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Perinatal Outcomes of Pregnancies with Preterm Premature Rupture of Membranes after 34 Weeks of Gestation

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ABSTRACT

Background: Preterm premature rupture of the membranes (PPROM) is an important contributor to perinatal mortality and morbidity. Neonatal complications are related primarily to the gestational age at rupture of membranes.

Objective: The aim of the present study was to improve the perinatal maternal and fetal/neonatal outcomes in cases with preterm premature rupture of membranes between 34 -37 weeks of gestations.

Patients and methods: This prospective case control study included 82 women comprised 41 with PPROM (group I) and 41 without ROM as matched controls (group II). All women were presented to maternity unit of Obstetrics and Gynecology Department over 8 months period, at Zagazig University Hospitals.

Results: In this study (73.2%) with PPROM were below the age of 30 years. Urinary tract infection was 17.1% versus 12.2 %, cervicitis 4.9% versus 0% in patients with PPROM versus controls respectively. Maternal outcome in this study was evaluated; there were 82.9% of patients with PPROM versus 95.1% discharged from hospital within 4 days after delivery with no bad outcomes. Good Apgar score was (68.3%) in patients with PPROM and 82.9% in control group. In PPROM group; 7 fetuses were diagnosed as fetal distress and only 2 (4.9%) cases had clinical chorioamnionitis. Regarding neonatal morbidity in patients with PPROM, the results showed that respiratory distress syndrome (RDS) was diagnosed in 4 neonates, 7 with tachypnea, 6 with jaundice, and 3 with sepsis and no case of perinatal mortality.

Conclusion: With appropriate care, the maternal risks of expectant management after 34 weeks of gestation are generally accepted to be minimal and a clear neonatal advantage exists by reducing risks of neonatal respiratory problems, admission for neonatal intensive care, and cesarean section.

Keywords: Fetal/neonatal outcomes, Maternal outcome, Perinatal, Preterm premature rupture of membranes (PPROM).

INTRODUCTION

Premature rupture of fetal membranes (PROM) refers to the rupture of fetal membranes prior to the onset of labour. Despite improved prenatal care, the causes and management of this obstetric dilemma remain a mystery. Increased newborn and maternal morbidity have long been related to PROM and preterm premature rupture of membranes before 37 weeks of pregnancy [(1)].

Spontaneous preterm rupture of the membranes (SPROM) occurs when ROM occurs after or before the start of labour before 37 weeks. Prolonged ROM is defined as any ROM that lasts more than 24 hours and occurs before the start of labour. Membranes rupture occurs owing to mechanical stresses, as well as programmed cell death and activation of catabolic enzymes like collagenase. PPROM is most likely caused by the same mechanisms and premature activation of these pathways [(2)].

A ruptured membrane is diagnosed by vaginal watery leakage and sterile speculum inspection of fluid buildup in the posterior fornix, which is validated by other biochemical tests such as Nitrazine or AmniSure rupture of fetal membrane test (placental alpha microglobulin-1) [(3)].

PROM is managed by striking a balance between the advantages of extending the pregnancy and the risks of intraamniotic infection and its effects on the mother and the fetus/neonate. As a result, the goal of therapy is to extend the latency period without complications [(4)].

Survival rates have increased considerably as a result of advances in newborn care, particularly intensive care for infants on the verge of viability. Advances in newborn stabilization, surfactant administration, and optimizing respiratory support, the use of nitric oxide and reduction in associated morbidities such as infection and intraventricular hemorrhage, and the use of probiotics to reduce necrotizing enterocolitis (NEC) are among the changes that reflect a multimodal approach to care [(5)].

Many studies have demonstrated significant benefits of expectant or conservative management in PPROM at less than 34 weeks of gestation but the management of PPROM between 34-37 weeks continues to be a controversial issue. Very few studies were done so far regarding management of PPROM at 34 – 37 weeks' gestation. So it is not clear whether intentional delivery or expectant management will be beneficial to both mother and baby. Several aspects must be considered when considering the management of PPROM. Prematurity is the most serious risk to the fetus, while infection morbidity is the most serious risk to the mother [(6)].

