Prevalence of Preterm Premature Rupture of Membranes and Factors Associated with its Poor Outcome Among Pregnant Women Attending Ain Shams Maternity Hospital

Thesis

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Abstract

Background: Preterm Premature rupture of membranes (PPROM) is fairly a common major complication of pregnancy and can lead to increased maternal complications, neonatal morbidity and mortality**.** The most common cause of PPROM is idiopathic.

Objectives: The study aims to identify the maternal and fetal outcome and the potential associated factors for poor fetal outcomes of PPROM.

Methodology: A Cross sectional study was conducted at Ain Shams maternity hospital using data that was retrieved from the hospital information system (HIS) and reviewed from the patients' medical files.

Results: The prevalence of PPROM was 4.7%. 58.3% were between 21 -30 years and 70.3% were housewives. 95.7% were not smokers & amniotic fluid was gushed from the vagina in 74.7% of cases. 58%were multi gravida with singleton pregnant & 52.3% went into spontaneous labor within 24 hours .Women without history of previous PPROM were 96%.77%were free from chronic diseases & the mean gestational age at PPROM & delivery was 32±3weeks. 95.7% did not develop chorioamnionitis and 46.7% were delivered by CS. Infants who were born alive & well were 38.7%, while 61.3% had poor outcome. Maternal age, type of PPROM, presence of choriamnionitis, mode of delivery, LBW and GA at PPROM & at delivery were significantly related to poor fetal outcome $p<0.05$. By multivariate regression analysis; employment (OR=1.8), early GA at PPROM (OR=.8) , gush type of PPROM (OR=2.01), chorioamnionitis (OR=14.1), CS delivery (OR=2.7) were risk factors for poor fetal outcome.

Conclusion: The study concluded that PPROM is major complication of pregnancy with significant impact on mothers& neonates. by multivariate regression analysis showed that women employment , early gestational age at PPROM, gush type of PPROM, chorioamnionitis , delivery by caesarean section and low birth weight were risk factors for poor fetal outcome.

Keywords: PPROM, prevalence rate, gush type of PPROM, low birth weight, poor fetal outcome.

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List of Abbreviations

ACOG : American College of Obstetricians and Gynecologists Practice Bulletin

AFI :Amniotic Fluid Index

ANC : Ante Natal Care

CI : Confidence Interval

CS : Caesarean Section

ECM : Extra Cellular Matrix

EDHS : Egypt Demographic and Health Survey

EONS : Early Onset Neonatal Sepsis

G A :Gestational Age

HIS :Hospital Information System

LBW : Low Birth Weight

MMP : Matrix Metalloproteinase

NICU : Neonatal Intensive Care Unit

PPROM : Preterm Premature Rupture of Membranes

PTB : Preterm Birth

RCOG : Royal College of Obstetricians and Gynaecologists

RDS : Respiratory Distress Syndrome

TIMPs : Tissue Inhibitor of Metallo Proteinase

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Introduction

Spontaneous rupture of fetal membranes is a normal component of labor and delivery **(Caughey et al., 2008).** Preterm premature rupture of membranes **(PPROM)** is the rupture of the fetal membranes before 37 weeks of gestation **(Mercer, 2010).**

There is variation in the prevalence of preterm premature rupture of membranes (PPROM) and this is due to the difference in the populations studied. Premature rupture of membranes occurs between 5 and 15% of all pregnancies **(Hernandez et al., 2011).** It was 1.8% in Oman and 8% in Bangladesh. While in Pakistan a prevalence of 9.6% was previously reported **(Noor et al., 2007).**

The pathophysiology is complex and multifactorial (**Osaikhuwuomwan, 2010).** The most common cause of PPROM is idiopathic. However, many risk factors have been identified such as; structural defect in the membranes due to collagen deficiency or malformation, weakening of the membranes due to enzymatic destruction in inflammatory or infectious processes and previous occurrence of PPROM **(Caughey et al., 2008).** It has also been associated with low socioeconomic status of pregnant women, maternal smoking and vaginal bleeding **(Al-Qa'Qa' & Al-Awaysheh, 2005).**

The primary complication of PPROM for the mother is the risk of infection which can lead to chorioamnionitis which is as high as 25–35% **(Afza et al., 2011)**, Other complications that may be associated with PPROM include placental abruption, postpartum hemorrhage and postpartum infection. For these reasons, many physicians recommend that labor be induced if the pregnancy is at term and labor doesn`t begin spontaneously shortly after the membranes rupture (**Ibishi and Isjanovska., 2015).** Complications of PPROM for the fetus and newborn consist of prematurity, cord compression leading to fetal distress, neonatal sepsis, respiratory distress syndrome (RDS), cord prolapse during rupture of membranes, placental abruption and risk of fetal and neonatal death **(Dars et al., 2014).**

