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## The correlation between parity and incidence of premature rupture of membranes

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### Abstract

**Objectives:** To identify the correlation between parity and premature rupture of membrane (PROM) incidence at Government Maternity Hospital, Tirupati in 2022.

**Methods:** This is a retrospective observational study conducted in a Tertiary Care Hospital in Andhra Pradesh from May 2022 to July 2022. The study population was all pregnant women giving birth at Tertiary Care Hospital from May to July 2022. The samples used in this study were 2965 women who delivered in Tertiary Care Hospital among them patients with PROM 312. The data were secondary data obtained from medical records and then analyzed in univariate and bivariate analysis using a chi-square test with p-value = 0.007.

**Results:** The incidence of premature rupture of membrane at Tertiary Care Hospital is 10.5%. Incidence in Primi's is 2.4% and multi para's is 4.6%.

The research results showed that most PROM incidences occurred in primipara as many as 72 respondents (8.3%), and those who did not experience PROM occurred in multipara were as many as 777 respondents (28.5%). Chi-Square (X<sup>2</sup>) statistical test obtained p-value = 0.007 so that it can be concluded that there was a correlation between parity and the incidence of premature rupture of membranes in Tertiary Care Centre in Tirupati from May 2022 to July 2022.

**Conclusion:** Mothers in Tertiary Care Centre, Tirupati mainly were multipara. There is a relationship between parity with the incidence of premature rupture of membranes in Tertiary Care Centre from May 2022 to July 2022 with p value = 0.007. Further research is needed and develop this title by connecting to other variables so that the results obtained will be more comprehensive.

**Keywords:** Key words-proximal tibia fracture, MIPPO, knee stiffness, wound dehiscence

### Introduction

Maternal Mortality Rate (MMR) and Infant Mortality Rate (IMR) are important indicators used in determining public health status because MMR and IMR show their ability and quality in health services. MMR describes the number of women who die from a cause of death related to pregnancy disorders or treatment (not including accident or incidental causes) during pregnancy, childbirth, and in the puerperium (42 days after delivery) without taking into account the length of pregnancy per 100,000 live births. IMR is the number of people who die before reaching one year, stated in 1,000 live births in the same year. The age of a baby is a condition that is susceptible to both pain and death.

Premature rupture of membranes (PROM) is one of the fundamental problems of the largest cause of preterm labor. CPD can also cause infection in mothers and babies, increasing maternal and neonatal morbidity and mortality.

Many factors can cause PROM, both from the mother and the fetus. These factors include infection, incompetent cervix, excessive intrauterine pressure, sexual trauma, localized abnormalities, socioeconomic conditions, blood type, disproportion, multigravida, smoking, antepartum hemorrhage, and iron deficiency. According to (Cunningham 2006) [16], mothers who have given birth several times are more at risk of developing PROM because vascularity in the uterus is impaired, which results in brittle membrane connective tissue and eventually spontaneous rupture. In the research conducted by Al Riyami, the maternal complications observed in this study included; infection, which was seen in 20 (45%) patients; antepartum hemorrhage in 11 (25%) patients; and cesarean section, which was required in 12 (27%) patients. There was no significant association between risk factors such as gestational age at delivery, maternal age at PPROM, maternal Body Mass Index (BMI), and cesarean section rate.

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### The correlation between parity and Premature Rupture of membranes

Parity	PROM	Non-PROM	total	p-value
Grand Multipara	40 (1.3%)	380 (12.8%)	420 (14.2%)	0.007
Multi para	135 (4.6%)	777 (26.2%)	912 (30.8%)	
Primi Para	72 (2.4%)	786 (26.5%)	858 (28.9%)	
Nulli Para	65 (2.2%)	710 (23.9%)	775 (26.1%)	
Total	312 (10.5%)	2653 (89.5%)	2965 (100%)	

### Methods

The type of research used in this study was a descriptive analytic study. The study was conducted using a cross sectional approach. Study period was from May 2022 to July 2022. The population in this study were all mothers giving birth in Tertiary Care Centre from May to July 2022, which had complete data with 2965 people. The samples used in this study were 2965 normal maternity mothers and 312 maternity mothers with PROM. The sampling technique used in this study is a total sampling. The research variables are divided into two variables, the independent variable in this study is parity. The dependent variable in this study is the incidence of premature rupture of membranes. The tool used for data collection in this study uses a master table with columns or lanes containing numbers, medical record numbers, respondents' names, PROM, not PROM, and parity. This study has two data analyses: univariate analysis and bivariate analysis, with the chi-square ( $\chi^2$ ).