Therefore, this study aimed to improve the perinatal maternal and fetal/neonatal outcomes in cases with preterm premature rupture of membranes after 34 and below 37 weeks of gestations. Also in this prospective study, we tried to find out the optimum management option for PPROM at that gestational age.

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PATIENTS AND METHODS

A prospective observational case control study included 82 pregnant women with age ranged from (18-38 years) presented to (High Risk Unit and Maternity Sector) of Obstetrics and Gynecology Department, Zagazig University Hospitals. Women were divided into 41 women presented with PPROM and the remaining 41 without ROM (taken as controls).

Inclusion criteria for group 1: Pregnant women with rupture of membranes after 34 and below 37 weeks of gestation who were presented to maternity. Single pregnancy and pregnancies without other medical and or previous surgery.

Exclusion criteria: Multiple pregnancies, presence of fetal congenital anomalies, positive maternal medical history e.g. diabetes, hypertension, etc. Women with clinical picture suspected chorioamnionitis. Also, women who had intrauterine fetal demise (IUFD), non-reassuring fetal cardiotocography (CTG) and women in labour were excluded.

Ethical Consideration:

The study was approved by the Local Ethical Committee of Zagazig University. Written consent was obtained from every patient prior to the procedures. This study has been carried out in accordance with the code of Ethics of the World Medical Association (Declaration of Helsinki) for studies involving humans.

All patients were subjected to the following:

1. History taking: Included personal history as name, age, occupation, smoking and history of consanguinity, educational level and socioeconomic status. Menstrual history as regularity of cycles, and first day of last menstrual period (LMP). Obstetric history as gravidity and parity, method and place of previous deliveries. Present history as presence or absence of antenatal care; gestational age including reliable, 1st day of last menstrual period and or first trimester ultrasound; presence of abdominal pain or vaginal bleeding with analysis of the complaint; history suggestive of ruptured membrane or decreased fetal movement and history of trauma preceding the main complaint; and history of associated medical diseases. Past history included history of systemic diseases such as diabetes mellitus, hypertension, renal disease, previous birth of infants with chromosomal abnormalities and history of preterm labor and/or PROM in previous pregnancies. Antepartum and postpartum hemorrhage; and any complications in the previous deliveries. In addition to history of the duration of ROM in patients with preterm PROM.

2. Clinical examination was done including general, abdominal and pelvic examination included weight, height and body mass index, level of consciousness, blood pressure measurement, pulse, temperature and respiratory rate, for pulse and temperature to exclude chorioamnionitis, face examination for pallor, jaundice and cyanosis and lower limb for edema. Presence or absence of uterine contractions, tenderness and uterine tone were evaluated and auscultation of fetal heart sound (FHS).

3- Local examination:

PPROM was diagnosed by sterile speculum examination and the presence of gross pooling of amniotic fluid in the vaginal vault. Digital cervical examination was avoided in all women. The diagnosis of preterm labor was made in the presence of regular uterine contractions (at least 3 in 20 minutes) accompanied by cervical changes (dilatation and effacement) at less than 37 weeks' gestation[7].

Uterine contractions were monitored clinically and / or by CTG.

4-Laboratory investigations:

Maternal total leucocytic count (TLC) and its differential count were measured in all patients. Normal leucocyte count varies considerably during pregnancy usually ranging from 5000 to 12000/ ml. C-reactive protein was also measured (CRP normal reference range < 6 mg/dl). Complete blood picture (hemoglobin level, hematocrit, platelets count). Blood group and Rhesus typing. Assessment of coagulation system (Prothrombin time, prothrombin concentration, partial thromboplastin time and international normalized ratio. Liver function test (liver transaminase level, serum albumin level). Kidney function test (serum creatinine and blood urea nitrogen.

5-Transabdominal ultrasound:

The women were placed in supine position and examination was performed with the bladder filled, which allowed optimal visualization of the uterine serosa and the bladder wall. Ultrasound examination and Color Doppler was performed using: VOLUSION 730 prov of 5 MHZ (USA). Fetal viability; fetal biometry, amniotic fluid index; biophysical profile (BPP) were evaluated to exclude fetal congenital anomalies.

