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A Clinical study of Risk Factors and Fetomaternal Outcome of Preterm Deliveries in a Tertiary Care Center

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ABSTRACT

Background: Spontaneous preterm delivery is India's leading cause of neonatal morbidityand is the most common reason for hospitalization during pregnancy. In the present study, we aim to evaluate the risk factors, maternal and neonatal outcomes of preterm birth in a homogenous obstetric population attending a tertiary referral hospital to highlight the areas where further research or intervention is required to prevent preterm birthand improve perinatal outcome.

Methods: This prospective observational study was conducted on 400 pregnant women diagnosed as preterm labor, fulfilling the inclusion and exclusion criteria in Government Medical College, Aurangabad between November 2019 and November 2021.The study is based on history, examination, and findings in women who delivered preterm(28-37 weeks of gestation).The age, parity, previous pregnancy outcome, andrisk factors are identified in this pregnancy, including PIH,GDM, or UTI, were noted. The neonatal outcome was recorded. The data is analyzed using the chi square test.

Results: In the present study, we found that in 72.5 % of preterm cases, the maternal age group was 18-25 years old, 152 (37.97%) participants were Gravida 2, and 232(58.22%) participants delivered between 34.1-37 weeks. Out of 400,168 (42.18%), participants had a history of abortion. According to the present study, the most common high-risk factor among mothers was PPROM (9 %). In addition, 96% of patients delivered vaginally, 4 % delivered by cesarean section. Out of vaginal deliveries, 72. 13 % were born spontaneously, and 27.87% were delivered by elective inductions.

In the present study, neonates with low birth weight (below 2500 gm)were 308 (75.85%) cases. Early preterm babies more frequently had low APGAR scores (<7) compared to late preterm babies. Out of 158 babies admitted to NICU, 28 (17.64%) neonates developed Respiratory distress syndrome, 26(16.42%) sepsis, 9(5.87%) intraventricular hemorrhage, 9(5.87%) jaundice, 8(5.29%) Necrotising enterocolitis, 9(5.69%) Hypoxic Ischaemic Encephalopathy, 6(3.52 %) pneumonia.

Conclusion: Preterm labor is challenging yet the unmet goal of maternal and neonatal development. Proper antenatal care will help identify high-risk cases for preterm delivery early and plays a major role in lowering preterm births and improving neonatal outcomes.

Key Words: *Preterm births, Risk factors, Preterm premature rupture of membranes.*

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INTRODUCTION:

Preterm labor is the onset of labor between 28 to 37 completed weeks of gestation or 259 days of pregnancy since the first day of a woman's last menstrual period. India records the highest number of preterm births according to 2018 data from WHO. Preterm birth occurs in 7% to 11% of pregnancies but is responsible for 85 % of neonatal deaths in normally-formed infants with no congenital anomalies.The incidence is increasing worldwide due to the increased frequency of multiple births, Assisted Reproductive Technology, more working mothers, increasing psychological stress in mothers, and medically induced prematurity(1). Preterm delivery (birth before 37 weeks gestation) is further delineated into very early preterm (before 32 weeks), early preterm (32 0/7 to 33 6/7 weeks), and late preterm (34 0/7 to 36 6/7 weeks).(2)

According to WHO, 12 % of babies in lower-income countries were born too early compared to 9 % in higher-income countries (3).PROM is the leading cause of preterm labor.

Preterm neonates have more possibility to die, but those who survive are at higher risk of developing short-term and long-term morbidities. Commoncomplications are respiratory distress syndrome, bronchopulmonary dysplasia,

necrotizing enterocolitis, sepsis, periventricular leukomalacia,seizures, intraventricular hemorrhage, cerebral palsy, infections, feeding difficulties, hypoxic-ischemic encephalopathyand visual and hearing problems(4).

In the present study, etiological factors and maternal and perinatal outcome were studied in pregnancy between 28 to 37 weeks of gestation.Aim was to find out the frequency of preterm pregnancies and the major causes of preterm delivery, to study the maternal outcome, and to know the neonatal morbidity and mortality.

MATERIALS AND METHODS :

This was a Prospective Observational study conducted on 400 women in preterm labor(Gestational age between 28.0– 36.6 weeks) and delivered during a study period of 2 years at Government Medical College Aurangabad from November 2019 to November 2021 after approval from the ethical committee.