### Results

Table 1 shows the parity of mothers giving birth at Tertiary Care Centre in Tirupati in 2022. Most respondents had multipara parity of 912 respondents (30.7%), and a small proportion of respondents had grand multipara parity as many as respondents (16.8%).

**Table 1:** Frequency distribution of parity in the study population

Type	Frequency	Percentage (%)
Grand Multipara	420	14.2
Multi para	912	30.8
Primi Para	858	28.9
Nulli Para	775	26.1
Total	2965	

Frequency Distribution of premature rupture of membranes incidence in Tertiary Care Centre in Tirupati from May to July 2022 is shown in Table 2, 312 maternity mothers experienced PROM (10.5%) and 2388 respondents (89.4%) are Non PROM.

**Table 2:** Frequency distribution of premature rupture of membranes

Outcome	Frequency	Percentage (%)
PROM	312	10.5
Non-PROM	2653	89.5

**Table 3:** The correlation between parity and Premature Rupture of membranes

Parity	PROM	Non-PROM	total	p-value
Grand Multipara	40 (1.3%)	380 (12.8%)	420 (14.2%)	0.007
Multi para	135 (4.6%)	777 (26.2%)	912 (30.8%)	
Primi Para	72 (2.4%)	786 (26.5%)	858 (28.9%)	
Nulli Para	65 (2.2%)	710 (23.9%)	775 (26.1%)	
Total	312 (10.5%)	2653 (89.5%)	2965 (100%)	

### Data analysis

The research variables are divided into two variables, The independent variable= Parity.

The dependent variable= Incidence of premature rupture of membranes.

Data was entered into excel 2007 and was analysed using SPSS-23.

We did Univariate analysis and bivariate analysis when it comes significance with the chi-square ( $\chi^2$ ).

### Discussion

**Parity of mothers with PROM giving birth IN Tertiary Care Centre from May 2022 to July 2022:** The study results shows that most respondents have a multipara parity of 912 respondents (30.7%). The second and third parity are relatively safer conditions for pregnancy and childbirth in the reproductive period. In these circumstances, the uterine wall had not changed much, and the cervix has not experienced too often the opening so that it can support the membranes properly [12]. Mothers who have given birth several times are more at risk of experiencing PROM because vascularity in the uterus has a disruption that results in brittle membrane connective tissue which is fragile and eventually spontaneous rupture [13]. This study's results are in line with Ferguson's research, with the title "Preterm premature rupture of membranes: nutritional and socioeconomic factors," which states that PROM incidence mostly occurs in mothers with primipara and multipara parity [14]. The study results showed that a small percentage of respondents had grand multipara parity as many as 598 respondents (20.1%).

### The incidence of premature rupture of membranes in Tertiary Care Centre from May 2022 to July 2022:

The research data shows that the mothers who experienced PROM were 312 respondents (10.5%), and those who did not experience PROM were 2653 respondents (89.4%). According to Mercer, the causes of PROM are multiparity, hydramnios, localized abnormalities (breech or latitude), spinopelvic disproportion, multiple pregnancies, pendular abdomen (abdominal hanging) [1]. According to Harger, in another research entitled "Understanding the Health of Female Reproduction," the cause of rupture of membranes (fetal membranes) are direct trauma to the mother's abdomen abnormalities in the location of the fetus in the uterus and grand multipara pregnancy or pregnancy more than five times [2].

The cause of PROM, according to Singh, is multipara [3]. Multipara is more likely to have an infection because the cervical opening process is faster than nullipara, so there can be a premature rupture of membranes. In the case of infection, it can cause a biomechanical process in the membranes' proteolytic form to facilitate membranes' rupture. In multipara, because of a history of labor, the connective tissue condition is looser than nullipara. In multipara connective tissue that supports the amniotic membrane decreases, multipara is more at risk of premature rupture of membranes than nullipara [4]. Consistency of the cervix in labor dramatically affects the occurrence of premature rupture of membranes. In multipara with thin cervical consistency, the likelihood of premature rupture of membranes is more significant in the presence of intrauterine pressure at the time of delivery. The consistency of a thin cervix with the cervix's opening in a multipara (flattening while opening almost at once) can speed up the cervix's opening so that the risk of amniotic rupture before complete opening [1].

