Original Research Article

Study risk factors of preterm labor and association of risk factors with preterm labor in tertiary care center - A prospective study

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Abstract

Background: Preterm labor is an obstetrics emergency and a threat to population health. 75% of infant mortality is related to preterm labor. Preterm labor not only inflicts financial and emotional distress on the family, it may also lead to permanent disability (physical or neurological damages) in infants. The economic cost of preterm birth is high in terms of neonatal intensive care and ongoing health care and educational needs. The social cost is also high, with many families experiencing the sudden loss of a preterm baby or a stressful hospital stay, sometimes for months. **Aim and Objective: 1.** Study risk factors of preterm labor and association of risk factors with preterm labor. 2. Study neonatal outcome of preterm labor **Method: Study design:** Prospective study. **Study setting:** Department of Obstetrics and Gynaecology, Dr. D.Y Patil Medical College and Research Institute, Kolhapur. **Study duration:** From July 2022 to July 2023. **Study population:** All Patients with preterm labor admitted in Department of Obstetrics and Gynaecology, Dr. D.Y Patil Medical College and Research Institute, Kolhapur during study period. **Sample size:** 50 **Results:** Mean age of the mothers was 29.7 ± 5.1 years, ranging from 20 to 43 years. It was observed that 84% of the patients were in the age group of 21 to 35 years. 16% of the mothers had GA less than 28 weeks, 28% had GA of 28 to 32 weeks and rest 56% of the mothers had GA of 32 to 37 weeks. Half of all mothers were primigravida, 28% were gravida 2 and rest 22% were gravida 3 or higher. 6% cases with fibroid, 4% had bicornuate uterus and one case had septate uterus. Surgical history of Dilation and curettage in 18%, previous LSCS in 14% and hysterolaparoscopy in 6%. Most of cases mode of delivery was normal vaginal delivery 22 cases (44%) followed by LSCS 18 cases (36%) and assisted delivery 10 (20%). majority of perinatal outcome was live birth 52 and 8 still birth. **Conclusion:** It is recommended that specialized antenatal care for the patients, who are thought to be at risk of preterm birth, should be performed that can bring down the incidence to some extent. Provider initiated preterm birth can be minimized by early detection of risk factors and prompt intervention to minimize their effects.

Keywords: Preterm labor, Risk factor, Perinatal morbidity, Perinatal mortality

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Received Date: 02/06/2023 Revised Date: 23/07/2023 Accepted Date: 08/08/2023

Access this article online

Quick Response Code:

Website: www.medpulse.in

INTRODUCTION

Preterm labor and delivery before 37 weeks of gestation is a principal contributor to perinatal mortality and morbidity.[1] Preterm labor is an obstetrics emergency and a threat to population health. 75% of infant mortality is related to preterm labor. Preterm labor not only inflicts financial and emotional distress on the family, it may also lead to permanent disability (physical or neurological damages) in infants. The economic cost of preterm birth is high in terms of neonatal intensive care and ongoing health care and educational needs. The social cost is also high, with many families experiencing the sudden loss of a preterm baby or a stressful hospital stay, sometimes for months.[2,3] Despite advances in perinatal medicine in recent decades the problems of preterm delivery continues to frustrate satisfactory reproductive outcomes with little progress having been made in identifying and reducing the frequency of preterm birth.[4-6] Due to continued innovation in neonatal intensive care facilities and obstetric interventions, fetal survival is now possible even at 20

How to cite this article: Dr Eluri Deepika, Dr Mouna Cherabudla, Dr Kavita Kabade, Dr Vasudha Sawant. Study risk factors of preterm labor and association of risk factors with preterm labor in tertiary care center - A prospective study. *MedPulse International Journal of Gynaecology.* August 2023; 27(2):08-13. http://medpulse.in/Gynacology/index.php

weeks gestation in developed countries. However, in even the best setups in developing countries, salvage is rare below 28 weeks of gestation.[7]

However a real reduction in preterm delivery rates will only take place through an improvement in understanding of the physiology of preterm labor, identification of patients at risk, prediction and prevention of its occurrence, early detection of its onset and effective management.[8,9] Our study aims at studying the etiology, various risk factors, preventive measures, treatment and neonatal outcome in patients admitted with preterm labor so that we are able to achieve a better understanding of the problem which are looking to tackle in the future.