Conservative management and follow up of women with PPROM:

All women in the study were observed in labor ward for 12 hours. If there was no initiation of labor and fetal heart tracing was good, they were eligible for expectant management. They were monitored for evidence of chorioamnionitis. In absence of signs or symptoms of chorioamnionitis and/or abnormalities of fetal heart tracing they were admitted to the unit of high risk pregnancy and they were received prophylactic antibiotics in the form of ampicillin 2 gm iv/6 hours for 2 days with azithromycin 1 gm orally single dose then completed by 500 mg amoxicillin/8 hours and metronidazole 500 mg bid for 5-7 days. Corticosteroid administration in the form dexamethasone 12 mg 12 hours for two doses IV/IM for fetal lung maturity after ruling out any contraindication for its administration

and short term tocolytic ($MGSO_4$) was given as Hospital protocol.

Women were restricted to bed rest and remained in hospital till delivery and were observed for signs of clinical chorioamnionitis at least 12 hourly, which include: maternal tachycardia, pyrexia, leucocytosis, uterine tenderness, offensive vaginal discharge and fetal tachycardia. Twice weekly: maternal full blood count; CRP and ultrasonography for Biophysical profile (BPP) and amniotic fluid index (AFI) were done. Fetal monitoring with cardiotocography was done at 2 days' interval for assessment of fetal well-being and/or uterine contractions for exclusion of developing labor.

Indications for termination of pregnancy: Fetal distress, initiation of labor and/or signs of clinical chorioamnionitis. The patient was assigned to active management received tablet misoprostol (50 microgram) orally12 hourly for a maximum 4 doses. Digital examination was avoided till the patient goes into advanced labor (in the early stage of labor, cervical dilatation was examined by speculum). Caesarean section was performed for standard obstetric indications. Neonates were assessed by neonatologist.

Outcomes: Time of delivery in weeks, mode of delivery, maternal and fetal complications of delivery, and neonatal outcome were estimated.

Statistical analysis

Data were analyzed using Microsoft Excel software. Data were then imported into Statistical Package for the the Social Sciences (SPSS version 20.0). According to the type of data qualitative were represented as number and percentage and were compared by Chi square test (X^2). Quantitative continuous data were represented by mean ± SD and range and were compared by t test. P value was set at <0.05 for significant results and<0.001 for high significant result.

RESULTS

The current study showed a statistically significant difference between the studied groups as regard to BMI, educational level and smoking, as risk factors for PPROM. But the difference was not significant for age and socioeconomic status **(Table 1)**.

Table (1): Demographic data of the studied groups (n=82)

Variable	Group I (n=41)		Group II (n=41)		P
Maternal age (years)	**No.**	**%**	**No.**	**%**	
<20	**10**	**24.4**	**7**	**7.1**	**0.53**
20-30	**20**	**48.8**	**25**	**61**	
>30	**11**	**26.8**	**9**	**21.9**	
Range	**18 – 38**		**18 – 38**		**0.488**
Mean ± SD	**27.68 ± 6.87**		**26.73 ± 5.40**		
Body mass index (BMI)					
<20	**9**	**22**	**2**	**4.9**	**0.049***
20-25	**17**	**41.4**	**25**	**61**	
>25	**15**	**36.6**	**14**	**34.1**	
Range	**19 – 31**		**20 – 29**		**0.608**
Mean ± SD	**24.58 ± 3.45**		**24.22 ± 2.87**		
Education level					
Low	**10**	**24.4**	**2**	**4.9**	**<0.001***
Moderate	**22**	**53.7**	**13**	**31.7**	
High	**9**	**21.9**	**26**	**63.4**	
Socioeconomic status					
Low	**17**	**34.1**	**7**	**17.1**	**0.03**
Middle	**19**	**53.7**	**23**	**56.1**	
High	**5**	**12.2**	**11**	**26.8**	
Smoking					
Passive smoking	**22**	**53.7**	**9**	**21.9**	**0.003***
No smoking	**19**	**46.3**	**32**	**78.1**	

*: Statistically significant; Group I: PPROM; Group II: No PPROM

Table (2) shows that there was statistically significant difference between the studied groups as regard to history of PPROM and interval between pregnancies, as risk factors for PPROM. While the difference was not significant regarding to gravidity, parity, history of abortions and history of preterm labor (PTL).