INCLUSION CRITERIA

Preterm women with onset of labor between 28 to 36.6 weeks of gestation
Live-born deliveries with adequate dating scans.
Patients willing to participate in the study

EXCLUSION CRITERIA

Term women with onset of labor more than 36.6 weeks of gestation
Intrauterine fetal death or still born babies
Congenitally malformed babies
Irregular menstrual cycles and unknown LMP, and not having 1st-trimester ultrasonography.

The clinical profile of these patients was noted in terms of age, occupation, residential status, gestational age at delivery, associated risk factors, obstetric history, previous history of preterm labor, and urogenital infection. Associated co-morbidities like anemia, preeclampsia, eclampsia,and heart diseases were promptly treatedif identified. The mode of delivery was planned as per the clinical status of the patients. Cesarean sections were done only for obstetrical reasons.

All those under 34 weeks gestation were given 6 mg dexamethasone intramuscularly 6 hourly for four doses at admission. In addition, antenatal steroid administration status was checked.

Patients were monitored forthe progress of laborand mode of delivery noted. In the post-natal period,the mother was examined and kept under observation till the hospital stay. Maternal complications in the postoperative period were noted and managed accordingly.

Delivered neonates who required further care were managed in NICU. Neonatal outcomes were assessed in terms of survivability and duration of NICU stay.

Data collected during the study wereanalyzed for percentages and proportions. Also,individual factors in the study were studied for association with preterm labor, and their association was tested for statistical significance using chi-square, fisher exact test.

RESULT:

Table No 1: Distribution Of Participants According To Demographic Factors

Demographic profile	No of cases (N=400)	Percentage (%)
Age		
18-25 yrs	290	72.5
26-30 yrs	79	19.75
31-35 yrs	26	6.5
>35 yrs	5	1.25
Antenatal care		
Booked	336	84.81
Unbooked	64	15.1
Gravida Status		
Primi	108	27.1
G2	152	37.97
G3	44	10.9
G4 and more	96	24.05

Gestational age in weeks		
28.1-30	44	11.39
30.1-32	50	11.81
32.1-34	74	18.14
34.1-37	232	58.22
Previous history of :		
Preterm birth	59	12.64
Abortions	168	42.18
Both	8	2.52

In the present study, in 72.5 % of preterm cases, the maternal age was 18-25 years.
336 (84.81%) participants were booked pregnancies.
232(58.22%) participants delivered between 34.1-37 weeks, and only 50(11.81%) participants had between 30.1-32 weeks. The mean gestational age among cases was 33.4 weeks of gestational age.
Out of 400, 168 (42.18%) participants had a history of abortion.

Table No 2:Distribution Of Participants According To Pre-Pregnancy Medical Disorders And Maternal High-Risk Factors

Highrisk factors	**No of patients(n=400)**	**Percentage (%)**
Medical disorders		
Hypothyroidism	8	2.109
Chronic Hypertension	7	1.68
Heart disease	3	0.84
Asthma	2	0.42
Epilepsy	0	0
Diabetes	2	0.42
No known medical disorder	378	94.5
Obstetric high risk factors		
PPROM	36	9
Oligohydramnios	24	5.9
Gestational hypertension	7	8.01
Non-severe preeclampsia	2	0.42
Severe preeclampsia	34	8.43
Antepartum eclampsia	12	2.9
Anhydramnios	2	0.42
Polyhydramnios	4	0.84
Uterine anomaly	2	0.42
Uterine fibroid	2	0.42
Hemoglobin less than 9 gm%	7	1.68
Previous 1 LSCS	11	2.75
Previous 2 LSCS	2	0.42
Rh-negative	5	1.265
Placenta previa	6	1.5
Placenta hematoma	2	0.42
Succenturiate lobe	2	0.42
Abruptio placentae	7	1.68
Gestational diabetes	2	0.42
Twins	6	1.5
Breech	2	0.42
Transverse lie	3	0.75
Urinary tract infection	16	6.75

The most common high risk factor among mothers was PPROM 9 %, followed by severe preeclampsia (8.43 percent). Other risk factors which frequently were seen in preterm delivered mothers were urinary tract infections (6.75%), gestational hypertension(8.1%), abruptio placentae (1.68%), twins (1.68%), and polyhydramnios (0.84%). More than one high risk factor co-existed in some cases.

Table No 3: Distribution Of Participants According To Antenatal Steroid Administration

Steroid given	**No of patients (n=400)**	**Percentage(%)**
Complete dose	172	53.75
Partial dose	148	37

Out of 400 preterm deliveries, only 172 (53.7%) mothers received steroids in complete doses. Twenty percentof mothers did not receive steroidsbecause they were admitted in late labor.