AIM AND OBJECTIVES

1. Study risk factors of preterm labor and association of risk factors with preterm labor
2. Study neonatal outcome of preterm labor

MATERIAL AND METHODS

Study design: Prospective study

Study setting: Department of Obstetrics and Gynaecology, Dr. D.Y Patil Medical College and Research Institute, Kolhapur.

Study duration: From July 2022 to July 2023.

Study population: All Patients with preterm labor admitted in Department of Obstetrics and Gynaecology, Dr. D.Y Patil Medical College and Research Institute, Kolhapur during study period.

Sample size: 50

Inclusion criteria

1. All pregnant women in the age group of 18-40yrs.
2. Patients giving their consent for the study.
3. Gestational age more than 24 weeks and less than 37 weeks.
4. Patients coming in preterm labor fulfilling the ACOG criteria for preterm labor.

Exclusion criteria

1. Age less than 18 and more than 40 yrs.
2. Gestational age less than 24 and more than 37 weeks
3. Patients with induced preterm labor for medical or surgical indications.
4. Pregnant women with major foetal congenital anomalies incompatible with life detected by USG
5. Intrauterine foetal demise

Approval for the study

Written approval from Institutional Ethics committee was obtained beforehand. Written approval of OBGY department and related department was obtained. After obtaining informed verbal consent from all cases were included in the study

Sample Size: 50

Sampling technique: Using purposive sampling technique a total of 50 cases were included in the study.

Methods of Data Collection and Questionnaire: In this study, pregnant women less than 37 weeks gestational age admitted with preterm labor were studied. Patients enrolled in this study were subjected to a detailed history with respect to age, parity, previous pregnancy outcomes and to identify the presence of any risk factors in this pregnancy including presence of GDM, anemia, hypertension or any medical disease. They were evaluated by history taking, clinical examination, and ultrasonography. ACOG criteria for preterm labour was used to document preterm labor and threatened preterm labor viz., atleast 4 contractions in a time period of 20 minutes or 8 contractions in a time period of 60 minutes with progressive change in the cervical score in the form of effacement of 80% or more and cervical dilatation greater than 1 cm. Leaking i.e., rupture of membranes was diagnosed by speculum Examination. Detailed history taking, and general, systemic and obstetrical examinations were done for the presence of polyhydramnios or multiple gestation paying special attention to presence or absence of conventional risk factors for preterm labor. All women with preterm labor were subjected to ultrasonography to assess the placenta location, fetal maturity estimated fetal weight, cervical length, status of os, amniotic fluid index and they will also be investigated for presence of infection by complete hemogram, and urine and high vaginal swab culture. All women less than 34 weeks will be given 2 doses of betamethasone 12 mg 24hrs apart.

Appropriate intervention will be done to to know upto what time period the pregnancy can be extended after the interventions. Also the neonatal outcome such as birthweight, NICU stay, mortality, etc will be assessed.

Obstetrical outcomes were recorded in terms of:

- Gestational age at the time of delivery
- Mode of delivery vaginal, Assisted vaginal delivery / cesaraen delivery.
- Details of perinatal outcome
- Complications if any

Fetal outcomes were recorded in terms of:

- Apgar score at birth

Data entry and analysis:

The data were entered in Microsoft Excel and data analysis was done by using SPSS demo version no 21 for windows. The analysis was performed by using percentages in frequency tables, $p<0.05$ was considered as level of significance using the Chi-square test.

RESULTS AND OBSERVATIONS

This prospective study was conducted among 50 cases of preterm labor admitted in OBGY department during study period.