Table (2): Obstetric history of the studied groups (n=82)

Variable	Group I (n=41)		Group II (n=41)		P
Parity	**No.**	**%**	**No.**	**%**	
Nulliparous	**27**	**65.9**	**19**	**46.3**	**0.21**
P1-P2	**8**	**19.5**	**12**	**29.3**	
>P2	**6**	**14.6**	**10**	**24.4**	
Gravidity					
Primigravida	**27**	**65.9**	**19**	**46.3**	**0.08**
Multigravida	**14**	**34.1**	**22**	**53.7**	
History of abortion					
No	**26**	**63.4**	**31**	**75.6**	**0.231**
Yes	**15**	**36.6**	**10**	**24.4**	
History of preterm labor (PTL)					
No	**28**	**68.3**	**33**	**80.5**	**0.206**
Yes	**13**	**31.7**	**8**	**19.5**	
History of PPROM					
No	**24**	**58.5**	**36**	**87.8**	**0.003***
Yes	**17**	**41.5**	**5**	**12.2**	
Interval between pregnancies					
<2 years	**28**	**68.3**	**12**	**29.3**	**<0.001***
>2 years	**13**	**31.7**	**29**	**70.7**	

*: Statistically significant; Group I: PPROM; Group II: No PPROM.

Table (3) shows that there was statistically significant difference between the studied groups as regard to the, mean gestational age at admission and AFI. While the difference was not significant regarding to bleeding in early pregnancy; genitourinary infections and antenatal care.

Table (3): Condition of the current pregnancy in the studied groups (n=82)

Variable	Group I (n=41)		Group II (n=41)		P
History of bleeding in early pregnancy	**No.**	**%**	**No.**	**%**	
No	**29**	**70.7**	**34**	**82.9**	**0.191**
Yes	**12**	**29.3**	**7**	**17.1**	
Gestational age at admission					<0.001*
Mean ± SD.	35.3±0.64		36.1±0.72		
History of infections					
Non	**31**	**75.6**	**35**	**85.4**	**0.462**
Urinary tract infection	**7**	**17.1**	**5**	**12.2**	
Cervicitis	**2**	**4.9**	**0**	**0**	
Vaginitis	**1**	**2.4**	**1**	**2.4**	
Antenatal care					
Booked	**14**	**34.1**	**22**	**53.7**	**0.08**
Unbooked	**27**	**65.9**	**19**	**46.3**	
Amniotic fluid index					
< 5	**14 34.1**		**2 4.9**		**0.003***
5-8	**18 43.9**		**24 58.5**		
> 8	**9 22**		**15 36.6**		

*: Statistically significant; Group I: PPROM; Group II: No PPROM.