Table No 4: Distribution Of Participants According To The Mode Of Delivery

Mode of delivery	No. Of patients (n=400)	Percentage(%)
Vaginal Delivery	384	96
LSCS	16	4

Of the 384 vaginal deliveries, 72.13 percent were delivered spontaneously, and 27.87 percent were delivered by elective inductions.
The most common indications for induction of Labour were PPROM (33.33%)in 36 cases, preeclampsia (23.33%)in 25 cases, oligohydramnios(23.33%) in 25 cases, preeclampsia with IUGR (16.66%) in 18 cases.
The most common indications for LSCS were previous LSCS (25%)in 4 cases, and Placenta Previa(12.5%)in 6 cases. Fetal distress, Twins, Severe PIH, Eclampsia, and Abruptio placenta were other indications of LSCS

Table No 5: Distribution Of Participants According To Neonatal Outcome At Birth

Neonatal outcome at birth	No. of patients (n=406)	Percentage (%)
Weight		
500-1000 gm	34	8.37
1001-1500 gm	64	15.76
1501-2000 gm	136	31.03
2001-2500 gm	182	44.82
APGAR score		
<7	125	30.78
>7	281	69.21
NICU Admissions	158	38.91

In the present study, the participants who delivered extremely low birth weight (501-1000gm) were 34 (8.37 %), and very low birth weight (1001 gm to 1500 gm) were 64 (15.76%).

125 (31.22%) babies had APGAR score <7 at 5 minutes. APGAR score was found to be significantly associated with the age of gestation. Early preterm babiesmore frequently had low APGAR scores (<7) compared to late preterm babies.($p<0.05$)

Table No 6: Distribution Of Participants According To NicuOutcome

NICU Admission	No. of patients (n=406)	Percentage (%)
Indications		
Prematurity	127	80.43
Respiratory distress	96	23.91
Perinatal Asphyxia	8	5.43
Low Birth weight	46	29.11
Convulsions	3	4.34
Hyperbilirubinemia	31	19.31
Septicaemia	27	17.08
COMPLICATIONS		
RDS	28	17.64
Sepsis	26	16.42
IVH	9	5.87
Jaundice	9	5.87
Pneumonia	6	3.52
NEC	8	5.29
HIE	9	5.87
Early Neontal Death	**(n=50)**	
<34 weeks	35	70
>34 weeks	15	30

In the present study, out of 406 babies,158(38.81%) were admitted in the NICU. Neonatal outcomewas found to be significantly associated withgestational age. Early preterm babieshad morefrequent NICU admissionsas compared to late preterm babies ($p<0.05$)

In the present study there were 50 early neonatal deaths. 30(60 %) were born at 28.1-30 weeks of gestation, 12(23.3 %) were born at 30.1-32 weeks of gestation, 5(10 %) were born at 32.1-34 weeks of gestation,and 3(6.66 %) were born at 34.1-36 weeks of gestation. The early neonatal Deaths were found maximum in 28.1- 30 weeks of gestation and minimum in 34.1- 36 weeks. Neonatal outcomewas found to be worse in early preterm as compared to late preterm babies. ($p<0.05$)

DISCUSSION :

Across countries, the rate of preterm birth ranges from 5% to 18% of babies born.In our study,13.2% of babies were born preterm.PPROM is the most common cause found in our study .The median gestational age of the preterm neonates was 33.4 weeks.In the present study, we found that late preterm births were significantly associated with a history of previous preterm births. ($p<0.05$). Early preterm births were significantly associated with the history of previous abortions.

Demographics in preterm birth: Table 1

The age effect on the relative increase ofpreterm delivery is well established. In extremes of age groups, women are more likely to undergo preterm labor(7). In our study, 72.5% of patients were 18-25 years old.Radhanpuri F. et al.found that 41.91 % of preterm cases were in maternal ages 18-25.(8) According to D Jyothi et al., the risk of preterm labor was highest (15.8%) in adolescents (<18 years) and decreased to a minimum of 6 percent in the reproductive age group 20-45 years and rose to 9.9 % in cases more than 45 years of Age (9).

