Prevalence and Determinants of unfavorable Maternal and Neonatal Outcome in Term Premature Rupture of Membrane

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Abstract

Aim of study: To determine the prevalence of maternal and fetal outcomes in PROM among term pregnant women and to discover the risk factors that increase the rate of PROM.

Patients and Methods: A cross sectional study included 80 pregnant women diagnosed with term PROM (after 37 weeks of gestation) and gave birth in the hospital or attended to labor ward with leaking of liquor before onset of labor and delivered at our labor ward. Information about maternal age, occupation, gestational age, residence, parity, mode of delivery, antenatal care visits, duration of PROM, and postpartum complications as sepsis or hemorrhage. Information regarding neonates' Apgar score at 1 and 5 minutes, birthweight, admission to neonate intensive care unit.

Results: In this study, 35% of them showed unfavorable outcome, 16.3% of mothers complained from postpartum hemorrhage; 21.2% of neonates were admitted to NICU; and 15% of babies were weighing < 2.5 kg. The highest prevalence of unfavorable maternal outcome in this study was seen among women living in rural area (45.5%), in those who didn't receive ANC (31.6%), and in those who had PROM for 24 hours or more (29.4%). Unfavorable fetal outcome in this study was seen among women who didn't receive ANC (36.8%), and in those who had PROM for 24 hours or more (33.3%).

Conclusion: Unfavorable maternal or fetal outcome is not uncommon among women with PROM. Prolonged duration of PROM and lack of ANC visits were a significant associated factors. So, an early accurate diagnosis of PROM is essential for favorable outcome in pregnancy and thus it decreases the maternal and fetal morbidity.

Keywords: *Term PROM, maternal, fetal, mortality, Iraq.*

Introduction

Premature rupture of the membranes (PROM) is usually defined as rupture of membranes at any time before the onset of uterine contractions. PROM which occurs after 37 weeks of gestation is named term PROM, whereas; PROM which occurs prior to 37 weeks of gestation is named preterm PROM [(1)]. The latent period is defined as the duration from rupture of the membranes until the onset of true labor which is the key factor for determining maternal and fetal outcome [(2)]. Term rupture of the membranes (PROM) is one of the most common and controversial problems facing the obstetricians [(3)]. At term, PROM complicates approximately 8% of pregnancies over the world [(4)]. It has no known etiology but, sub clinical infection has been postulated [(5)]. Other workers suggested that the rupture of membrane is related to factors other than infection, membrane dysfunction on a molecular level, collagen destruction, and programmed cell death in fetal membranes [(6)]. PROM is linked to significant maternal and fetal morbidity and mortality. It

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has been shown to be the cause of 18%–20% and 21.4% of prenatal mortalities and morbidity respectively [7]. The key factor in the fetal and maternal outcome is that the diagnosis of pre-labor rupture of membranes must be established. In most instances, either it is obvious from the escape of clear amniotic fluid from cervix or by simple laboratory test like detection of fern pattern/ Litmus paper test [8]. Maternal complications include intra-amniotic infection, which occurs in 13%–60% of women with PROM, placental abruption, and postpartum endometritis. While preterm birth, infection, hypertensive disease, and asphyxia are cited as the most common contributors to maternal and fetal mortality in developing countries [9, 10]. The three causes of fetal death associated with PROM are sepsis, asphyxia, and pulmonary hyperplasia. Women with intrauterine infection deliver earlier than non-infected women, and infants born with sepsis have a mortality rate four times higher than those without sepsis do [11]. Diagnosis and proper management is very important to limit various fetal and maternal complications generally due to infection [7]. The maternal and fetal outcome in PROM is very important to decrease morbidity and mortality for both the mother and the child and for prevention of complications. So, the aim of this study is to determine the prevalence of maternal and fetal outcomes in PROM among term pregnant women and to discover the risk factors that increase the rate of PROM in a sample admitted to the delivery room in Al-Yarmouk Teaching Hospital.

Patients and Methods

Study design, setting: This was a cross sectional study that was conducted in the Department of Obstetrics and Gynecology at Al-Yarmouk Teaching Hospital during the period from 1st of Feb 2019 till end of Jan 2020.

