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Original Article

Outcome and Indication of Caesarean Section amongst Pregnant Women Experiencing Premature Rupture of Membranes

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Abstract

Premature rupture of membranes (PROM) is characterized by the spontaneous rupture of chorioamniotic membranes more than one hour before the onset of labor. This condition typically arises spontaneously in most cases, affecting a significant portion of pregnancies. Notably, PROM can also occur in full-term pregnancies. This cross-sectional follow-up study was conducted among pregnant women had premature rupture of membranes and experiencing Caesarean Section (CS) in the department of Obstetrics and Gynaecology of Dhaka National Medical College Hospital (DNMCH), Dhaka, Bangladesh during the period of March to August 2011. The main aim of the study was to find out the indication and outcome of pregnant women with PROM and completed CS. A total of 90 data were collected purposively from all pregnant women more than 28 weeks of gestational age with PROM admitted in the Department of Obstetrics and Gynaecology, DNMCH, Dhaka for labour and underwent CS during study period. The data were collected using a semi-structured data sheet through direct questioning of the patients and physical examinations. Daily follow-ups were conducted until the patients were discharged, and data were also obtained from the clinical records of the patients. PROM patients encompassed all age groups, with ages ranging from 18 to 38 years. The overall educational level of the participants was low, with less than two-third (61.1%) belonging to the low socio-economic status. The average gestational age was 36.65 weeks, with 53.3% being primigravida, 45.6% being multigravida and grand multipara was 1 (1.11%). Only two had multiple pregnancies, and 11 respondents had experienced per vaginal bleeding. During previous gestations, 20 had a history of Caesarean section, 12 had experienced abortion, and 2 had previous cases of PROM. Nutritional deficits were found in 36.7% of patients, Pregnancy Induced Hypertension (PIH) in 35.6%, infections in 12.2%, and chronic hypertension in 5.6%. Four foetuses were in breech presentations, one had a single compound presentation, and two had a transverse or oblique lie. All the women were experiencing gushing of fluid per vagina, with one-fifth (20.0%) having meconium-stained and 12.2% blood-stained vaginal discharge. Attempts to prolong pregnancy were not very successful, with the longest duration being 75 hours. Caesarean sections had to be performed in all cases, with 34.4% within 24 hours and 41.2% within the next 24 hours. Elective caesarean sections following PROM were 28.9%. Indications for emergency caesarean section included a previous history of Caesarean section in 19 cases, foetal distress was found in 18 cases, failed induction in 7 cases, chorioamnionitis in 6 cases, foetal malpresentation was in 5 cases, and other reasons in 9 cases. More than one-third (35.56%) respondents had morbid condition to complicate the postpartum period. Among the complications, 21.11% suffered from wound infection; followed by puerperal sepsis 8.89% and postpartum haemorrhage 5.56%. At termination, all 92 foetuses were alive, but 6 babies had an apgar score <7 at 5 minutes after delivery, 30.4% of babies had low birth weight and 73.9% were in good condition, whereas 26.1% were admitted in neonatal ward, and out of the admitted 7 died with neonatal sepsis being the primary cause of death. A better understanding of the diagnosis babies and management of PROM will enable obstetric care providers to optimize perinatal outcomes and minimize neonatal morbidity and mortality. Therefore, this study finds the indication and outcome of caesarean section in pregnant women experiencing PROM.

Keywords: *Premature rupture of membranes, caesarean section, pregnant women.*

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INTRODUCTION

Premature rupture of membranes (PROM) is a significant obstetric problem in pregnancy that has a major impact on