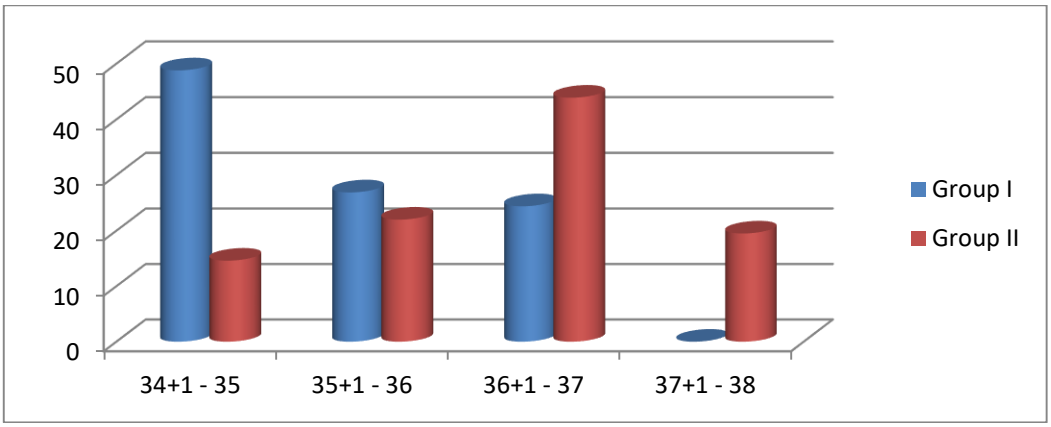

Figure (1): Difference in gestational age at delivery among both studied groups

Table (4) shows that there was no statistically significant difference between the two studied groups regarding maternal outcome. 7 patients with PPROM versus 2 stayed at hospital > 4 days after delivery. the maternal morbidities included 2 cases with clinical chorioamnionitis underwent puerperal sepsis after delivery .Three cases with abruptio placenta,4 cases with primary postpartum hemorrhage, and 2 cases with superficial wound infection after C S in patients with PPROM.

Table (4): Maternal outcomes among the studied groups (n=82)

Variable	Group I (n=41)		Group II (n=41)		P
	No.	%	No.	%	
Bleeding after ROM (abruptio placentae)	3	7.3	0	0.0	0.24
Clinical chorioamnionitis	2	4.9	0	0.0	0.49
Postpartum hemorrhage	4	8.9	2	4.9	0.68
puerperal sepsis	2	4.9	1	2.4	1.0
Superficial wound infection.	2	4.9	1	2.4	1.0
Stay at hospital after delivery > 4 days.	7	17.1	2	4.9	0.15

Group I: PPROM; Group II: No PPROM

Table (5) shows that Apgar scoring at one and 5 minutes <7points was significantly higher among patients with PPROM, than controls. While 68.3% of women with PPROM gave birth of neonates with good Apgar score versus 82.9% in matched controls. Also, the percentage of low birth weight in patients with PPROM was higher than controls. 39.0% versus 26.8 %. This is due to ROM accounts for 30 -40 % of preterm labor.

Table (5): Apgar scoring and birth weight of neonates in studied groups (n=82)

Variable	Group I (n=41)		Group II (n=41)		P
	No.	%	No.	%	
APGAR at 1 min.					
<7 points	21	51.2	16	39.0	
7-9	20	48.8	25	61.0	0.27
Mean ± SD	7.33 ± 0.81		7.98 ± 0.95		0.001*
APGAR at 5 min.					
<7 points	13	31.7	7	17.1	
7-10	28	68.3	34	82.9	0.09
Mean ± SD	8.61 ± 0.71		9.12 ± 0.88		0.005*
Birth weight					
<2 kg	2	4.9	0	0.0	0.27
2-2.5 kg	14	34.1	11	26.8	
>2.5 kg	25	61.0	30	73.2	
Range Mean ± SD	2.3 – 3.25 2.88 ± 0.24		2.45 – 3.6 2.98 ± 0.65		0.36

*: Statistically significant; Group I: PPROM; Group II: No PPROM

Figure (2) shows that, fetal distress, admission to NICU, morbidities and, hospital stays > 4 days for neonates were insignificantly more in group I than in group II while there was significant difference only regarding to fetal distress.