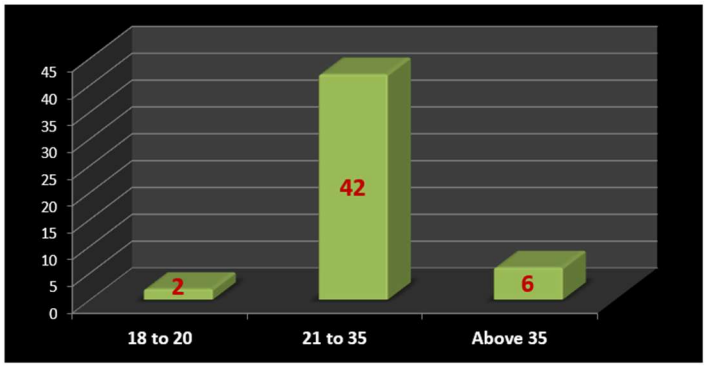

Figure 1: Distribution of mothers according to their age (years)

The above figure shows 50 mothers were included. Mean age of the mothers was 29.7 ± 5.1 years, ranging from 20 to 43 years. It was observed that 84% of the patients were in the age group of 21 to 35 years.

Table no 1: Distribution of mothers according to their gestational age and gravid status

Gestational Age (weeks)	Frequency	Percent
< 28	8	16
28 to 32	14	28
32 to 37	28	56
Gravid status		
Primigravida	25	50
G2	14	28
≥ G3	11	22
Total	50	100

It was observed that 16% of the mothers had GA less than 28 weeks, 28% had GA of 28 to 32 weeks and rest 56% of the mothers had GA of 32 to 37 weeks. Half of all mothers were primigravida, 28% were gravida 2 and rest 22% were gravida 3 or higher.

Table no 2: Distribution of mothers according to their past anatomical and surgical history

Anatomical factors	Frequency	Percent
Fibroid	3	6
Bicornuate uterus	2	4
Septate uterus(resection done)	1	2
None	44	88
Surgical history		
Dilation and curettage	9	18
Previous LSCS	7	14
Hysterolaparoscopy	3	6
H/O myomectomy	1	2
Op laproscopy i/v/o ectopic pregnancy	1	2
Septal resection	1	2
Exploratory laparotomy	1	2
None	27	54
Total	50	100

There were 6% cases with fibroid, 4% had bicornuate uterus and one case had septate uterus. Surgical history of Dilation and curettage in 18%, previous LSCS in 14% and hysterolaparoscopy in 6%. There was one case each with history of myomectomy, operative laproscopy i/v/o ectopic pregnancy, septal resection and exploratory laparotomy.

Table no 3: Association of cervical dilatation with days prolonged

		Days prolonged				Total
Cervical dilatation (cm)		**Up to 5**	**6 to 10**	**11 to 15**	**More than 15**	
Up to 1	N	9	1	1	0	11
	%	21.40%	33.30%	25.00%	0.00%	22.00%
1.1 to 2	N	17	1	2	1	21
	%	40.50%	33.30%	50.00%	100.00%	42.00%
2.1 to 3	N	11	1	1	0	13
	%	26.20%	33.30%	25.00%	0.00%	26.00%
3.1 to 4	N	5	0	0	0	5
	%	11.90%	0.00%	0.00%	0.00%	10.00%
Total	N	42	3	4	1	50
	%	100.00%	100.00%	100.00%	100.00%	100.00%
			p value = 0.67			

We observed that cervical dilatation was not significantly associated with the number of days pregnancy was prolonged (p value = 0.67). There was only one case for which pregnancy was prolonged by more than 15 days and that case had cervical dilatation of 1.1 to 2 cm. There were four cases for which pregnancy had to be prolonged by 11 to 15 days, of which two cases had cervical dilatation of 1.1 to 2 cm and one case had 2.1 to 3 cm. Of the three cases for which pregnancy had to be prolonged by 6 to 10 days, one case each had cervical dilatation of up to 1 cm, 1.1 to 2 cm and 2.1 to 3 cm. Of the 42 cases for which pregnancy had to be prolonged by up to 5 days, 21.4% had cervical dilatation of up to 1 cm, 40.5% had 1.1 to 2 cm, 26.2% had 2.1 to 3 cm and 11.9% had 3.1 to 4 cm.