In the present study, booked patients were 84.81%.However,manystudies indicated that lack of prenatal care was associated with preterm birth.Radhanpuri et al also concluded the same in his study.(8)Jiang et al., in his study, concluded that due to nonmodifiable risk factors like early age of conception, anemia, and lower socioeconomic status in these patients, prenatal checkups did not contribute much to preventing preterm labor (10)

In the present study, gravida two and three presented with preterm laborand showed an increasing trend in grand multiparas. The majority of preterm deliveries in the present study were multigravida.The study conducted by Cupen et al., Jiang et al., Patil et al., and Garg et al. showed similar findings.(11)

Many maternal or fetal characteristics have been associated with preterm birth, including maternal demographic characteristics, nutritional status, pregnancy history, present pregnancy characteristics, psychological characteristics, adverse behaviors, infection, uterine contractions and cervical length, and biological and genetic markers.(12)

It is noted that history of previous preterm birth and short inter-pregnancy interval were significantly associated with preterm births.In the present study,51 (12.64%) had a previous history of preterm birth,142 women had a previous history of abortions, and8 (2.52%) participants had history of both. Radhanpuri F et al. 2014 reported that 25 % of cases had history of previous preterm birth. M. Jiang et al. found 49.44 % of cases had history of abortion, which was significantly associated with preterm birth. Mercer and colleagues reported that women with previous preterm deliveries had a 2·5–fold increased risk in their subsequent pregnancy. The risk of another preterm birth is inversely related to the gestational age of the previous preterm birth.(13)

Maternal risk factors and preterm birth: Table 2

Multiple gestations, placental abruption or placenta Previa,polyhydramnios or oligohydramnios, and PPROM are major risk factors for preterm labor. Other factors areanemia, UTI, transverse lie, and uterine fibroid. Maternal medical disorders, such as thyroid disease, asthma, diabetes, and hypertension, are associated with increased rates of preterm delivery, many of which are indicated because of maternal complications. Iatrogenic preterm labor is seen in cases of severe PIH, Eclampsia, and IUGR. Our study had all the above risk factors present in preterm labor cases. Chythra R. Rao et al. reported that 1.9 % of cases had thyroid disorders, 0.7 % had hypertension, 1.9 % had asthma/bronchitis, and 0.7 % had diabetes.(14). Our findings were in agreementwithChythra Rao. Women exposed to stressful and medical conditions also have increased serum concentrations of inflammatory markers—such as C-reactive protein—an observation not accounted for by other established risk factors for inflammation. These findings suggest that systemic inflammation might be a pathway by which stress could increase the risk of preterm birth.(15).Asymptomatic bacteriuriaand UTI are associated with, and probably predispose to, preterm birth.(16) Microorganisms are recognized by pattern-recognition receptors—e.g., toll-like receptors, which elicit the release of inflammatory chemokines and cytokines—such as interleukin 8, interleukin 1β, and tumor necrosis factor (TNF) α. Microbial endotoxins and proinflammatory cytokines stimulate the production of prostaglandins, other inflammatory mediators, and matrix-degrading enzymes. Prostaglandins stimulate uterine contractility, whereas degradation of the extracellular matrix in the fetal membranes leads to PPROM(17)

Steroids and preterm birth Table3:

In our study, only 53.7% of women received a complete dose of dexamethasone. This is because women came in late labor, and some had received partial dose of the steroid before delivery.53% of subjects were given corticosteroids in a study by Patil P et al. and only 53.7 % received corticosteroids in a study by Jyothi D et al. The use of corticosteroids is

associated with decreased neonatal morbidity and mortality.Infants whose mothers receive antenatal corticosteroids are less likely to exhibit respiratory distress syndrome, intraventricular hemorrhage, and necrotizing enterocolitis compared with those whose mothers did not receive corticosteroids.(18)

Mode of delivery in preterm birth.Table4:

In our study, 96% of women delivered vaginally, and 4% needed LSCS. Patil P et al. (65.3%) and Radhanpuri F et al. (90.80%), Nungsangtemjen et al. (69.2%), and Naveen Kumar et al. (77.6%) also reported that the majority cases delivered vaginally in their studies. (19)Increased difficulties are associated with cesarean sections performed in preterm birth. In addition, there is an increased risk of requiring a vertical uterine incision which may have implications for future pregnancies. Although there is very limited evidence, there are currently no known benefits or harms to the baby from cesarean section. (20) The mode of delivery should be considered and discussed with the mother about the risks and benefits of both cesarean section and vaginal birth.

Neonatal outcome and preterm delivery:

The common predictors of preterm neonatal deaths are gestational age, birth weight, lower APGAR score, respiratory distress syndrome, sepsis, pneumonia, meningitis, and asphyxia(21`, 22, 23)

In our study,158 (38.9%) preterm neonates were admitted in NICU.In this study,111 of the preterm neonates (34 weeks) had 5 minute APGAR scoreof<7, and only 14neonates were >34 weeks with a score of <7.As gestational age advances, the APGAR score improves.(P<0.0001).Early preterm babies were more likely to have NICU admissions than late preterm.(P <0.05).Out of 158 preterm neonates, 127 were admitted due to prematurity, 96 preterm babies had RDSand sepsis in 27cases—3 babies presented with convulsions.