Study Population and sample size: The study included 80 pregnant women diagnosed with term PROM (after 37 weeks of gestation) and gave birth in the hospital or attended to labor ward with leaking of liquor before onset of labor and delivered at our labor ward. Pregnant women diagnosed with multiple gestation, had fetus with malformations, and any comorbidity with term PROM were excluded from this study. Assessment and estimation of gestational age was done depending on the date of last menstrual cycle, and / or early ultrasound scan.

In this study, the outcome variables were maternal and fetal outcomes, which was divided into two groups:

1. Favorable group (when the mother and neonate discharged from the hospital without complications).

2. Unfavorable group (when the mother or neonate died or experienced complications).

Data collection: We told all the pregnant women about the nature of the study and verbal consent was taken from them. Information about maternal age, occupation, gestational age, residence, parity, mode of delivery, antenatal care visits, duration of PROM, and postpartum complications as sepsis or hemorrhage. Information regarding neonates' Apgar score at 1 and 5 minutes, birthweight, admission to neonate intensive care unit,

All enrolled women underwent a general examination, vital signs (systolic and diastolic blood pressure), abdominal and obstetric examination, laboratory investigation and sonographic examination.

Statistical Analysis

The data analyzed using Statistical Package for Social Sciences (SPSS) version 25. The data presented as mean, standard deviation and ranges. Categorical data presented by frequencies and percentages. Chi square test was used to assess the association between maternal and fetal outcome and certain information. A level of P – value less than 0.05 was considered significant.

Results

In this study, 80 pregnant women were enrolled. Maternal age was ranging from 17 to 43 years with a mean of 26.3 ± 7.23 years. Most of them lived in urban area (86.3%); 60% were housewives; 67.5% were prim gravida; 52.5% received ANC; 63.7% had PROM for more than 24 hours; and 72.5% of them delivered by vaginal delivery as shown in table (1).

Table 1: Distribution of study patients by general information

Variable	No. (n= 80)	Percentage (%)
Age (Years)		
< 20	13	16.3
20 - 29	39	48.8
30 - 39	22	27.5
≥ 40	6	7.4
Residence		
Urban	69	86.3
Rural	11	13.8
Occupation		
Housewife	48	60.0
Employee	24	30.0
Student	8	10.0
Parity		
Primi	54	67.5
Multiparty	26	32.5
ANC visit		
Yes	42	52.5
No	38	47.5
Duration of PROM to delivery		
< 24 hrs.	29	36.3
≥ 24 hrs.	51	63.7
Mode of delivery		
Vaginal delivery	58	72.5
Caesarean section	22	27.5

Figure 1 showed the prevalence of unfavorable maternal and fetal outcome. We noticed that 35% of them showed unfavorable outcome.

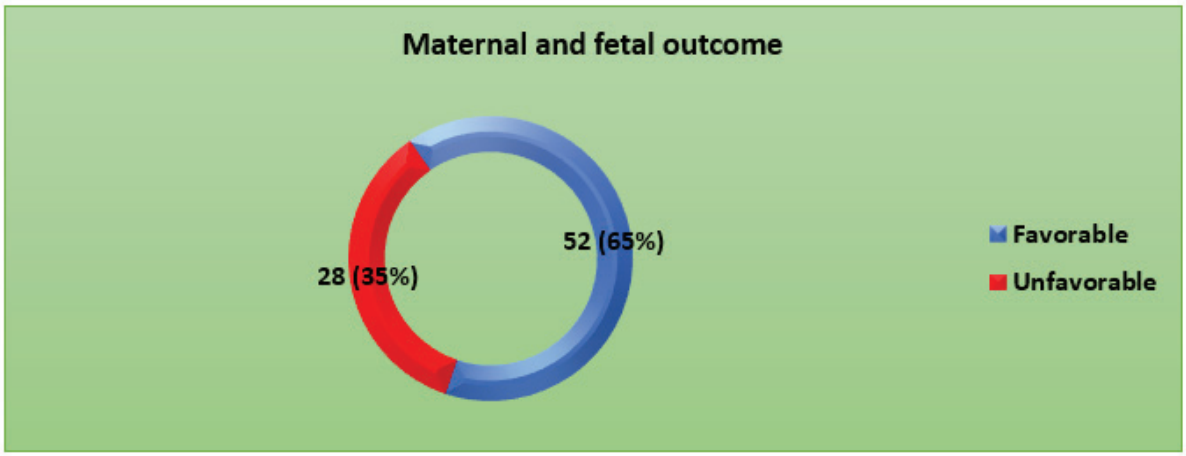

Figure 1: Prevalence of unfavorable maternal and fetal outcome

In this study, 16.3% of mothers complained from postpartum hemorrhage; 21.2% of neonates were admitted to NICU; and 15% of babies were weighing < 2.5 kg as shown in table (2).

