

Meta Analysis

# Preterm birth: causes and complications observed in tertiary care hospitals



Poluri Koteswari<sup>1</sup>, Pilly Aishwarya Lakshmi<sup>1</sup>, Mohammed Yaseen<sup>1</sup>, Sameera sultana<sup>1</sup>, Amena Tabassum<sup>1</sup>, Paspula Soumya<sup>1,\*</sup> , Aasimah Kawkab<sup>1</sup>



## Article info

Received: 17 Mar 2022

Revised: 05 May 2022

Accepted: 25 Jul 2022

Use your device to scan and read the article online



## Keywords:

Gestational Age, Prematurity, Low Birth Weight, Oligohydramnios, Polyhydramnios, Immature Genitalia, Neonatal Deaths

## ABSTRACT

The main aim of the study was to identify factors associated with preterm birth. The study was conducted for a period of 6 months from September 2019 to February 2020 in 1607 women at SVS Medical College and Hospital, and Sushrutha Hospital, Mahabubnagar and it eventually selected 80 pregnant women for the final experiment. Those pregnant women who had pre-eclampsia, intrahepatic cholestasis during pregnancy, placenta previa or chorioamnionitis were more likely to experience pre-term birth. A patient interview was conducted in a detailed manner and all the necessary information regarding the mother and the infant were collected to carry out the study. Among 80 patients, collected the highest number of 39 cases i.e. 49% in between the age group of 17-23 years and the least number of cases therefore 19 i.e. 24% in between the age group of 35-45 years. We studied that maternal variable such as social status and educational status also impacts deliveries. Alcoholics had the highest number of very pre-term deliveries i.e., 36.25%. And among undergraduates, moderate preterm deliveries were a predominant number, i.e. 38.75%. Among the cases collected, 22.5% of women who have previous abortions had the highest number of preterm births with 31 cases and 5% of women with thyroid had the least number of pre-term births. 41% of premie births were observed in the gestational gap of < 18 months, while 24% were recorded in > 30 months. In between two types of deliveries, 69% of premie births were observed in the cesarean section and normal delivery includes 31%. The results of our study reveal that there is a need to assess the causes and complications among pregnant women who are at risk of delivering a premature baby. We have concluded that counseling the patients about their risk factors is necessary, and the patients should be told that harmful social habits will have a huge impact on their baby, before or after the delivery.

## 1. Introduction

Birth is considered premature or preterm when it occurs before the 37<sup>th</sup> week of pregnancy. A normal pregnancy lasts about 40 weeks. Those final weeks in the womb are crucial for healthy weight gain and for the full

development of various vital organs, including the brain and lungs. This is why premature babies may have more medical problems and may require a longer hospital stay[1, 2]. They may also have long-term health issues, such as learning disabilities or physical disabilities and nervous system disorders in children. In

<sup>1</sup>Smt. Sarojini Ramulamma College of Pharmacy, Seshadrinagar, Mahabubnagar, Telangana 509001, India

\*Corresponding Author: Paspula Soumya ([paspulasoumya07@gmail.com](mailto:paspulasoumya07@gmail.com))

the past, premature birth was the major cause of infant death. Today, the quality of care for newborns and their survival rates have improved. According to the Centres for Disease Control and Prevention Trusted Source, premature birth is still the top cause of infant death worldwide. The incidence, gestational age, and underlying aetiology of preterm birth are highly variable across different racial and ethnic groups and geographic boundaries. In this study, we will review the risk factors and complications of preterm birth globally [3, 4].

- Low birth weight infants have a higher risk of developing insulin resistance and its co-morbidities later in life. The concept of developmental origins of health and disease suggests that intrauterine and postnatal environments have an important role in increasing these risks. The risk of such adult-onset diseases in LBW infants might be associated with adipose tissue mal-development including altered body composition and increased amounts of visceral fat, which is the same mechanism as that in children and adults with metabolic syndrome[5, 6].
- However, LBW infants often have different characteristics: they are not always overweight or obese over their life course. The inconsistency might be associated with the thrifty phenotype, which is produced in response to impaired growth potential and decreased lean body mass. LBW infants tend to be obese within the limits of impaired growth potential [7-9].

Classification of prematurity categorized by birth weight or gestational age is shown as follows (Table 1) [10, 11].

According to birth weight, neonates are divided into three sub-groups. Neonates weighing < 2,500 grams are called as Low Birth Weight neonates[12, 13].

