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An analysis of factors affecting the duration of latency period in patients with pre term premature rupture of membranes in a tertiary care centre

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Abstract
Introduction: Identification of predictive factors for the duration of the latency period may help obstetrician in risk stratification and providing consultation for women presenting with PPROM. Correct diagnosis and timely intervention is the bottom line to strike a delicate issue of prematurity thereby optimizing the feto-maternal outcome.
Material and Methods: A total of 51 patients presented with PPROM to department of obstetrics and gynaecology TMMC & RC, Moradabad during period July 2018-2019. After detailed history and examination, patients were investigated and evaluated for various factors affecting the duration of latency period in patients with PPROM.
Results: About sixty percent of females presenting with PPROM were in lower age group with mean age of 23.07 +/- 4.27 years, low body mass index with mean BMI of 20.7 kg/m2 and belonging to low socio economic group. All clinical and investigative parameters of infection were related to decreased latency period.
Conclusion: Prevention of PPROM is challenging, however incidence can be reduced only by identifying pregnant women at risk and providing adequate preventive counselling, monitoring and adequate treatment.

Keywords: Latency period, preterm prelabour rupture of membrane

Introduction
Preterm rupture of membranes is one of the most challenging and controversial dilemmas that occurs even in low risk pregnancies. PPROM complicates approximately 3% of pregnancies and leads to one third of preterm birth and leads to number of other perinatal and neonatal mortality and morbidity [1]. The longer the time elapsed between rupture and delivery, the greater the chance of infection for both mother and fetus [2]. PPROM is attributed to various risk factors like black ethnicity, lower socio-economic status, cigarette smoking, a history of STI's, bleeding per vaginum, uterine distension (e.g. polyhydramnios, multiple gestation) [3], cerclage and amniocentesis. "Latency period is defined as the time elapsed between onset of PPROM to delivery". Fetomaternal outcome depends on many factors mainly on gestational age, treatment (antibiotics or steroids), duration of labor and development of chorioamnionitis. Major complications of prematurity are respiratory distress syndrome, intraventricular haemorrhage and necrotizing enterocolitis. Many predictive factors have been established in the current study that can affect the length of the period of latency in PPROM subjects. This knowledge may help out obstetricians with risk stratification and consultation regarding the natural course of expectant management for cases with Premature PROM. Finally identification and timely referals of these high-risk women in preconceptional or early pregnancy for specialized obstetric evaluation and management is beneficial in decreasing premature birth morbidity, mortality and psychological trauma.

Materials and Methods
The present observational prospective study was conducted in Department of Obstetrics and Gynaecology Teerthanker Mahaveer Medical College and Research Centre, Moradabad during period July 2018-2019. All Patients admitted in Department of Obstetrics of TMMC & RC with PPROM with Gestational age more than 24 weeks and less than 37 completed weeks were included in the study.

After taking complete history and examination, patients were investigated and evaluated for various factors affecting the duration of Latency period in patients with PPROM.

Exclusion criteria

Patients with intrauterine fetal death, congenital anomalies, cord prolapse or any maternal illness which warrants immediate termination of pregnancy were excluded from the study.

Statistical Analysis

Calculating mean and standard deviation for the continuous variables was used to perform descriptive statistics. As absolute numbers and percentage, categorical variables are presented. SPSS (Statistical Package for Social Sciences) version 25.0 and MedCalc software were the software used for statistical analysis.

Results and observations

A total of 51 patients were included in the present study. In orde r to determine if they had any clinically significant effect on late ncy, many maternal characteristics were studied.

Table 1: Demographic factors in cases

Demographic factor	mean	Standard deviation
Age (years)	23.07	+/-4.27
BMI (kg/m2)	19.75	+/-3.09

Majority of patients presented with PPROM were in younger age group < 22years with mean age 23.07 years and low BMI <18 with mean BMI 19.75kg/m2.

Table 2: Distribution of gestational age among cases

	Gestational age		
Latency	**Mean**	**Std. Deviation**	**p-value**
48 hours or more	34.50	2.22	0.041*
< 48 hours	32.84	3.18	

The mean gestational age was significantly more among subjects with latency more than 48 hours compared to subjects with latency less than 48 hours.

Table 3: Association of maternal age with latency period

Latency	Age	
	≤ 22 years	**> 22 years**
Latency < 48 hours	27	13
	67.5%	32.5%
Latency 48 hours or more	4	7
	36.4%	63.6%
Chi-square value = 2.894, p-value = 0.044*		

The distribution of age was compared between subjects with latency period < 48 hours and 48 hours or more using the chi-square test. Age less than 22 years was significantly more among subjects with latency < 48 hours. Both the age extremities are associated with increase chances of PPROM.

Table 4: Association of socio economic status with latency period

Latency	Socioeconomic status	
	Low	**Middle**
Latency < 48 hours	34	6
	85.0%	15.0%
Latency 48 hours or more	8	3
	72.7%	27.3%
Chi-square value = 2.894, p-value = 0.044*		

Low socioeconomic status was significantly more among subjects with latency < 48 hours.

Table 5: Association of fever with latency period

Latency	Fever	
	No	**Yes**
Latency < 48 hours	32	8
	80.0%	20.0%
Latency 48 hours or more	4	7
	36.4%	63.6%
Chi-square value = 4.018, p-value = 0.028*		

Infection diagnosis is clinical. It needs fever (>100*F or 37.8*C) to be present and other symptoms. Fever was significantly highe r in subjects with less than 48 hours of latency than in subjects w ith > 48 hours of latency.