The fetal and neonatal morbidity and mortality risks are significantly affected by the severity of oligohydramnious, duration of latency period and gestational age at PPROM **(Patil and Patil, 2014).** PPROM is significant not only in perinatal morbidity and mortality, but also in the long term neonatal complications and sequelae in survived neonates **(Al-Riyami et al., 2013).**

Preterm birth, defined as delivery before 37 weeks gestation, is the leading cause of perinatal mortality in the

US. PPROM is one of the leading identifiable causes of premature birth and it accounts for approximately 18% to 20% of perinatal deaths in the United States **(Caughey, 2008).** It comprises 30-40% of preterm deliveries in Oman **(Al-Riyami et al., 2013)** and approximately 1/3 of all preterm births. (**Mercer, 2010).** It causes around 25-30% of all preterm deliveries in Iran **(Tavassoli et al., 2010).**

Approximately 70% of neonatal deaths, 36% of infant deaths, and 25-50% of cases of long-term neurologic impairment in children can be attributed to preterm birth **(American College of Obstetricians and Gynecologists (ACOG), 2016).** Estimates indicate that the costs to the United States of America alone in terms of medical and educational and lost productivity associated with preterm birth were more than US$ 26.2 billion **(Chery et al., 2014).**

In Egypt, preterm delivery and Low birth weight (LBW) are considered as frequent and significant health problems. In 2015 a Study was done in the obstetric unit of El Moneera general hospital revealed that (8.2%) of all deliveries were preterm deliveries among all deliveries **(Ayman et al., 2015). Mansour et al, 2005** found that LBW rate was 12.1% among live births

Study Rationale

So PPROM is critically important to be evaluated and to study its impact as a clinical and public health problem **(Goldenberg et al., 2008).**

In order to maximize perinatal outcomes, delivery of preterm infants should occur at facilities capable of providing the appropriate level of neonatal resuscitative and supportive care commensurate with the gestational age. The American Academy of Pediatrics has recently redefined levels of neonatal care providing recommendations to ensure each newborn infant is delivered and cared for in a facility most appropriate for his or her needs **(Pediatrics, 2012).**

There is paucity of data regarding prevalence of PPROM and its outcome at Ain Shams maternity hospital so, this study was carried out to address this problem and to help analyze the extent of the complication caused by PPROM. It was also contributed to the epidemiological data of preterm premature rupture of membranes at Ain Shams maternity hospital and serve as a baseline data for future research.

Research Hypothesis:

There is increase in the frequency of preterm premature rupture of membranes (PPROM) among pregnant women attending Ain Shams maternity hospital during the 5 year period from (2011-2015).

Research Questions:

*What is the trend or frequency of preterm premature rupture of membranes (PPROM) among pregnant women attending Ain Shams maternity hospital during the 5 year period from (2011-2015)?

*What are the outcomes of pregnancies complicated with preterm premature rupture of the membranes (PPROM) and the potential associated factors with the outcome?

Aim of the Work

Goal:

To promote the health of pregnant mothers and infants and attain finally a favorable outcome of the pregnancy.

Objectives:

1- To measure the frequency of preterm premature rupture of membrane (PPROM) among pregnant women attending Ain Shams maternity hospital in 5 years (2011-2015).

2- To identify the maternal and fetal outcome among pregnant women presented with preterm premature rupture of the membranes (PPROM).

3- To identify the potential associated factors for poor maternal and fetal outcomes among pregnant women presented with (PPROM).

CHAPTER 1

1- Fetal Membranes &Premature rupture of membranes

1.1: Definition of fetal membranes:

The membranous structure that surrounds the developing fetus and forms the amniotic cavity **(Benirschke et al., 1995).**

This membrane is derived from fetal tissue and is composed of two layers: the amnion (inner layer) and the chorion (outer layer). The amnion is a translucent structure adjacent to the amniotic fluid, which provides necessary nutrients to the amnion cells. The chorion is a more opaque membrane that is attached to the decidua (maternal tissue that lines the uterus during pregnancy). The amnion and chorion are separated by the exocelomic cavity till about three months gestation, when they become fused. Intact, healthy fetal membranes are required for an optimal pregnancy outcome **(Parry &Strauss, 1998).**

1.2:Anatomy and Importance:

By inspection of the fetal membranes after delivery shows amnion that is mildly adherent to the fetal side of the