Original Research Article

An observational case control study: study of preterm labour- risk factors and its outcome

Krima V. Shah*, Rushabh H. Agrawal, Radhika Parmar

Department of Obstetrics and Gynecology, SBKS Medical Institute and Research Dhiraj hospital Centre, Vadodara, Gujarat, India

*Correspondence:
Dr. Krima V. Shah,
E-mail: krimashah21@yahoo.com

ABSTRACT

Background: Preterm birth is considered as the most significant risk in infant morbidity and mortality. The number of preterm births can be reduced significantly if all of the risk factors for predicting preterm births were eliminated to maximum extent. The aim of this study was analysis of risk factors of preterm labour and its outcome through case control study.

Methods: It was an observational case control study of 200 pregnant women divided into study group of 100 pregnant women who were admitted with signs and symptoms of preterm labour with gestational age between 28-36 weeks. Control group of 100 pregnant women having gestational age above 36 weeks and with spontaneous onset of active labour. Risk factors and other parameters of both the groups were analyzed along with their neonatal outcome.

Results: It was found that premature rupture of membrane, previous abortion, previous preterm delivery, anemia and impaired body mass index (BMI) are significantly higher in cases with preterm labour (p value <0.05). Hyperbilirubinemia, birth asphyxia and respiratory distress syndrome are significantly higher in cases with preterm labour (p value <0.05).

Conclusions: Preterm labour is a multifactorial problem. Preterm labour and delivery require early and prolonged hospitalization causing great financial and psychological burden on the society and the number of preterm births can be reduced significantly if all of the risk factors for predicting preterm births were eliminated to maximum extent.

Keywords: Preterm birth, Prematurity, Prevention

INTRODUCTION

Preterm birth has been defined by world health organization as "birth of babies born alive before 37 completed weeks of gestation".[1] Based on gestational age, the World Health Organization (WHO) also defines the sub categories of preterm birth, i.e. extremely preterm (less than 28 weeks of gestational age), very preterm (between 28 weeks to less than 32 weeks of gestational age), and moderate to late preterm (between 32 to less than 37 weeks of gestational age).[2]

Preterm birth is considered as the most significant risk in infant morbidity and mortality. Every year approximately 15 million preterm deliveries are done globally and out of all preterm births more than 60% of preterm births occur in South Asia and Africa.[3,4] The incidence of preterm labour in India is 11-14%.[5]

The number of preterm births can be reduced significantly if all of the risk factors for predicting preterm births were eliminated to maximum extent. Elimination of risk factors is not possible unless the risk factors are known and prioritized according to the contributions that each make

towards preterm births. The priority list can be used to target interventions to eliminate risk factors. Hiacz et al postulated that combined use of cervical length and fetal fibronectin levels increase prediction of preterm labour.[6]

While managing preterm labour, use of antenatal steroids reduce the incidence of intra ventricular hemorrhage by 50%.[7]

This study was conducted to assess the magnitude of maternal infectious and non-infectious parameters and their association with preterm labour and low birth weight among pregnant women. Also, it shows analysis for neonatal outcome.

METHODS

This was observational, case control study which was carried out prospectively and included 200 pregnant women who were admitted to the Dhiraj General Hospital, Piparia, Vadodara between February 2021 to December 2021 with preterm or full-term delivery. The permission for the study was obtained by the ethical committee of SBKS Medical College.

This data was analyzed using statistical package for the social sciences (SPSS) 20 software. P value less than 0.05 was assumed to be statistically significant.

Out of 200, 100 delivered preterm and remaining 100 delivered full term with the criteria.

Inclusion criteria

Pregnant women who are admitted with signs and symptoms of preterm labour with gestational age between 28-36 weeks are included in the study group. And pregnant women having gestational age above 36 weeks and with spontaneous onset of active labour are included in the control group.

Exclusion criteria

All pregnant women with major fetal congenital anomaly and/or intrauterine fetal demise. Women having absolute indication of lower segment caesarean section (LSCS) like

antepartum hemorrhage, malpresentation and previous LSCS.

RESULTS

It was found that BMI, hemoglobin, RBS and newborn weight for women with preterm delivery were significantly low as compared to those who delivered at full term. However, there was no significant difference in age of mother in both the groups.