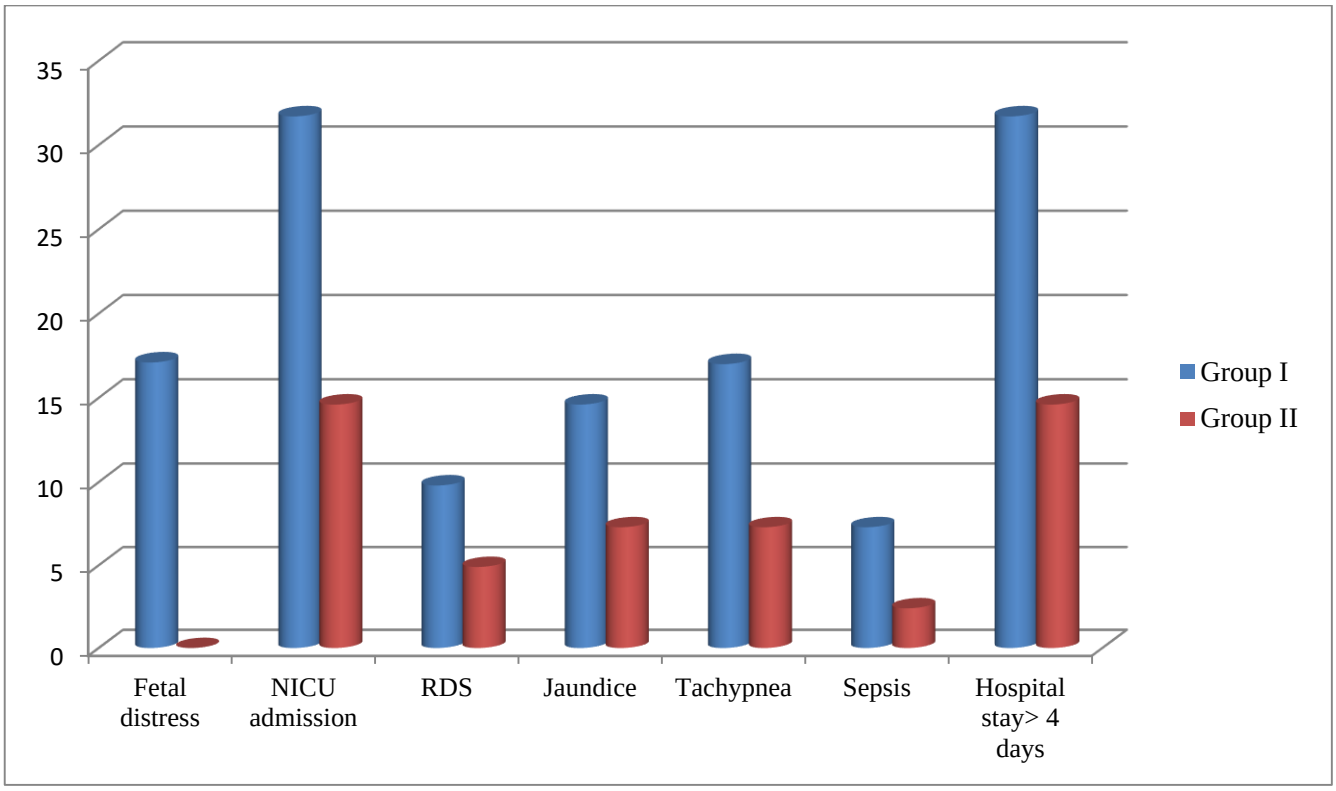

Figure (2): Differences in fetal and neonatal outcomes in the studied groups.

DISCUSSION

Premature rupture of membranes (PROM) happens in around 20% of all pregnancies and is defined as the rupture of the amniotic membrane prior to childbirth [(8)]. If PROM develops during pregnancy, early delivery is advised since it is linked to a lower risk of perinatal morbidity than expectant care [(9)]. However, the management of women with preterm PPROM accounting for 40% of the total preterm deliveries is somewhat controversial. Immediate delivery may cause difficulties due to fetal immaturity, while expectant management is linked to risks such placenta abruptio, infection, fetal distress, and umbilical cord prolapse, posing a medical conundrum. Expectant care is particularly indicated in early PPROM, before 34.0 weeks of pregnancy, due to the risk of severe newborn outcomes from preterm [(10)].

A study of **Kim *et al.*** [(11)] revealed that complications such as chorioamnionitis and placental abruption were more common in women who were handled proactively and overall unfavourable pregnancy outcomes were lower. The best way to treat late PPROM, which is defined as PROM that occurs between 34.0 and 36.6 weeks of pregnancy, is still unknown. Therefore, the management of late PPROM should be determined on the basis of a comprehensive acknowledgment of the risk of infection and possible complications from premature delivery, according to the 2018 American College of Obstetricians and Gynecologists (ACOG) guidelines.

Expectant care is strongly indicated, which includes intravenous ampicillin and erythromycin therapy, prenatal corticosteroids till 34.0 weeks of pregnancy, and group B streptococcus prevention. After 34.0 weeks of pregnancy, the guidelines advocate delivering the baby as soon as possible. The Cochrane review, on the other hand, acknowledged a lack of clinical data to support these guidelines [(8, 12)].