The proportion of death among preterm neonates was12.5%.A majority (60%) were with a gestational age of 28.1-30 weeks.Neonatal death rate was more commonly seen in early preterm neonates compared to late preterms p <0.001.The associated morbidities with preterm neonatal death were respiratory distress syndrome (17.64%), neonatal sepsis (16.42%), NEC (5.29%), HIE (5.29%), pneumonia(3.52%), and jaundice(5.87%)

Survival status of preterm neonates:

A total of 356(87.5%) neonates survived, while 50 (12.5%) died. Furthermore, among the neonates admitted to NICU, 35 neonates died in the first 5 days of their lifeand were < 34 weeks gestational age

Predictors of mortality in preterm neonates

In bivariate analysis, gestational age, birth weight, fetal presentation, 1 and 5-minute APGAR score, respiratory distress syndrome, and perinatal asphyxia showed significant statistical association with preterm neonatal death. After adjusting for confounding variables, the 5-minute APGAR score was not continued as a predictor of death. Death can occur in association with poor pulmonary outcomes and other obstetric reasons. Also, poor clinical setup, limited respiratory support devices and other resource scarcity issues in the hospital might contribute to a higher number of deaths associated with respiratory distress syndrome. In connection with this, neonates who were diagnosed with perinatal asphyxia had 2.83 hazards of dying compared to those who were not asphyxiated, which has also been reported in the study by Prakash et al. (24)(25)

Conclusion

Until research provides better answers, the study advises taking effective measures now, such as screening women for known medical conditions that could put them at risk during pregnancy, assuring good nutrition before and during pregnancy and taking care of anemia, and making sure that all women have access to good preconception and prenatal health care and receive the recommended number of visits during pregnancy.There is role of antenatal steroids, antibiotics, and good NICU setups in the overall survival of preterm neonates

REFRENCES:

1. Liu L, Oza S, Hogan D, Chu Y, Perin J, Zhu J, et al(2016). Global, regional, and national causes of under-5 mortality in 2000-15: an updated systematic analysis with implications for the Sustainable Development Goals. Lancet; 388(10063):3027-35.
2. Saccone G, Perriera L, Berghella V(2016). Prior uterine evacuation of pregnancy as independent risk factor for preterm birth: a systematic review and meta- analysis. Am J Obstet Gynecol.;214:572–91.
3. Barros FC, Papageorghiou AT, Victora CG, Noble JA, Pang R, Iams J, Cheikh Ismail L, Goldenberg RL, Lambert A, Kramer MS, Carvalho M, Conde-Agudelo A, Jaffer YA, Bertino E, Gravett MG, Altman DG, Ohuma EO, Purwar M, Frederick IO, Bhutta ZA, Kennedy SH, Villar J(2015) International Fetal and Newborn Growth Consortium for the 21st Century. The distribution of clinical phenotypes of preterm birth syndrome: implications for prevention. JAMA Pediatr; 169(3):220-9. doi: 10.1001/jamapediatrics.2014.3040. PMID: 25561016
4. United Nations Inter-agency Group for Child Mortality Estimation (UN IGME). 'Levels & Trends in Child Mortality: Report. Estimates devel- oped by the United Nations Inter-agency Group for Child Mortality Estimation'. New York, NY: United Nations Children's Fund; 2019.