foetal and maternal outcome. It is one of the common clinical events which may occur in any time during pregnancy and where normal pregnancy can turn into high-risk situation for mother as well as foetus. Premature rupture of membranes (PROM) is defined as spontaneous rupture of (chorioamniotic) membranes more than 1 hour before the onset of labour.1 PROM affects 2.7-17% of all pregnancies and in most cases happens spontaneously.[1] PROM occurs in approximately 8% of term pregnancy.[2] PROM is responsible for about 35% of all preterm delivery and its consequences.[1] Forty six percent (46%) women developed labor pain between 1-15 hours of rupture of membranes and another 26% developed pain between 15-30 hours.[2,4,5] Infection is the most common cause of PROM.[2,3,8] Subclinical infection, high blood sugar level, over distension of abdomen decrease tensile length of foetal memebrane.[7] Chorioamnionitis is an important sequel of PROM and may precede endometritis or puerperal sepsis. PROM also increases the risk of caesarean section and duration of stay in hospital.[8, 9] Treatment of PROM after confirmation of diagnosis depends the gestational age and risk of infection. The best outcome depends on several factors among which are gestational age, evidence of foetal disease, initiation of labor, anti-partum sepsis and condition of the cervix.[10] There has been increasing incidence of Caesarean section during last two decades to extent from about 5% to more than 20% among hospital delivery. Thus, incidence depends on different indications, which is now diagnosed and detected early and reduces the foetal maternal morbidity.[11] Labor and delivery may be a severe insult to preterm PROM infant. This has led to suggestion that Caesarean section should be used to delivery infants less than 1.5 kg irrespective of their presentation. This is a controversial subject and there is no solid evidence that Caesarean section is better suggestive proposition.[12] Caesarean section is a powerful intervention and contributing the best chance to preterm baby with foetal distress, CPD, prime breach and mal-presentation. Preterm breech probably benefits to some extent from Caesarean section. Actually our aim should be to continue the pregnancy up toten in preterm PROM and managed normally but due to unavoidable circumstances for saving the life of the mother or foetus, an interventional procedure that is Caesarean section has to be done immediefly.[13] As the study will explore the pre-mature rupture of membrane patients and record maternal and child outcome in a tertiary hospital of Bangladesh, it has several policy implications in terms of resource (human, financial, and informational) allocation and utilization. This information is vital to plan for antenatal obstetrics care in Bangladesh and other similar settings.

MATERIALS AND METHODS

This was a hospital based cross sectional followup study. The study was carried out in the department of Obstetrics and Gynaecology of Dhaka National Medical College Hospital, Dhaka, Bangladesh. The study was conducted over a period of 6 (six) months from March to August 2011. Study population was the all women with premature rupture of membrane (PROM) with more than 28 weeks of gestational age underwent caesarean section without labour admitted in the Department of Obstetrics and Gynaecology, DNMCH, Dhaka during study period. The sample size for this study was 90 cases. The respondents for the study were selected purposively from the study population depending on their willingness to participate in the study. The inclusion criteria were primi and multi-gravida with PROM, gestational age more than 28 weeks and spontaneous rupture of membrane before initiation of labor. On the other hand, the exclusion criteria were patients with rupture of membrane with established labor, rupture of membrane with anti-partum haemorrhage (APH) and severe pre-eclampsia and eclampsia. A preformed data sheet was prepared for data collection. After admission, full history including particulars of the patient, duration of pregnancy, time and onset of rupture of membrane, past obstetric history was taken. Gestation was determined from last menstrual period (LMP) and from early USG. Examination of pulse, blood pressure (BP), fundal height, uterine contraction, and fetal condition was recorded. Sterile per vaginal examination was done to assess cervical dilatation, effacement and for progression of labor according to standard protocol. The data was collected by questioning the patients and by physical examination, daily follow up patients till their discharge and also from clinical records of the patients. At the end of an interview a cross-check was performed to detect and gather missed data. Code fills up in each completed datasheet at the end of each working day. Regular entry of each fully completed questionnaire using the SPSS program. After collection of data, those were edited through checking and rechecking. Data analysis was done by computer aided statistical software SPSS. Data was presented in the form of tables and graphs. Data was analyzed with descriptive statistics and bi-variate analysis. The level of significance of 0.05 was used for this study.

Ethical Clearance

Ethical clearance this study was taken from the Ethical Review Committee of DNMCH. After getting written permission from the concerned authority of the selected Institute, the patients were approached and their interview was taken.