Table no 4: Distribution of fetus according to APGAR score

APGAR	Frequency	Percent
0 to 3	0	0
4 to 6	16	32
7 to 10	34	68
Total	50	100

The above table shows majority of cases APGAR score range in 7 to 10 (68%) followed by 4 to 6 in 16 cases (32%) and 0 to 3 no case.

Table no 5: Association of gestational age and birth weight at delivery with birth status

		Birth type		Total	
Gestational age at delivery (weeks)		**Live birth**	**Still birth**		**p value**
< 28	N	3	6	9	< 0.01
	%	5.80%	75.00%	15.00%	
28 to 32	N	15	1	16	
	%	28.80%	12.50%	26.70%	
32 to 37	N	34	1	35	
	%	65.40%	12.50%	58.30%	
Birth weight (gm)					
Less than 1000	N	2	7	9	< 0.01
	%	3.80%	87.50%	15.00%	
1000 to 1499	N	16	1	17	
	%	30.80%	12.50%	28.30%	
1500 to 2499	N	30	0	30	
	%	57.70%	0.00%	50.00%	
≥ 2500	N	4	0	4	
	%	7.70%	0.00%	6.70%	
Total	N	52	8	60	
	%	100.00%	100.00%	100.00%	

We observed that among still born, 75% had gestational age at delivery of less than 28 weeks (p value < 0.01). In addition, we found that 87.5% of the still born had birth weight of less than 1000 gm (p value < 0.01).

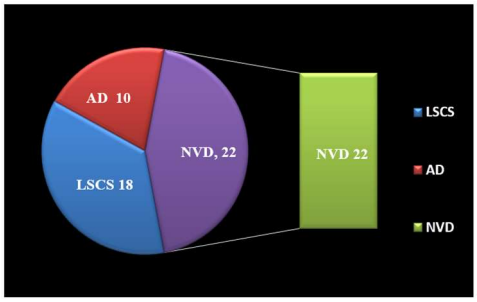

Figure 2: Distribution of cases as per mode of delivery

The above figure shows majority of cases mode of delivery was normal vaginal delivery 22 cases (44%) followed by LSCS 18 cases (36%) and assisted delivery 10 (20%)

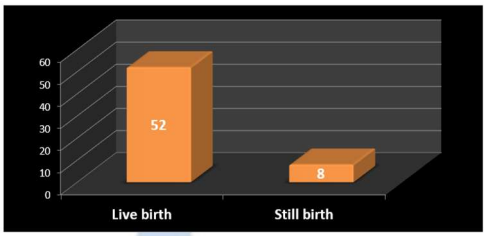

Figure 3: Perinatal Outcome

The above figure shows most of perinatal outcome was live birth 52 and 8 still birth

DISCUSSION

This prospective study was conducted among 50 cases of preterm labor admitted in OBGY department during study period.

Distribution of cases as per Age: In the present study, mean age of the mothers was 29.7 ± 5.1 years, ranging from 20 to 43 years. It was observed that 84% of the patients were in the age group of 21 to 35 years.

In another study, Beevi *et al.* studied 105 Antenatal women with gestational age between 28 weeks to 36 weeks 6 days, who got admitted with preterm labour or PPROM in labour room. In their study, the maternal age groups 22 to 30 years was the most common.

Distribution of mothers according to their past anatomical and surgical history: In current study 6% cases with fibroid, 4% had bicornuate uterus and one case had septate uterus. Surgical history of Dilation and curettage in 18%, previous LSCS in 14% and hysterolaparoscopy in 6%. There was one case each with history of myomectomy, operative laproscopy i/v/o ectopic pregnancy, septal resection and exploratory laparotomy. Similar finding observed in the study conducted by Meis PJ[10] Jamal and Srivastava,[12]

Distribution of mothers according to their gestational age and gravid status: In the present study, it was observed that 16% of the mothers had GA less than 28 weeks, 28% had GA of 28 to 32 weeks and rest 56% of the mothers had GA of 32 to 37 weeks. Half of all mothers were primigravida, 28% were gravida 2 and rest 22% were gravida 3 or higher. 26% reported bleeding per vaginum in the first or second trimester. At 20 weeks, cervical length was less than 2.5 cm in 10%, 2.5 to 3 cm in 42% and more than 3 cm in 48%. In another study, Beevi *et al.* 62% of the mothers had gestational age of more than 34 weeks[13]