5. Fuchs F, Monet B, Ducruet T, Chaillet N, Audibert F(2018). Effect of maternal Age on the risk of preterm birth: A large cohort study. PLoS One; 13(1):e0191002. Published 2018 Jan 31. doi:10.1371/journal.pone.0191002
6. Perin J, Mulick A, Yeung D, Villavicencio F, Lopez G, Strong KL, et al(2022). Global, regional, and national causes of under-5 mortality in 2000-19: an updated systematic analysis with implications for the Sustainable Development Goals. Lancet Child Adolesc Health; 6(2):106-15. doi:10.1016/S2352-4642(21)00311-4
7. Garg S, Kaur T, Saran AS, Yadav M(2017). A study of etiology and outcome of preterm birth at a tertiary care centre. Int J Reprod Contracept Obstet Gynecol; 6(10):4488. doi:10.18203/2320-1770.ijrcog20174429
8. FarhinRadhanpuri*, Deepak A. Desai, Jyoti Sharma, Pawanpreet(2014). Preterm birth and its outcome International Journal of Reproduction, Contraception, Obstetrics and Gynecology; 3(1):153-157
9. Lin, Jun-Hunga,b; Hsu, Yueh-Hana,b; Wang, Peng-Huia(2020). Risks for preterm premature labor: Many of them are preventableJournal of the Chinese Medical Association 83(5):p 421-422. | DOI: 10.1097/JCMA.0000000000000296
10. Dr. Jyothi D ,Dr.Shaheen,Dr.Balgopal Sing(2015). A Prospective Analysis of Etiology and Outcome of Preterm Labor- INDIAN JOURNAL OF RESEARCHVolume : 4 | Issue : 7 | July2015
11. Pervin J, Rahman SM, Rahman M, et al(2020). Association between antenatal care visit and preterm birth: a cohort study in rural Bangladesh BMJ Open; 10:e036699. doi: 10.1136/bmjopen-2019-036699
12. Goldenberg RL Goepfert AR Ramsey PS Biochemical markers for the prediction of preterm birth.Am J Obstet Gynecol. 2005; 192: S36-S46
13. Mercer BM Goldenberg RL Moawad AH et al(1999).The preterm prediction study: effect of gestational age and cause of preterm birth on subsequent obstetric outcome. National Institute of Child Health and Human Development Maternal-Fetal Medicine Units Network.Am J Obstet Gynecol; 181: 1216-1221
14. Blencowe H, Cousens S, Oestergaard M, Chou D, Moller AB, Narwal R, Adler A, Garcia CV, Rohde S, Say L, Lawn JE(2010). National, regional and worldwide estimates of preterm birth. The Lancet, June 2012. 9;379(9832):2162-72. Estimates from.
15. Gavin NI Gaynes BN Lohr KN Meltzer-Brody S Gartlehner G Swinson Perinatal depression: a systematic review of prevalence and incidence.Obstet Gynecol. 2005; 106: 1071-1083
16. Goldenberg RL Hauth JC Andrews WW Intrauterine infection and preterm delivery.NEngl J Med. 2000; 342: 1500-1507
17. Romero R Espinoza J Kusanovic JP et al(2006). The preterm parturition syndrome.Br J ObstetGynaecol; 113: 17-42
18. Davey MA, Watson L, Rayner JA, Rowlands S(2015). Risk-scoring systems for predicting preterm delivery with the aim of reducing associated adverse outcomes. Cochrane Database Syst Rev; 10:CD004902.
19. Nungsangtemjen, KaushikMahajan, M. Rameswar Singh. Fetomaternal outcome in preterm Labour.IJRCOG.https://mail.ijrcog.org/index.php/ijrcog/issue/view/90
20. National Institute for Health and Care Excellence editor. Preterm Labour and birth. NICE Guideline; 2015.
21. Chawanpaiboon, S. et al(2019). Global, regional, and national estimates of levels of preterm birth in 2014: A systematic review and modelling analysis. Lancet Glob. Health 7(1), e37–e46.
22. Ndombo, P. K. et al(2017). A cohort analysis of neonatal hospital mortality rate and predictors of neonatal mortality in a sub-urban hospital of Cameroon. Ital. J. Pediatr. https://doi.org/10.1186/s13052-017-0369-5.
23. Muhe, L. M. et al. Major causes of death in preterm infants in selected hospitals in Ethiopia (SIP): A prospective, cross-sectional, observational study. Lancet Glob. Health 7(8), e1130–e1138 (20
24. Prakash SA, Rasquinha S, Rajaratnam A, Lavanya S(2016). Analysis of risk factors and outcome of preterm labor. Int J of Eng Sci; 6(8):2602-4.
25. Vinturache A, McKeating A, Daly N, Sheehan S, Turner M(2017). Maternal body mass index and the prevalence of spontaneous and elective preterm deliveries in an Irish obstetric population: a retrospective cohort study. BMJ Open; 7(10):e015258. Published 2017 Oct 15. doi:10.1136/bmjopen-2016-015258
26. Smid MC, Lee JH, Grant JH, Miles G, Stoddard GJ, Chapman DA, Manuck TA(2017). Maternal race and intergenerational preterm birth recurrence. Am J Obstet Gynecol; 217(4):480.e1-480.e9. doi: 10.1016/j.ajog.2017.05.051. Epub 2017 May 31. PMID: 28578169.