Un-booked patients were significantly higher in preterm group as compared to full term group (p value=0.0002). For underweight and obese mother, it was found to have more preterm delivery compared to full-term delivery as the difference was statistically significant (p value=0.0009, 0.018). It shows that premature rupture of membrane, previous abortion, previous preterm delivery was associated significantly with the preterm as compared to full-term group (p value=0.046, 0.059, 0.001). Patients with co-morbidities as well as Anemic patients were significantly higher in preterm group as compared to full term group (p value=0.019, 0.046).

The difference between both the groups is not statiscally significant considering the following parameters: parity, amniotic fluid index, urinary tract infection (UTI) and bacterial vaginosis (p value >0.05).

Table 1: Baseline characteristics in two groups.

Parameter	Preterm	Full term	P value
Age	23.49±3.13	23.42±3.28	0.878
Body mass index	21.75±2.62	22.59±3	0.007
Hemoglobin	9.67±1.57	11.48±1.34	0.0001
Random blood sugar	75.78±34.38	87.16±12.54	0.002
Newborn weight	1.8±0.27	2.71±0.39	0.0001

Hyperbilirubinemia, birth asphyxia and respiratory distress syndrome were found to be significantly associated with preterm as compared to full-term group (p<0.001).

Table 2: Analysis of labour according to risk factors between the two groups.

Parameters	Preterm		Full term		P value
	Number	%	Number	%	
Primi	35	35	27	27	0.474
Multigravida	65	65	73	73	
BMI <18.5	22	22	4	4	0.0009
BMI ≥25	17	17	6	6	0.018
Booked	42	42	68	68	0.0002
Unbooked	58	58	32	32	
Premature rupture of membrane	24	24	12	12	0.046
Previous abortion	13	13	5	5	0.059

Continued.

Parameters	Preterm		Full term		P value
	Number	%	Number	%	
Previous preterm delivery	21	21	3	3	0.001
Oligohydramnios	14	14	7	7	0.127
Polyhydramnios	3	3	2	2	0.655
UTI	5	5	1	1	0.102
Bacterial vaginosis	1	1	0	0	NA
Other co-morbidity like hypertension, and diabetes mellitus	19	19	7	7	0.019
Anaemia	40	40	24	24	0.046

Table 3: Comparison of neonatal morbidity between both groups.

Morbidity	Preterm		Full term		P value
	Number	%	Number	%	
Hyperbilirubinemia	21	21	10	10	0.001
Birth asphyxia	18	18	5	5	0.001
Septicemia	5	5	2	2	0.257
Respiratory distress syndrome	25	25	8	8	0.001
Aspiration pneumonia	3	3	1	1	0.317

DISCUSSION

The World Health Organization estimates the prevalence of preterm birth from 5 to 18% across 184 countries.[8] The overall incidence of PTB rates in India is found to be above the level (15%) estimated by World Health Organization.[9] Preterm labour is a multifactorial problem. In this study, common etiological factors are premature rupture of membrane, previous abortion, previous preterm delivery, anemia and impaired BMI. Common causes of neonatal morbidity and mortality are hyperbilirubinemia, birth asphyxia, septicemia and respiratory distress syndrome.

In a study done in south India, pregnant women having low BMI before pregnancy are reported to be at higher risk of delivering preterm babies, comparable to our study showing the risk with significant p value of 0.0009.[10] A systematic review and meta-analysis study, found that the risk of preterm birth with the previous history of previous preterm delivery was 30.0% and it supports the findings of the present study in which risk of preterm birth was 21%.[11] Furthermore, prior history of preterm birth and maternal medical complications increased the chance of preterm birth delivery by 23% among Brazilian women showing consistent results with our study in which the risk is 21% and 19% respectively.[12]

Regarding maternal anaemia and its association with preterm birth, Rahmati et al revealed that maternal anaemia during pregnancy increases the risk for premature birth with a relative risk of 1.56 (95% CI, 1.25 to 1.95).[13] Similarly, a meta-analysis that conducted among the low and middle income countries including 13 studies showed significantly greater risk of preterm birth in anaemic pregnant women with relative risk 1.63.[14] Our results confirm the consistent findings with previous meta-

analysis, showing anaemia as a risk factor with p value 0.046.

In a study conducted in California, urinary tract infections increase a woman's risk of preterm birth delivery, however our study does not show significant risk of preterm labour (p value=0.102) in patients with urinary tract infections.[15]

Hyperbilirubinemia, birth asphyxia and respiratory distress syndrome were found to be significantly associated with preterm birth (p<0.001), which is consistent with finding of a study done in USA.[16]

Some etiological factors are modified by good nutrition, safe sex, good hygiene, family planning, routine antenatal care and healthy working space. It is highly correlated finding that increased frequency of preterm births is seen when is employment is of physical demanding in nature.[17] Non-modifiable factors require early detection and treatment in the form of antibiotics, tocolytics, and maternal administration of steroids.