RESULTS

Socio-demographic information

During the study period 98 pregnant women with PROM and completed CS were selected from the obstetric ward at DNMCH, among them data were collected from 90 subjects who agreed to participate in this study.

Table I shows the distribution of participants in age group. Age range of the participants was 18 to 38 years and mean age was 24.44 years and SD = 4.089. Among the women 53.3% was in the age group 21 to 25 years. Others 24.4%, 17.8% and 4.4% were in age group 26 to 30 years, up to 20 years and more than 30 years respectively.

Table- I: Distribution of the participants by their age (n = 90)

Patients	Frequency	Percent
Up to 20 yrs	16	17.8
21 to 25 yrs	48	53.3
26 to 30 yrs	22	24.4
More than 30 yrs	4	4.4
Total	90	100.0

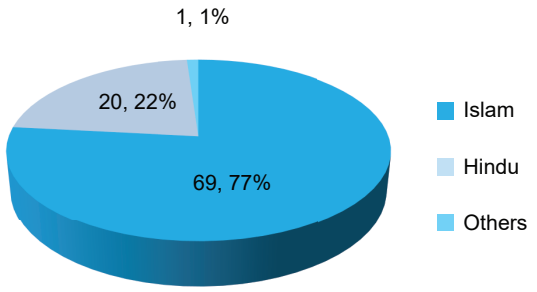

Figure- 1: *Distribution of the participants by their religion*

Figure 1 illustrates the distribution of the participants by their religion, 69 (76.7%) were Muslim; 20 (22.2%) respondents were Hindu and the remaining 1 (1.1%) belonged to other religion.

Table II states the educational level of the participants. Here 51.1% of the respondents had no education, 35.6% had primary level of education and 13.3% had secondary and above.

Table- II: Distribution of the participants by their educational status

Educational status	Frequency (n)	Percent (%)
Illiterate	46	51.1
Primary	32	35.6
Secondary	11	12.2
Tertiary	1	1.1
Total	90	100.0

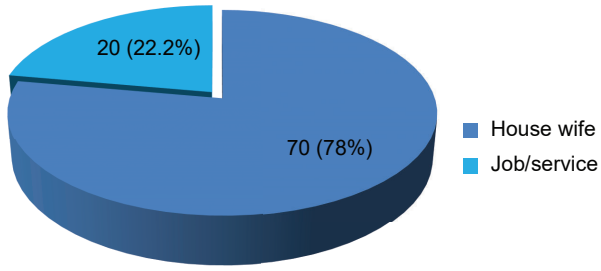

Figure-2: *Distribution of the patients by their occupation (n=100)*

Figure 2 indicates that 70 (77.8%) were housewives and the remaining were employed (house- keeper, garments worker, teacher, NGO jobs and government service).

Table III states that 61.1%) of the cases belonged to low socio-economic status following 18.9% lower middle class, middle class 17.8% and 2.2% was upper-middle class.

Table- III: Distribution of the participants according to their socio-economic status

Socio-economic status	Frequency	Percent
Low	55	61.1
Lower middle	17	18.9
Middle class	16	17.8
Upper middle class	2	2.2
Total	90	100.0

Table IV shows that the gestational age of the participants ranged from 34 completed weeks to 40 weeks plus 2 days with average gestational age of 36.65 weeks. Here 85.5% respondents had 37-40 weeks of pregnancy, 7.8% had less than 37 weeks and 6.7% had 40 weeks or more.