Table 2: Distribution of study patients by outcome

Outcome	No. (n= 80)	Percentage (%)
Maternal complication		
No	63	78.7
Postpartum hemorrhage	13	16.3
Sepsis	4	5.0
Fetal complication		
No	60	75.0
NICU admission	17	21.2
Death	3	3.8
Birthweight (Kg)		
< 2.5	12	15.0
≥ 2.5	68	85.0

As shown in table (3), the highest prevalence of unfavorable maternal outcome in this study was seen among women living in rural area (45.5%), in those who didn't receive ANC (31.6%), and in those who had PROM for 24 hours or more (29.4%) with a significant association between prevalence of unfavorable maternal outcome and all of residence (P= 0.034), ANC visit (P= 0.031) and duration of PROM to delivery (P= 0.017).

Table 3: Association between maternal outcome and certain characteristics

Variable	Maternal outcome		Total (%) n= 80	P - Value
	Unfavorable (%) n= 17	Favorable (%) n= 63		
Age (Years)				
< 20	4 (30.8)	9 (69.2)	13 (16.3)	0.272
20 - 29	5 (12.8)	34 (87.2)	39 (48.8)	
30 - 39	7 (31.8)	15 (68.2)	22 (27.5)	
≥ 40	1 (16.7)	5 (83.3)	6 (7.4)	
Residence				
Urban	12 (17.4)	57 (82.6)	69 (86.3)	0.034
Rural	5 (45.5)	6 (54.5)	11 (13.8)	
Occupation				
Housewife	8 (16.7)	40 (83.3)	48 (60.0)	0.355
Employee	6 (25.0)	18 (75.0)	24 (30.0)	
Student	3 (37.5)	5 (62.5)	8 (10.0)	
Parity				
Primi	11 (20.4)	43 (79.6)	54 (67.5)	0.768
Multiparty	6 (23.1)	20 (76.9)	26 (32.5)	
ANC visit				
Yes	5 (11.9)	37 (88.1)	42 (52.5)	0.031
No	12 (31.6)	26 (68.4)	38 (47.5)	
Duration of PROM to delivery				
< 24 hrs.	2 (6.9)	27 (93.1)	29 (36.3)	0.017
≥ 24 hrs.	15 (29.4)	36 (70.6)	51 (63.7)	
Mode of delivery				
Vaginal delivery	12 (20.7)	46 (79.3)	58 (72.5)	0.842
Caesarean section	5 (22.7)	17 (77.3)	22 (27.5)	

The highest prevalence of unfavorable fetal outcome in this study was seen among women who didn't receive ANC (36.8%), and in those who had PROM for 24 hours or more (33.3%) with a significant association between prevalence of unfavorable fetal outcome and both of ANC visit (P= 0.019) and duration of PROM to delivery (P= 0.022) as shown in table (4)

Table 4: Association between fetal outcome and certain characteristics

Variable	Fetal outcome		Total (%) n= 80	P - Value
	Unfavorable (%) n= 20	Favorable (%) n= 60		
Age (Years)				
< 20	6 (46.2)	7 (53.8)	13 (16.3)	0.069
20 - 29	6 (15.4)	33 (84.6)	39 (48.8)	
30 - 39	5 (22.7)	17 (77.3)	22 (27.5)	
≥ 40	3 (50.0)	3 (50.0)	6 (7.4)	
Residence				
Urban	15 (21.7)	54 (78.3)	69 (86.3)	0.091
Rural	5 (45.5)	6 (54.5)	11 (13.8)	
Occupation				
Housewife	13 (27.1)	35 (72.9)	48 (60.0)	0.846
Employee	5 (20.8)	19 (79.2)	24 (30.0)	
Student	2 (25)	6 (75)	8 (10.0)	
Parity				
Primi	13 (24.1)	41 (75.9)	54 (67.5)	0.782
Multiparty	7 (26.9)	19 (73.1)	26 (32.5)	
ANC visit				
Yes	6 (14.3)	36 (85.7)	42 (52.5)	0.019
No	14 (36.8)	24 (63.2)	38 (47.5)	
Duration of PROM to delivery				
< 24 hrs.	3 (10.3)	26 (89.7)	29 (36.3)	0.022
≥ 24 hrs.	17 (33.3)	34 (66.7)	51 (63.7)	
Mode of delivery				
Vaginal delivery	13 (22.4)	45 (77.6)	58 (72.5)	0.385
Caesarean section	7 (31.8)	15 (68.2)	22 (27.5)	