Limitations for this study includes the total time period of the study is 18 months and the sample size comparatively lesser than meta-analysis, this decreases the level of significance of the study results.

CONCLUSION

This study concludes that preterm labour and delivery requires early and prolonged hospitalization causing great financial and psychological burden on the society. Measures should be taken to prevent modifiable risk factors and for dealing efficiently with non-modifiable risk factors. Delivery must be attended by experienced neonatologist capable of dealing with complications of prematurity. We can prevent babies from being too early

and too small, and ensure that small babies get critical life-saving care and protection they need.

REFERENCES

1. World Health Organization. Preterm birth. Fact sheet no 363. 2012. Available at: http://www.who.int/mediacentre/factsheets/fs363/en/. Accessed on 22 September 2022.
2. National Institutes of Health Consensus Development Panel. Antenatal corticosteroids revisited: repeat courses - National Institutes of Health Consensus Development Conference Statement, August 17-18, 2000. Obstet Gynecol. 2001;98(1):144-50.
3. Berns S. Understanding prematurity. Presentation at the 26th Annual International Neonatal Conference. Miami, FL. 2002.
4. Jayaram VK, Sudha S. A study of premature rupture of membranes- Management and outcome. Jo Obstet Gynecol India. 2001;51(2):58-60.
5. Bloom SL, Yost NP, McIntire DD, Lenovo K.J. Recurrence of preterm birth in singleton and twins pregnancies. Obstet Gynecol. 2001,98(3):379-85.
6. Morrison JC. Preterm labour prediction and treatment; obstetrics and gynecology clinics north America. 1st edition. Saunders. 2005.
7. Crowley PA. Antenatal corticosteroid therapy: a meta-analysis of the randomized trials, 1972 to 1994. Am J Obstet Gynecol. 1995,173(1):322-35.
8. Vogel JP, Lee AC, Souza JP. Maternal morbidity and preterm birth in 22 low- and middle-income countries: a secondary analysis of the WHO Global Survey dataset. BMC Preg Childbirth. 2014;14:56.
9. Howson CP, Kinney MV, Lawn J. Born Too Soon: the global action report on preterm birth March of Dimes, PMNCH, Save the Children. World Health Organization. 2012.
10. Soundarajan P, Muthuramu P, Veerapandi M, Marriapam R. Retrospective study factors related to preterm birth in Government Raja Mirasudar Hospital and obstetric and perinatal outcome. Int J Reprod Contracept Obstet Gynaecol. 2016;5(9):3006-10.
11. Philips C, Velji Z, Hanly C, Metacalfe A. Risk of recurrent spontaneous preterm birth: a systematic review and meta-analysis. BMJ Open. 2017;5;7(6).
12. Chen KH, Chen IC, Yang YC, Chen KT. The trends and associated factors of preterm deliveries from 2001 to 2011 in Taiwan. Medicine (Baltimore). 2019;98:13.
13. Rahmati S, Azami M, Badfar G, Parizad N, Sayehmiri K. The relationship between maternal anaemia during pregnancy with preterm birth: a systematic review and meta-analysis. J Matern Fetal Neonatal Med. 2019;1-11.
14. Rahman M, Abe SK, Rahman S, Kanda M, Narita S, Bilano V, Ota E, Gilmour S, Shibuya K. Maternal anemia and risk of adverse birth and health outcomes in low- and middle-income countries: systematic review and meta-analysis. Am J Clin Nutr. 2016;103:495-504.
15. Baer RJ, Bandoli G, Chambers BD, Chambers CD, Oltman SP, Rand L, Ryckman KK, Jelliffe Pawlowski LL. Risk of preterm birth among women with a urinary tract infection by trimester of pregnancy. Am J Obstet Gynecol. 2019;220(1):S433-4.
16. Clark R, Powers R, White R, Bloom B, Sanchez P, Benjamin DK Jr. Prevention and treatment of nosocomial sepsis in the NICU. J Perinatol. 2004;24(7):446-53.
17. Quilligan EJ. Pathologic causes of preterm labor. In Preterm Labor (Elder MG, Hendricks CH, editors). Butterworth, London. 1981;61-74.