Table- IV: Distribution of the participants by their gestational age (n= 90)

Gestational age	Frequency	Percent
< 37 weeks of gestation	7	7.8
37-40 weeks of gestation	77	85.5
40 weeks of gestation + 2 days	6	6.7
Total	90	100.0

Mean 36.65; Median 38; Mode 38; SD 10.998; Range 34 weeks - 40 weeks and 2 days

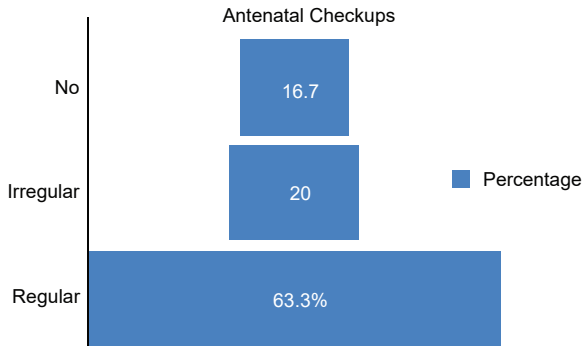

Figure- 3: *Distribution of the participants by their antenatal checkups*

Figure 3 illustrates that 57 (63.3%) of the respondents had regular ante-natal checkups, while 18 (20.0%) were irregular and remaining 15 (16.7%) had never attended any ANC centre during current pregnancy.

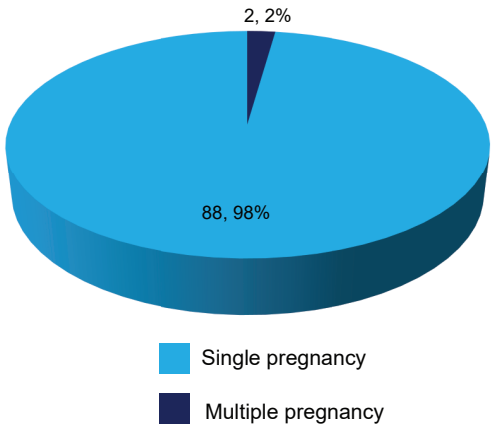

Figure- 4: *Distribution of the participants by their number of foetus*

Figure 4 shows that 2 (2.2%) of the respondents had multiple pregnancies and the rest were single pregnancy.

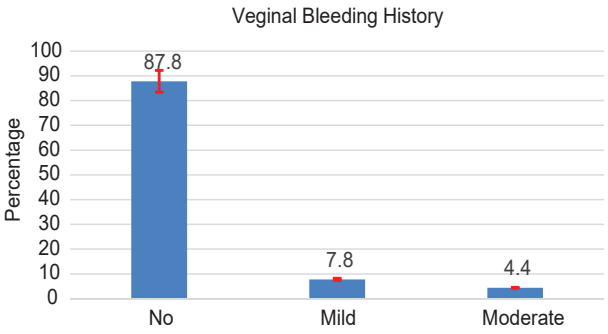

Figure-5: *Distribution of the participants by per vaginal bleeding*

Figure 5 shows that, 79 (87.8%) of the respondents had no per vaginal (PV) bleeding, whereas mild PV bleeding was found in 7 (7.8%) and the remaining 4 (4.4%) had moderate PV bleeding per vagina.

Table V shows that 93.3% respondents experienced regular cycle where the rest were irregular.

Table- V: Distribution of the respondents by their type of menstrual cycle.

Type of cycle	Frequency (n)	Percent (%)
Regular	84	93.3
Irregular	06	6.7

Table VI shows that 36 (40.0%) respondents had never used any contraceptive method, 45 (50.0%) had used only oral pill, injection method was used by 7 (7.8%) respondents and 2 (2.2%) had used intra uterine devices (IUD).

Table- VI: Distribution of the respondents by their practicing birth control methods and the type of method

		Birth control		Total
		Yes	No	
Method	No method	0	36	36
	Pill	45	0	45
	Injectable	7		
	IUD	2	0	9
	Total	54	36	90

Table VII shows that 81 (90.0%) of the PROM patients were suffering from various medical conditions. Among them, nutritional deficit was found in 33 (36.7%), followed by 32 (35.6%) from pregnancy induced hypertension (PIH, eclampsia and pre-eclampsia), 11 (12.2%) from Infections (UTI, Lower genital tract infection) and 5 (5.5%) were suffering from chronic hypertension n f PROM Patients.