Table 6: Association of recent genitourinary tract infection (urine routine microscopy) with latency period.

	Urine-RM (pus cells)	
	≤ 5 cells	**> 5 cells**
Latency < 48 hours	25	15
	62.5%	37.5%
Latency 48 hours or more	9	2
	81.8%	18.2%
Chi-square value = 17.547, p-value = 0.018*		

The distribution of URINE-RM (PUS CELLS) was compared between subjects with < 48 hours and 48 hours or more using the chi-square test. Pus cells > 5 in number was significantly more among subjects with latency less than 48 hours compared to subjects with latency > 48 hours.

Table 7: Association of C - reactive protein with latency period.

Latency	C-RP	
	Negative	**Positive**
Latency < 48 hours	30	10
	75.0%	25.0%
Latency 48 hours or more	10	1
	90.9%	9.1%
Chi-square value = 4.374, p-value = 0.035*		

C-RP was significantly more among subjects with latency less than 48 hours compared to subjects with latency > 48 hours.

Table 8: Association of amniotic fluid index with latency period

Latency	Oligohydramnios		Total
	2-5	**>5**	
< 48 hours	14	26	40
	35.0%	65.0%	100.0%
48 hours or more	7	4	11
	63.6%	36.4%	100.0%
Total	21	30	51
	41.2%	58.8%	100.0%
Chi-square value = 3.921, p-value = 0.047*			

Reduction of latency period is linked with oligohydramnios. The reasons could be many but most accepted one is that there is redistribution of blood flow increases in these foetuses because of inflammatory response syndrome in foetus. In present study, Oligohydramnios was significantly more among subjects with latency less than 48 hours compared to subjects with latency > 48 hours (p-value = 0.040).

Table 9: Mode of delivery in P prom cases

	Mode of delivery	
	LSCS	**Vaginal delivery**
Latency < 48 hours	8	32
	20.0%	80.0%
Latency 48 hours or more	4	7
	36.4%	63.6%
Chi-square value = 5.668, p-value = 0.029*		

LSCS was significantly more among subjects with latency less than 48 hours compared to subjects with latency > 48 hours. Due to oligohydramnios most patients had developed fetal distress and as a consequence has undergone LSCS.

Discussion

PPROM causes substantial maternal and neonatal morbidity and mortality, so attending physicians should be well aware of the risk factors and should be able to adequately determine whether to terminate pregnancy or continue pregnancy [4, 8]. Latency predictions may be significant, particularly when delivery to a hospital with tertiary facilities is planned. In a retrospective study done by Walker *et al.* [4] it was found that latency in PPROM of three weeks was associated with high mortality and reduced likelihood of morbidity-free interval in all subgroups irrespective of gestational age. The impact of age of mother is directly related to the duration of latency and pregnancy outcome. In our study PPROM was more common in age group of less than 22 years compared to other age groups (p-value = 0.044*) which was equivalent to the study by *Poovathi et al.* [5], PPROM had an incidence of 54% out of which 36% late PPROM and 10% early PPROM. Noor *et al*. in Ayub medical college in 2006 demonstrated that (58.8%) higher incidence among younger age group. No correlation between BMI and latency time was found in the present study. In Poovathi *et al.* [5] report, the latency time in patients with lower BMI was shorter.

Prenatal assistance is of poor quality in women with lower socio economic level as they undergo less ANC checkup with few inv estigations that may contribute to the onset of this disease. In our study, low socioeconomic status was significantly more among subjects with latency < 48 hours (p-value = 0.044). In Dars *et al.* [6], in 72% of subjects, more number of patients belonged to the low socioeconomic class in comparison to the middle socioeconomic class in 21% and the upper class in 7%. The relation between GA and latency period had also been studied. Jeon *et al*. [7] reported that earlier GA at PPROM is associated with prolonged duration of latency. Other authors found that an inverse relationship between GA at the time of PPROM and period of latency was established. In present study fever was 32.5% in latency <48hours and 18.2% in >48hours Burchell [8] found that 1.7% of his patients with PPROM presented fever within 24hours, 7.5% between 24 and 48 hours, and 8.6% beyond 48hours.

In the systematic review by Zeng *et al.* [9] Staphylococcus (37.6%) and E. coli (11.9%) were the most prevalent pathogens similar to present study. LSCS was significantly more among subjects with latency < 48 hours (p-value = 0.029). In present study, 22.6% had LSCS delivery. It was the same as the analysis by *Poovathi M et al.* [5] in which 64% of cases had delivered vaginally and 36% had delivered by LSCS.

Conclusion

Majority of women presenting with PPROM were in lower age group i.e <22 years (60.7%) with mean age of 23.07 +/- 4.27 years, low body mass index with mean BMI of 20.7 kg/m2 and belonging to low socio economic group. Higher period of gestation (>34 weeks) PPROM cases had less latency period i.e < 48hours. Therefore we could establish an indirect relation between GA at Preterm PROM and latency period. The overall effect of latency duration on neonatal outcome can be viewed as fine balance between positive effects (eg-advanced lung maturity) and negative effect that exposes fetus to unfavourable intrauterine environment. Thus we suggest that immediate delivery after PPROM should not be practiced rather patients should be kept on expectant management as long as possible till fetus attains lung maturity. Prevention of PPROM is challenging, however incidence can be reduced only by identifying pregnant women at risk and providing adequate preventive counselling, monitoring and treatment wherever appropriate.

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