Discussion

The maternal and fetal outcome in PROM is very important to decrease maternal and fetal mortality and for better management of complications. Thus, this study aims to determine maternal and fetal outcomes in PROM among 80 term pregnant women enrolled. In which, prevalence of unfavorable maternal and fetal outcome was 35% of patients. A comparable results observed in Endale et al study (2016), as unfavorable outcome represented 33.5% of patients [7], a lower results observed in Amulya et al study in 2019 [8] and Vishwakarma et al study in 2015 [12], as rate was 16.6% and 14.9% respectively. Differences observed can related to the sample size, low socioeconomic status, which can contribute via, poor nutritional status, anemia, and increased genitourinary infections due to poor personal hygiene, all these causes increased risk of PROM. Many studies reported low socioeconomic status associated with PROM [13]. In this study, 16.3% of mothers complained from PPH; 21.2% of neonates were admitted to NICU; and 15% were weighing < 2.5 kg. By comparison to Endale et al study in 2016, a different results observed as PPH found in only 3.7%, also 25.4% of neonates need NICU admission and 9.7% of the neonates weigh < 2.5 kg [7]. Differently, febrile morbidity accounting to maximum maternal complication in Amulya et al study in 2019 (9.6%) [8], and in Vishwakarma et al study in 2015, 3% patients developed fever and abdominal distension, as the main complication [12]. This differences can attribute to different sample size, type of treatment received, co-morbid diseases, type of delivery and the experience of the staff of intervention, as the role of unskilled and unhealthy delivery practices as a leading risk factor for PPH. The highest prevalence of unfavorable maternal outcome, in this study, was significantly observed among women living in rural area, in those who didn't receive ANC, and in those who had PROM for 24 hours or more ($P<0.05$). An agreement observed to the results reported in Endale et al study in 2010, as observed that women in rural area had a significant risk of unfavorable outcome ($P<0.05$). The risk also was 5.6 times higher in women with a duration of PROM > 24 hours [7]. This finding corroborates the results of Sirak et al study in 2014 [14]. In contrary, Idrisa et al study in 2019 found no significant correlation between ANC and prevalence of outcome ($P=0.137$), furthermore, no significant relationship was found between the duration of PROM and adverse maternal or neonatal outcome($P>0.05$) [6]. This supported by Eleje et al study in 2010 that mothers with PROM greater than 24 hours were not associated with unfavorable outcome ($P>0.05$) [15]. These differences may be related to the different sample size and difference in management of PROM. In regard to rural area, there are more chances of infection, poor hygienic conditions; the quality of health care provided and remote tertiary centers, can participate in occurrence of PROM.

The highest prevalence of unfavorable fetal outcome was significantly noticed among women who didn't receive ANC and in those who had PROM for ≥ 24 hours ($P<0.05$), which was in accordance to Endale et al study (2016), in which ANC had a statistical significant association with fetal outcomes ($P<0.05$). Furthermore, neonates with a duration of PROM > 12 hours were 12 times more likely exposed to unfavorable outcomes ($P<0.05$) [7]. Similarly, there was an association between unfavorable fetal outcomes and longer duration of PROM also reported in Alam et al study in 2014 [16]. When PROM occurs earlier, there are significant risks of maternal and perinatal morbidity and mortality, therefore the attending physicians in a regular ANC visit play an important role in the management of PROM. They should a develop pregnancy outcome plan, whereby a suitable decision is reached for decreasing maternal and fetal unfavorable outcome [17]. In conclusion, unfavorable maternal or fetal outcome is not uncommon among women with PROM. Prolonged duration of PROM and lack of ANC visits were a significant associated factors. So, an early accurate diagnosis of PROM is essential for favorable outcome in pregnancy and thus it decreases the maternal and fetal morbidity.

Ethical Clearance: The Research Ethical Committee at scientific research by ethical approval of both MOH and MOHSER in Iraq

Conflict of Interest: Non

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