Table- VII: Distribution of the respondents by their pre-existing medical conditions (n= 90)

Diseases	Frequency (n)	Percent (%)
Nutritional deficit	33	36.7
PIH	32	35.6
Infections (UTI, Lower genital tract infection)	11	12.2
Chronic hypertension	5	5.5
Total	81	90.0

Table VIII shows that the primigavida was 48 (53.33%), multigravida was 41 (45.56%) and grand multipara was 1 (1.11%).

Table- VIII: Distribution of the respondents by their number of Gestations (n= 90)

Number of gestations	Frequency (n)	Percent (%)
1 Primigravida	48	53.33
Multigravida	21	23.33
	12	13.33
	4	4.45
	4	4.45
Grand multipara (> 5 pregnencies)	1	1.11
Total	90	100.0

Table IX shows the general condition of the patients at admission. All of them were anaemic; 33 (36.7%) moderate to severe anaemia and 44.4% of them had oedema; 43.3% patients had tachycardia, 41.1% were hypertensive and 21.1% had raised temperature.

Table- IX: Distribution of the respondents by their general condition at admission (n = 90)

Anaemia	Frequency	Percent
Mild	57	63.3
Moderate to severe	33	36.7
Oedema		
Absent	50	55.6
Present	40	44.4
Pulse/min		
<100	51	56.7
≥100	39	43.3
BP		
Hypertension	37	41.1
Normal	53	58.9
Temperature		
Normal	71	78.9
High	19	21.1
Total	90	100.0

Table X shows per vaginal examination, here all (100%) of the respondents experienced 'gushing of fluid per vagina'; 61 (67.8%) of the women had turbid colored discharge; 18 (20.0%) had meconium stained and remaining 11 (12.2%) had blood stained vaginal discharge.

Table- X: Distribution of the respondents by their condition in per vaginal findings

Leakage	Frequency (n)	Percent (%)
Gushing of fluid per vagina	90	100.0
Colour of discharge	Frequency (n)	Percent (%)
Turbid	61	67.8
Meconium stained	18	20.0
Blood stained	11	12.2
Total	90	100.0

Table XI shows the distribution of the respondents by their foetal position; 83 (92.22%) foetuses found as cephalic presentation, 4 (4.44%) had breech presentations, 2 (2.23%) had transverse compound presentation and remaining had transverse/ oblique lie.

Table- XI: Distribution of the respondents by their foetal presentation

Presentation	Frequency (n)	Percent (%)
Cephalic	83	92.22
Breech	4	4.44
Transverse/oblique	2	2.23
Compound	1	1.11
Total	90	100.0

Table XII explains that, 31 (34.4%) patient's delivery prolonged for less than 24 hours, 37 (41.2%) for 24-48 hours and 22 (24.4%) for more than 48 hours, but the duration did not exceed 75 hours.

Table- XII: Distribution of the participants by delay in delivery

Delay in delivery	Frequency (n)	Percentage (%)
<24 hours	31	34.4
24-48 hours	37	41.2
> 48 days	22	24.4
Total	90	100.0

Mean 1.2 days; Median 1.1 d; Mode 1.1 d; SD 0.937; Range 4 hrs-75 hrs

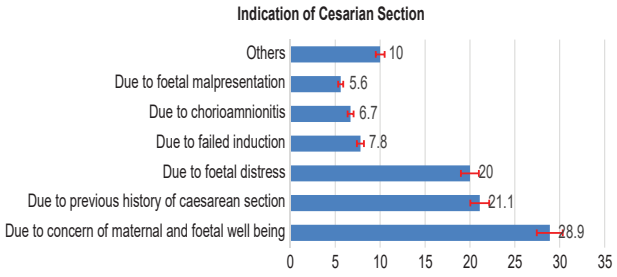

Figure-6: *Distribution of the respondents by the indication of C/S*

Figure 6 illustrates the distribution of the respondents by the indication of C/S; here all the babies (100%) were delivered by cesarean section. Elective C/S of patients following PROM was due to concern of maternal and foetal wellbeing counted for 26 (28.9%). Indications for abdominal delivery C/S) among the others were as follows- previous history of caesarean section 19 (21.1%), foetal distress 18 (20.0%), failed induction 7 (7.8%); chorioamnionitis 6 (6.7%), foetal malpresentation 5 (5.6%) and others 9 (10.0%).

