babies who develop complications after birth are referred to paediatrics unit and were not included in this study. In this study, perinatal mortality rate was 10/1000 total births in normal pregnancy group which is comparable with Thakur *et al.*¹¹ 18.3/1000 total births. Perinatal mortality rate was 45.4/1000 total births in high-risk group and 62.5/1000 total births in sever-risk group, which are comparable with the study of Daga *et al.*¹² 67.9/1000 total births. In the present study, result

is well-supported by Gupta *et al.*¹³ who found preinatal mortality as 8/1000 total births in control group, whereas 68/1000 total births in 'at-risk' group. In this study, there is a significant association of perinatal deaths with risk factors. Table-III shows Apgar score <7 at 5 minutes in relation to various risk groups. Apgar score <7 at 5 minutes indicates moderate asphyxia. Out of 21 neonates having Apgar score <7 at 5 minutes, 6 (28.57%) belonged to normal pregnancy group and 15 (71.43%) belonged to high-risk patient group. Distribution was highly significant ($P<0.001$). This relationship between high-risk patients and birth of neonates with low Apgar score was also observed by Thakur *et al.*¹¹ ($P<0.001$). Table-IV & V show relationship between low birth weight babies of various maternal risks groups. In the normal pregnancy group 3 (3%) neonates, in the high-risk group 25 (28.41%) neonates and in the severe-risk group 8 (50%) neonates had birth weight <2.5 kg. This association was highly significant ($P<0.001$). This study is well-supported by Thakur *et al.*¹¹ 6.4% in low-risk group, 22.6% in moderate-risk and 25.0% in high-risk group. Table-V shows maternal complications following normal delivery in various risk groups and Table-VI shows maternal complications following LSCS in various risk groups. In this study, wound infection after Caesarean section in normal pregnancy group was 2 (4.65%), in high-risk group 1 (1.59%) and in severe-risk group 1 (7.14%). Among 120 patients, wound infection developed in 4 (3.33%). This is comparable with the study of Watson *et al.*¹⁵ 1.54% in patients who had Caesarean delivery without labour. Urinary tract infection (UTI) following Caesarean section, in this study, was 1 (2.33%) in normal pregnancy group, 2 (3.17%) in high-risk group and 1 (7.14%) in severe-risk group. This is comparable with the study of Watson *et al.*¹⁵ who showed UTI among Caesarean delivery with labour in 2.72% and without labour as 4.65% in high-risk obstetric patients.

All pregnancies and deliveries are potentially at risk. It is the duty of the obstetricians to identify the risk for better care and every obstetrician does the same. But the system varies from person-to-person, institution-to-institution and country-to-country, but still neonatal death occur, indicating risk identification is not sufficient to reduce perinatal mortality or maternal morbidity.

Perinatal morbidity and mortality, and maternal morbidity and mortality are influenced by socioeconomic, nutritional and educational factors, besides the inherent risk associated with pregnancy and method of risk identification system. Since the maternal mortality of our country is high, we need definitive system of risk scoring, both antenatally and intranatally, including proper care after delivery. We need improvement in socioeconomic condition and increase in literacy rate. Our neonatal care needs further improvement. In order to reduce maternal mortality, World Health Organisation (WHO) has formulated "Risk Approach" strategy. The main goal of antenatal care in the developing countries is to identify women whose pregnancy or delivery is likely to raise problem and refer them to a hospital where necessary medical equipment and expertise are available¹⁴.

This study concluded that the perinatal morbidity and mortality, and maternal morbidity are significantly higher in high-risk pregnancies. This group, though represent only 20-30 percent of all pregnant patients, this group is responsible for 70-80 percent of the perinatal morbidity and mortality.

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