International Journal of Reproduction, Contraception, Obstetrics and Gynecology
Shetty MB et al. Int J Reprod Contracept Obstet Gynecol. 2017 Aug;6(8):3271-3274
www.ijrcog.org

pISSN 2320-1770 | eISSN 2320-1789

DOI: http://dx.doi.org/10.18203/2320-1770.ijrcog20173258

Original Research Article

Preterm birth: associated risk factors and outcome in tertiary care center

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Received: 08 June 2017
Revised: 04 July 2017
Accepted: 14 July 2017

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ABSTRACT

Background: The major cause of infant mortality and morbidity is preterm birth. WHO has defined it as any birth before 37 completed weeks of gestation or fewer than 259 days since the last day of menstrual period. Objective of present study was to identify major etiological factors associated with preterm birth, and their effects on mode of delivery and neonatal mortality and morbidity.
Methods: Retrospective cohorts study, which was conducted in M. S. Ramaiah Medical College, over period of 12 months (January 2015 to December 2015). The study included 343 women who delivered preterm they were followed from admission to discharge. Various parameters were analyzed like maternal characteristics, gestational age, associated risk factors, tocolysis, administration of steroids, and neonatal outcome.
Results: The incidence of preterm birth among the total deliveries was approximately 18.01%. Although the risk factors included many, the most common occurring were hypertensive disorders during pregnancy approximately 32.9%, followed by preterm rupture of membranes (18.1%), idiopathic 14.9%, and previous LSCS at 12.2%. Neonatal mortality was 6.9% (24 neonates), and stillborn were 0.5% (2 neonates).
Conclusions: Various risk factors for preterm labour are modifiable hence early detection and treatment prevents maternal morbidity and neonatal morbidity and mortality. Specific emphasis on regular antenatal checkups.

Keywords: Hypertensive disorders in pregnancy, Neonatal mortality, Preterm birth, Previous LSCS

INTRODUCTION

The major cause of infant mortality and morbidity is preterm birth. WHO has defined it as any birth before 37 completed weeks of gestation or fewer than 259 days since the last day of menstrual period. 60% of preterm birth occurs in developing countries such as Africa and South Asia and rest of the world contributes to 40% of preterm, hence having a impact globally.[1] India is one among ten countries with the greatest preterm neonates.[2]

Availability and accessibility to health care is a major problem which effects outcome of various diseases in developing countries. Whereas in developed countries preterm birth is attributed to other causes such as, increase in usage of infertility drugs due to late marriages leading to usage of artifical reproductive techniques. And increased in late conception and psychological stress in working women, drug abuse, smoking. 40-75% of neonatal deaths are contributed by developing countries, whereas in developed countries it effects 1 in 10 births.[3]

Approximately three-fourth of the perinatal deaths occur in fetus that delivered at <37 weeks, and 40% among these delivered at <32 weeks. In addition to its contribution to mortality, preterm birth is one of the cause for cerebral palsy and other neurodevelopemental functions such as impaired learning and visual disorders and leading to long term morbidity like risk of chronic disease of adulthood.[4]

Hence there is need to identify risk factors associated preterm birth, in means to provide improved health care facilities for preterm neonates along with mothers.

METHODS

Retrospective cohorts study, conducted in M.S Ramaiah Medical College and Hospital, Bangalore. Data was obtained from January 2015 to December 2015, approval for the study was taken from the Institutional Ethics Committee. The patient records and details were obtained from the medical records department from the case file. The prefix proforma was made to which includes these parameters like parity index, gestational age, and diagnosis, and mode of delivery, along with baby details, these parameters further analyzed. Deliveries which occurred in our institution from gestational period between 28 to 37 weeks, were included in this study. The total number of deliveries among this period was 1904 of which 343 were preterm deliveries equating to approximately 18.01%.

Women with regular cycles, the gestational age was calculated using Neagle's formula and women with irregular cycle, age of fetus was confirmed with dating scan done in first trimester. The proforma used was data entry included information of mother, medical history, current pregnancy details, baby details, previous conceptions, medical disorders during pregnancy, and investigations. Risk factors found were categorized: PROM, medical disorders, anemia, hypothyroidism, hyperthyroidism, malpresentation, multiple pregnancy, oligohydramnions/ polyhydramnios, diabetes, previous history of cesarean section, hypertensive disorders.

Frequency, percentage, univariate analysis, were used for analytic inference. Analysis was done using SPSS Statistical Software package.

RESULTS

Total 1904 number of deliveries occurred during the above-mentioned period, 343 patients delivered were preterm, approximately 18.01%.

As Table 2 demonstrates, that nearly half (55.7%) of the preterm were 32-36 weeks of gestation. On further analysis of all the risk factors associated with preterm births, as mentioned in Table 4, the following were the top 4 causes of preterm births, number one being hypertension during pregnancy approximately 32.9%, followed by preterm rupture of membranes (18.1%), idiopathic 14.9%, and previous LSCS at 12.2%.

Table 1: Maternal factors.

Factors	No. of cases	%
Maternal Age		
<20 years	30	8.7
20-24 years	97	28.3
25-29 years	151	44.0
30-35	46	13.4
>35	19	5.5
Parity Index		
Primigravida	146	42.6
Multigravida >2	197	57.4

Table 2 Gestational period.

Gestational age in weeks	No. of deliveries	%
28-32 weeks	72	20.9
32-36 weeks	191	55.7
>36 weeks	80	23.3

Majority of the pregnancy were vaginal deliveries (55.7%), of which 66% were spontaneous deliveries. As this is a tertiary referral center the number LSCS conducted are in hospital were approximately 44.3% this is attributed to increase in the number of referred case in view high risk pregnancy and for good neonate care.

Table 3: Mode of delivery.