Table XIII shows the distribution of the participants by their puerperal complications, here total 32 (35.56%) had morbid condition to complicate the postpartum period. Among the complications, 19 (21.11% suffered wound infection; followed by puerperal sepsis 8 (8.89%) and postpartum haemorrhage 5 (5.56%).

Table- XIII: Distribution of the participants by their puerperal complications (n= 90)

Complications	Frequency (n)	Percentage (%)
Wound infection	19	21.11
Puerperal sepsis	8	8.89
Postpartum haemorrhage	5	5.56
Total	32	35.56

Figure 7 illustrates the distribution of the respondents by their foetal outcome, here out of the 90 respondents; pregnancy outcomes of pregnant women with PROM at discharge from the hospital, there were 92 alive babies and 68 (73.9%) were in good condition, 24 (26.1%) had to be admitted for neonatal care. Among the babies at neonatal care (226.1%), 19 (20.7%) recovered and 5 (5.4%) died. Neonatal sepsis was the prime cause of death.

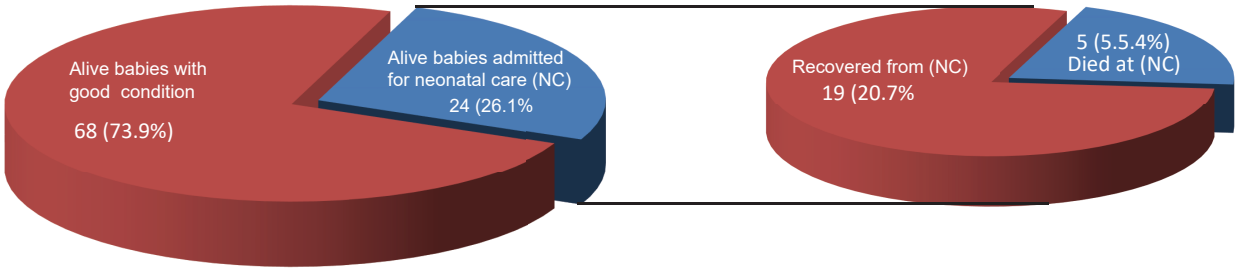

Figure- 7: *Distribution of the respondents by their foetal outcome*

DISCUSSION

This study was aimed at reporting the outcome and indications of caesarean section in PROM among women in Obstetric ward of DNMCH. Data were collected from 90 respondents who were admitted during March 2011 to September 2011. In this study, mean age of PROM cases was 24.44+4.09 years with a range of 18-38 years. Mondal BR. found mean age of PROM cases was 23 years with a range of 21-25 years.[27] Akter et.al 2010 found mean age 27.24±6.4 years with a range of 15-40 years.

In our study, 76.7% patients were Muslim, 22.2% were Hindu and remaining 1.1% belonged to other religion. The ratio of Hindu patients was similar to their existing proportion in the population of the country. On the contrary another study in Barisal found the ratio of Hindu patients were relatively higher than their existing proportion in the population of the country because in that district number of Hindu population is more.[27]

Socioeconomic status is reflected through the education of mothers, occupation, and monthly income of the family. In this study the overall educational level of the participants were poor, more than half (51.7%) of the patients had no education and 35.6% had primary education. These results are not very different in comparison to educational status of our country where literacy rate is about 55% and female literacy rate is about 49.8% (age is 15 years and above).