This study included 82 pregnant women who were divided into Group I: with PPROM after 34 weeks of gestation n=41 had mean age 27.68(±6.87 SD) with range (18-38) and Group II n=41 without PPROM of the same age range complaining of threatened preterm labour pains had mean age 26.73(±5.40 SD). In this prospective study, we tried to find out the optimum management option for PPROM at (34- 37 weeks) gestational age.

In this study 30 patients out of 41(73.2%) with PPROM were below the age of 30 years, 10 (24.4%) of them were below age of 20 years. this finding is near to that observed by **Sharma and Dey**[(13)] who reported 86% of patients with ROM below the age of 28 years. Also **Maryuni and Kurniasih**[(14)] found that mothers < 20 years and > 35 years were 2.6 times at risk of PPROM. **Hosny *et al.*** [(15)] concluded that women below the age of 20 years were at high risk of PPROM. A study done by **Linehan *et al.*** [(16)] found that the highest

incidence of PROM was in the 18-35-years old group (74.6%) versus 73.2% in our study**.** Also, **Maryuni and Kurniasih** [14] reported that patients with PPROM were younger than 20 years and older than 35 years**.**

The current study showed that the primigravida patients with PPROM were more common than multigravida 65.9 % versus 34.1 % respectively. This finding is similar to that reported by **Sharma and Dey**[13] who found 62.5% primigravida versus 37.5% multigravida in patients with PPROM. Based on parity most women with PPROM in our study were nulliparous 65.9% versus 46.3% in control group. In a study by **Emechebe *et al.*** [17] they found that most cases of PROM were in nulliparous (52%).

Regarding to BMI, 22% of patients with PPROM were below 20 kg/m^2 versus 4.9 % in patients without PPROM, and 36.6% over 25 years old were found in our study. Low BMI< 19.8 kg/m^2 was associated with preterm birth caused by PPROM [18]**.**

Educational level and socioeconomic status are risk factors for PPROM that were observed in this study and we found that low to moderate educational level and low to middle socioeconomic status were common among patients with PPROM, 56% and 53.7 % respectively. And also, women with low socioeconomic status were 34.1%. In a study done by **Ali *et al.*** [19] they reported that women with low socioeconomic level accounts for 38.7% of cases, this was consistent with **Sultana and Karmokar** [20] who found that the majority of the women came from lower middle and poor class of the society.

Smoking was present in the current pregnancy of patients with PPROM in this study (53.7% versus 21.9 in control group). Smoking was found to increase the risk of ROM 2-6 folds [21].

Based on obstetric risk factors in our study, the incidence of PPROM was common in patients with previous history of abortions (36.6%) versus (24.4%), PTL (31.7%) versus 19.5%, PPROM (41.5%) versus 12.5% in matched controls respectively and interval between pregnancies < 2 years (36.6%) versus 21.9% if > 2 years. **Assefa *et al.*** [22] revealed that previous PROM was a significant risk factor of ROM. In a case-control study; they noted that 13.7% of the PPROM study group had a prior miscarriage or pregnancy loss versus 8.1% of the matched controls [23]**.**

In our study the interval between pregnancies less than 2 years was found in 68.3% of patients with PPROM versus 29.3 % in control group, which is highly significant. **Shree *et al.*** [24] found that the short interval between pregnancies less than or equal to 16 months is significantly associated with an increased risk of PROM in the subsequent pregnancy.

Regarding infections as risk factors in the current pregnancy in this study, the results showed that urinary tract infection 17.1% versus 12.2 %, cervicitis 4.9% versus 0% in patients with PPROM versus controls respectively. Also, this study showed that there was positive history of bleeding in early 29.3% and 24.4% in late pregnancy in patients with PPROM. Vaginal bleeding before delivery seems to have a relatively strong association between it and PPROM, with risk ranging between 2-7 fold higher than control patients [25]**.** But vaginal bleeding in the second trimester increased the risk 3.6 fold, whereas the risk in the third trimester was increased by only twofold [26]**.** In the present study there was lack of antenatal care in 65.9% of patients with PPROM versus 34.1 % in control group.