Mode	No. of cases	%
Vaginal	191	55.7
Induced	65	34.0
Spontaneous	126	66.0
LSCS	152	44.3

Among the various risk factors, it was observed that hypertension complicating pregnancy was major cause of preterm birth, most mothers associated with severe preeclampsia was medical induced preterm birth, in order to decrease the risk of eclampsia and its complication.

Preterm rupture of membranes is the next leading cause of preterm birth, tocolysis was given to about 10 cases (16%) in order to allow time for betamethasone action. In our center 51 case (14.9%), no medical cause of preterm labour was identified, which may be attributed to maternal physical and/or psychological stress.

Approximately 44.3% of the preterm deliveries conducted in our hospital were LSCS, which may be attributed to various risk factors, such as previous LSCS (12.2%), malpresentation (8.2%), uterine scar dehiscence (1.5%), multiple gestation (4.9%), placenta praevia (2.3%). The neonatal mortality and morbidity has significantly reduced due increased medical advancements. 66.5% (228) of the newborns were

admitted to the NICU either for observation for pre-maturity and various other complications like perinatal asphyxia, respiratory distress syndrome, and spesis. Among the preterm births 42 neonates (12.24%) were intrauterine growth restriction. Neonatal mortality in NICU was 24 neonates (6.9%), and stillborn were 2 (0.5%). The risk of respiratory distress syndrome was significantly reduced due to 2 doses of bethametasone.

Table 4: Risk factors associated with preterm birth.

Risk factors	No. of cases	%
Anemia	10	2.9
Hypertension during pregnancy	113	32.9
Preterm rupture of membranes	62	18.1
Gestational diabetes mellitus	13	3.8
Infections	15	4.4
Antepartum hemorrhage	9	2.6
Placenta previa	8	2.3
Multiple gestation	17	4.9
Polyhydramnios	4	1.2
Oligohydramnios	29	8.5
Uterine Scar dehiscence	5	1.5
History previous LSCS	42	12.2
Cervical Incompetency	3	0.9
Malpresentation	28	8.2
Maternal cardiac disease	3	0.9
Fetal distress	2	0.6
Fetal anomaly	5	1.5
Hypothyroidism	34	9.9
Idiopathic	51	14.9

DISCUSSION

Preterm birth is truly a global problem as discussed above, the incidence of preterm birth is increasing in number, due to assisted reproductive techniques, maternal physical and psychological stress. The total number deliveries conducted over the period mentioned above, the preterm deliveries were total of 18.01%. Preterm births are influenced by many factors, from maternal risk factors, pregnancy related complications, the social and environmental factors.

As we further discuss, extremes of maternal age play large role in preterm birth. Diallo et al study shows that preterm births at early age of conception (7.95%) and late age of conception (3.95%).[6] In present study 8.7% of the patients were less 20 years of age, and 5.5% above 35 years as shown in Table 1.

Sonia Arogya et al study shows that multiparous women have higher chances at preterm delivery (72.92%) whereas primigravida was 27.08%, in our study we observed that there was 146 primigravida (42.6%) and 197 mulitgravida (57.4%) as depicted in Table 3.[7]

According to Cooper el al, study shows there is significant correlation between the number of previous abortion and its risk to preterm delivery, it states that multiparous patient has history of 1 abortion (26.72%).[8] In the study conducted in our hospital, fifty-seven women (16.6%) had previous history of one abortion, whereas twenty -four (6.9%) women had more than 2 abortions previously. Hence previous history abortion is also a risk factor for preterm births which correlates with EPIPAGE study.[9]

Carr-Hill and Hall state that there is 15% chance of preterm delivery with history one previous preterm delivery and 32% chance after 2 preterm delivery.[10] In our study, twenty-two women (6.4%) had previous history preterm labour. The commonest obstetrical risk factor in our study was hypertensive disorders of pregnancy (32.9%) which shows similarity to Rao CR et al, in which hypertensive disorders accounted for (21.4%).[11] In present study, preterm rupture of membranes accounted for 18.1% were as in Van der Pool 30% were associated with rupture of membranes.[12] 42 women (12.2%) with history of previous LSCS, in Divyakala et al they accounted for 25% with previous history of LSCS.[13]

The cause of delivery of 51 women (14. 9%) of preterm delivery are idiopathic whereas Singh Uma et al[5] had 23.6%, which may be attributed to maternal stress. Both in developed and developing countries preterm birth are unexplained.[14]

Table 5: Changing trends.

Country	Preterm birth	Trends
India (Singh Uma et al)[5]	20.9%	
USA (Martin et al)[15]	12.3%	Increasing
United Kingdom (Bibby and Stewart)[16]	7%	Increasing
Australia (Robert et al)[17]	5.5%	Stationary
Sweden (Morten et al)[18]	5-6%	Decreasing
China (Leuing et al)[19]	7.4%	Increasing
Zimbabwe (Shingairai et al)[20]	16.4%	Increasing
Present study	18.01%	

Data obtained from 184 countries, global average preterm birth rate was 11.1% in 2010. Table 5 demonstrates the change trends globally. India has the highest preterm birth rate, around 13.0%.[1,15-20] To reduces the incidence promotion of regular antenatal checkup and institutional deliveries.

CONCLUSION

Preterm birth is associated with various modifiable risk factors, providing proper education, preconceptional counseling and antenatal care will significantly reduce the incidence of preterm birth. The use of tocolysis,

steroids prophylaxis, and antibiotics, along with timely referral to tertiary care, reduces the maternal morbidity and neonatal morbidity and mortality.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

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Cite this article as: Shetty MB, Krupa BM, Malyala M, Swarup A, Pathadan DS, Pocha S. Preterm birth: associated risk factors and outcome in tertiary care center. Int J Reprod Contracept Obstet Gynecol 2017;6:3271-4.