About 77.8% were housewives and remaining (22.2%) were employed (house keeper, garment worker, teacher, NGO jobs and government service). Among the husband of the participants three-fourth earned daily. Majority of the respondents (61.1%) belonged to low socioeconomic status. In comparison to another study which showed PROM occur more in low socioeconomic condition.[33]

Studies showed that (60-80%) cases of PROM occurred in term pregnancy and (20-40%) cases occur before 37 weeks of gestational age.[31, 32] Our study shows that 85.5% patients experienced PROM in 37-40 weeks of gestation, which is more than their studies. This may due to inclusion of both vaginal delivery and caesarean section cases in their studies.[33]

In our study, incidence of PROM was more in primigravida (53.3%). This may be explained by the fact that primigravida are more prone to labor dystocia and seek treatment in hospital. The distribution of patients in this present study does not correlate with other studies that found association of PROM with multiparity is about 62%.[34] Parity generally does not correlate with PROM.

In this study PROM, MR, abortion, caesarean section in a prior pregnancy is an identified risk factor for PROM in about 37.8% cases and lower genital tract infection, UTI and medical conditions like nutritional deficiency are also responsible for PROM in about 54.4% cases in comparison to another study which showed association of those risk factors were 56% and 72% respectively. Irregular antenatal checkup or antenatal checkup not at all increases the risk of PROM. In our study, 18.2% patients had irregular antenatal checkup and 16.7% had never attended any ANC centre during current pregnancy.

Study shows that most of the patients (85%) with term pregnancy and PROM will go into labor spontaneously within 24 hours, 15% will go into labor within 48 hours and 2-3% may have latent period exceeding 7 days.[32] In this study, about 34.4% pregnancy had to be terminated within 24 hours of establishment of PROM. 41.2% were terminated within next 24 hours. The remaining patients succeeded to prolong pregnancy for a period of more than 2 days but the duration did not exceed 75 hours.

In this study all the babies were delivered by caesarean section. Elective operation following PROM due to concern of maternal and foetal wellbeing counted for most (28.9%) caesarean section. Indication for abdominal delivery among the other were as follows: previous history of caesarean section (21.1%), foetal distress (20%), failed induction (7.8%), chorioamnionitis (6.7%), foetal mal-presentation (5.6%) and others (10%) In comparison to other studies that showed evidence of caesarean section. The indication of caesarean 43.7% (Mousiolis et. al 2011) and 47%.[32] section were failed induction (34.6%), breech presentation (15.4%), transverse lie (11.5%), foetal distress (15.4%), previous history of caesarean section, deep transverse arrest and cervical dystocia.

In this study 62% babies were born with Apgar score >7. Mean birth weight was 2.7± 0.4 kg. At discharge from the hospital most of the babies (73.9%) were in good condition but 26% had to be admitted in the neonatal ward. Majority of them recovered but only 5.4% died. Neonatal sepsis was the prime cause of death, compared to other studies showed by Cox et. al 1998, perinatal mortality is 20% and Mondal BR, a study in Barisal showed neonatal mortality is very high.[27]

Maternal morbidity following PROM is quite high. In my study 37.7% had a morbid condition to complicate the

postpartum period. Most of them suffered from wound infection (23.3%), puerperal sepsis (8.9%) and PPH (5.5%) which is compared to 5.9% shown by Hui, 201132. In this study there was no maternal death.

CONCLUSIONS

This study finds the risk factors for pregnancy like nutritional deficit, lower genital tract infections and UTI. Past obstetric history like history of caesarean section, previous history of PROM and abortion also plays role in causation of PROM. This study also demonstrates morbidities for PROM like wound infection, puerperal sepsis, and PPH. Regular antenatal care, growing awareness among the family and society, improving the socio-economic condition by taking appropriate measures in appropriate time can decrease the incidence of PROM. Another important finding of this study is neonatal mortality (5.4%) which can also be reduced by giving immediate paediatric support in all of those vulnerable cases.

RECOMMENDATIONS

A better understanding of the diagnosis and management of premature rupture of membranes will allow obstetric care providers to optimize perinatal outcome and minimize neonatal morbidity and mortality. A large scale multicenter study will generate new information of PROM in our country.

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