The mean gestational age at admission (weeks.) in patients with PPROM was 35.29 (±0.64 SD) versus 36.12 (±0.72 SD) in control group, and the gestational age at delivery was 36.42 (±0.68 SD) for cases with PPROM, while it was 36.98(±0.87 SD) in control group. **Asgarian *et al.*** [27] revealed that mean gestational age at PPROM in their study was 36.3 weeks.

Maternal outcome in this study was evaluated; there were 34 (82.9%) patients with PPROM versus 39 (95.1%) discharged from hospital within 4 days after delivery with no bad outcomes. the maternal morbidities included 2 cases (4.9%) with clinical chorioamnionitis underwent puerperal sepsis after delivery. There were three cases (7.3%) with abruptio placenta, 4 (9.8%) cases with primary postpartum hemorrhage, and 2 cases (4.9%) with superficial wound infection after CS in patients with PPROM. Most of these complications occurred after 2 weeks from ROM. Our results are supported by a study done by **Choi *et al.*** [28] in which the chorioamnionitis was diagnosed in (17.9%) in the expectant group versus (4.3%) in the immediate delivery group in women with PPROM after 34 weeks of gestation. Those results were consistent with a meta-analysis concluding that expectant management improved maternal and infant outcomes in late preterm PROM, specifically relating to maternal infection [10]**.**
The fetal and neonatal outcomes were evaluated, in this study. Among the studied cases there were 28 mothers gave birth of healthy neonates with good Apgar score (68.3%), in patients with PPROM and 34 (82.9%) in control group.13 (31.7%) of neonates needed support in NICU from group 1 versus 6 (14.6%) in group 2. Among the 31.7% neonates required NICU admission 6/13 (14.6%), needed just observation for few hours, (4.8%) of them required continues positive airway pressure (CPAP), 2 were put on ventilator, 3/13(7.3%) needed O_2 by hood. In PPROM group; 7 fetuses were diagnosed as fetal distress due to oligohydramnios, cord compression, cord prolapse and clinical chorioamnionitis. Regarding to neonatal morbidity in patients with PPROM, the results showed that RDS was diagnosed in 4 (9.8%) neonates, 7 (17.1%) with tachypnea, 6 with jaundice, and 3 with sepsis and no case of perinatal mortality .The length of stay of neonates at hospital was also reported by this study, it was found that 68.3% of neonates were discharged at 4th. day from admission while only 13 (31.7%) of neonates stayed more than 4 days. The rate of low birth weight (< 2.5Kg) in this study was 34.1%. So the improvement in neonatal outcome especially

respiratory complications and birth weight, which are associated with neonatal morbidities, was due to the use of corticosteroids and antibiotics in all cases of PPROM subjected to conservative management in our study. **Caughey *et al.*[29]** mentioned the effect of broad-spectrum antibiotic on PROM remote from term could prolong the latency resulting in a reduction in the delivery within 48 hours by 30%, a reduction in the delivery within 7 days by 20%, an increase in birth weight, a reduction in the risk of chorioamnionitis and an improvement in neonatal complications like a decrease in neonatal sepsis, oxygen requirement and major cerebral abnormalities.

The results in this study are in agreement with the study of **Sharma and Dey [13]** in which, the neonatal outcomes were assessed, in patients with PPROM beyond 34 weeks of gestation. Eleven (15.3%) neonates needed NICU admission, 2 of them (2.7%) required ventilator support. 89% of the neonates discharged within 4 days while 8 neonates (11.2%) stayed more than 4 days at hospital. 35% of babies had birth weight below 2.5 Kg. 5 (6.9%) babies had respiratory syndrome (RDS) and one (1.3%) neonate had sepsis and no one with mortality.

CONCLUSION

With appropriate care, the maternal risks of expectant management after 34 weeks of gestation are generally accepted to be minimal and a clear neonatal advantage exists by reducing risks of neonatal respiratory problems, admission for neonatal intensive care, and cesarean section.

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Author contribution: Authors contributed equally in the study.

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