**The correlation between parity and the incidence of premature rupture of membranes in Tertiary Care Centre from May 2022 to July 2022:** The research results showed that most PROM incidences occurred in primipara as many as 72

respondents (8.3%), and those who did not experience PROM occurred in multipara were as many as 777 respondents (28.5%). Chi-Square (X<sup>2</sup>) statistical test obtained p-value = 0.007 so that it can be concluded that there was a correlation between parity and the incidence of premature rupture of membranes in Tertiary Care Centre in Tirupati from May 2022 to July 2022.

Primipara mothers should not be susceptible to premature rupture of membranes because the mother had never been pregnant or had a previous uterine stretching. Besides, primipara connective tissue maternity and vascularity were still healthy. Primiparous mothers who experience premature rupture of membranes are associated with psychological conditions, including pain during pregnancy, physiological disorders such as emotions, and anxiety for pregnancy<sup>[6]</sup>. Mothers who experience anxiety and emotions during pregnancy will interfere with the mother's condition because the adrenal gland will produce the hormone cortisol. Thus when the mother experiences anxiety, the brain called the amygdala sends a signal to the hypothalamus. The hypothalamus produces the hormone CRH associated with ACTH (Adrenocorticotropic). ACTH sends a signal to the adrenal gland to release cortisol.

Excess cortisol production will suppress the immune system, so the mother may be susceptible to infection/inflammation, which can cause increased activity of iL-1 and prostaglandin, produce tissue collagenase, resulting in collagen depolymerization in the chorion / amniotic membrane, thin membranes, weak and easily break spontaneously, causing premature rupture of membranes<sup>[7]</sup>.

Many multipara mothers experience premature rupture of membranes because the multiparous mothers will affect the embryogenesis process so that the formed membranes will be thinner, which will cause rupture of membranes<sup>[8]</sup>. Grande multipara mothers are indeed vulnerable to the incidence of premature rupture of membranes. Many mothers who experience premature rupture of membranes are mostly mothers aged > 35 years. This is because the mother has already been pregnant or the uterus has been enlarged before so that if the pregnant woman returns, her uterus will stretch.

According to Silverman's opinion, one of the risk factors associated with the onset of premature rupture of membranes is parity<sup>[10]</sup>. Lee's theory also reinforces this opinion that parity allows damage to the cervix during delivery<sup>[11]</sup>. premature rupture of membranes will increase in mothers with grand multipara. In this theory, the amniotic membrane is not healthy due to the lack of connective tissue and vascularization, which causes the membranes to rupture early<sup>[12]</sup>.

Primipara mothers who did not experience premature rupture of membranes are indeed not susceptible to the incidence of premature rupture of membranes. There are still many primipara mothers who do not experience premature rupture of membranes. This is in line with the theory of Serenius that primiparous mothers have never given birth so that they have not experienced stretching or enlargement of the uterus, and cervical damage has not occurred, as well as healthy connective tissue and vascularization<sup>[13]</sup>.

There are still many multipara mothers who do not experience premature rupture of membranes. This may be influenced by the mother's cervix's condition, which is still competent. If the mother's cervix is incompetent, it will predispose to premature rupture of membranes. This is consistent with the theory stated by Zarei that one of the factors predisposing to premature rupture of membranes is the incompetent cervix<sup>[14]</sup>.

There are still many grand mothers who do not experience premature rupture of membranes. Many other things may

influence this situation because it is not known with certainty for the cause of the amniotic rupture. Besides, mothers may not experience other predisposing factors, namely: a history of previous premature rupture of membranes, abnormalities of location, incompetent cervix. The results of this study are in line with the research conducted by<sup>[15]</sup> with the title of the relationship of maternal age, occupation, and parity to the incidence of premature rupture of membranes, which states that there is a significant relationship between parity and the incidence of premature rupture of membranes with chi-square formula and obtained p-value of 0.004.

### Conclusion

Mothers in Tertiary Care Centre, Tirupati mainly were multipara. There is a relationship between parity with the incidence of premature rupture of membranes in Tertiary Care Centre from May 2022 to July 2022 with p value = 0.007. Further research is needed and develop this title by connecting to other variables so that the results obtained will be more comprehensive.

### Conflict of Interest

Not available

### Financial Support

Not available

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