Association of cervical dilatation with days prolonged: It was observed that significantly high proportion of mothers had cervical encerclage done with cervical length less than 2.5 cm as compared to those with cervical length more than 3 cm (p value < 0.05). In addition, significantly higher proportion of mother took progesterone who had cervical length less than 2.5 cm as compared to those with cervical length more than 3 cm (p value < 0.05). It was observed that 28% of the mothers had 25% effacement, 58% had 25 to 50% effacement and rest 14% of the cases had more than 50% effacement. We also observed that 24% of the patients had PROM.It was observed that 42% mothers had cervical dilatation of 1-2cm, 26% mothers had cervical dilatation of 26%. In another study, Beevi *et al.* 62% of the mothers had gestational age of more than 34 weeks[13] Aggarwal *et al.* reported that median cervical dilatation at admission was 2.5 cm, ranging from 1 to 4 cm, with median effacement of 60% at admission. Study conducted by Jamal and Srivastava reported that elderly gravidas (23.9%) was common and multiparity, an independent risk factor observed in our study, was found to be associated with 47.5% cases. In their study, the commonest risk factor for preterm labor was PPROM (26.6%). Furthermore, maximum patients delivered at a period of gestation between 34-36.6 weeks i.e late preterm group (53%), followed by moderate preterm 26.4%. But early preterm deliveries also had a high proportion of

20.6%, and most of these cases were due to severe preeclampsia or eclampsia (80.6%).[11]

Jaju *et al.* reported that 49.12% were primigravida, while remaining 50.88% were multigravida[12] More than half of the patients 58.25% were primipara and 41.75% were multipara. In another study by Parry E *et al.*, mothers who received tocolysis had mean gestational age at delivery of 28.9 ± 2.7 weeks.[14] In their study only 1.7% of the mothers delivered at 34 weeks of gestation or more. Median cervical dilatation at admission was 5 cm, ranging from 4 to 5.5 cm. In their study, 23.6% of the mothers included had a history of previous preterm delivery and the incidence of preterm PROM was 47.2%.

Study conducted by Jaju *et al.* reported that of the 50 mothers, the mean gestation age was 31.5 ± 2.6 weeks at the baseline and majority of the patients were multigravida (58.0%). The mean cervical dilatation was 1.8 ± 0.5 cm and mean cervical effacement was 26.4 ± 17. The mean gestational age at delivery was 39.8 ± 2.1 weeks, with a mean latency period of 58.5 ± 18.7 days[12]

Mode of delivery

LSCS was performed in 36% and rest had preterm vaginal delivery. The indications for which LSCS was done were GA less than 32 weeks, Twin gestations, ART, previous history of LSCS, Bad obstetric history and precious pregnancy.

In another similar study, Jamal and Srivastava observed a labor induction rate of 23.4% and Caesarean delivery was performed in 146 (33.5%) cases, thus indicating a high induction and caesarean rates in such pregnancies.[11]

Neonatal outcomes: In the present study, it was found that 8 were still born and 42 were live births. Most of cases APGAR score range in 7 to 10 (68%) followed by 4 to 6 in 16 cases (32%) and 0 to 3 no case. We observed a significant association between gestational age at delivery and the birth status. Among 8 still births, 75% had gestational age of less than 28 weeks at the time of delivery. In addition, we found that 87.5% of the still born had birth weight of less than 1000 gm which was a significant association. Mean birth weight of the neonates was found to be 1605 ± 564, ranging from 540 to 2870 gm. In a similar study by Aggarwal *et al.*, mean birth weight of the neonates was 2266.76 ± 726.9 gm.

CONCLUSION

The results of the present study show that prolongation of pregnancy is safe in mothers presenting with preterm labor. It is recommended that specialized antenatal care for the patients, who are thought to be at risk of preterm birth, should be performed that can bring down the incidence to some extent. Provider initiated preterm birth can be minimized by early detection of risk factors and prompt intervention to minimize their effects.

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Source of Support: None Declared
Conflict of Interest: None Declared