Neonates weighing < 1,500 grams are called as Very Low Birth Weight neonates. Neonates weighing < 1,000 grams are called as Extremely Low Birth Weight neonates.

Extremely low birth weight neonates are at higher risks of developing several conditions relating to health that could be dangerous and foetal[14, 15].

**Table 1.** Classification of prematurity categorized by birth weight and gestational age

Birth weight	
Low birth weight (LBW)	< 2500 g
Very low birth weight (VLBW)	< 1500 g
Extremely low birth weight (ELBW)	< 1000 g
Gestational age	
Term	> 37 weeks
Late pre-term	34 weeks to 37 weeks
Moderate pre-term	32 weeks to 34 weeks
Very pre-term	< 32 weeks
Extremely pre-term	< 28 weeks

According to the age of gestation, the neonates are sub-divided into four groups. Neonates born after 37 weeks of gestation are considered as term neonates. Neonates born between 37 – 34 weeks of gestation age are called as Late Preterm neonates. Neonates born between 32 – 34 weeks of gestation age are called as Moderate Preterm neonates. Neonates born between 28 – 32 weeks of gestation age are called as Very Preterm neonates. And the neonates born any time before 28 weeks of gestation age are called as Extremely Preterm neonates [1-4].

Preterm birth is one of the major challenges in the world. Globally, prematurity accounts for 12.7% of all lives birth, while late pre-term accounts for around three-fourths [73%] of these premature births. Late preterm infants often have weight and size similar to some term infants, but they are still metabolically and physiologically immature[15, 16]. Preterm is associated with higher rates of neuro-developmental morbidity, sensorineural impairments, coronary heart disease, stroke, and other complications. Preterm birth is the leading direct cause of neonatal death [27%]; more than one million preterm newborns die annually. The incidence rates are higher in

undeveloped countries [11.8%] compared to those most developed [9.3%][17, 18].

A woman may have a higher risk of delivering a premature baby if she [19-21];

- Is African-American,
- Has a history of preterm birth,
- Has a history of abortion,
- Is underweight before getting pregnant.

The cause of premature birth often can't be identified. However, certain factors are known to increase a woman's risk of going into labor early. A pregnant woman with any of the following conditions is more likely to have a premature birth: diabetes, heart disease, kidney disease, high blood pressure, Pregnancy-related factors associated with premature birth include: poor nutrition before and during pregnancy, smoking, using illegal drugs, or drinking too much alcohol during pregnancy, certain infections, such as urinary tract and amniotic membrane infections, premature birth in a previous pregnancy, an abnormal uterus, a weakened cervix opening early, Pregnant women who are younger than 17, Pregnant women who are older than 35[22-24].

It was conducted a study showed the incidence of pre-term birth and provided us with results showing an increase in preterm births which has become a global health concern. Gestational age has a major impact on the clinical outcomes of neonates. History includes the maternal age at the infant's birth, parity and gravidity; history of abortions, and types of delivery including medical conditions, e.g., diabetes mellitus, hypertension, UTI, heart disease and others. Out of 250 newborns included in the study, 180 [72%] were FT and 70 [28%] were LPT. More than half of LPT newborns are admitted to NICU [Neonatal intensive care][25-27].

Delivery of LPT babies is associated with an increased risk of neonatal morbidity, including jaundice, requiring phototherapy, respiratory morbidities, hypoglycemia, and convulsions. LPT neonates were more susceptible to suffering from jaundice and

respiratory distress, among other morbidities. A premature baby can have a huge emotional impact on the mother and the entire family. Women who go into preterm labor are more likely to have the below health-related conditions following the delivery of the premie [25, 28]. The main aim of the study was to identify factors associated with preterm birth.

## 2. Methods and materials

### 2.1. Study design

- The study is a Prospective Observational study.

### 2.2. Source of data and materials

- Patient Consent Form.
- Patient Data Entry Form.

### 4.3. Inclusion criteria

- In-patients with pre-gestational emergency labor who are willing to consent.
- Neonates born before 37 weeks of the gestational period are included.
- Neonates weighing less than 2,500 grams are included.

### 2.4. Exclusion criteria

- In-patients with pre-gestational emergency labor who are not willing to give their consent are excluded.
- Neonates born after 37 weeks of the gestational period are excluded.

### 2.5. Tools of study

- Pelvic Examination
- Ultrasound Scan
- Uterine Monitoring
- Lab Tests

### 2.6. Method of data collection

- Case Report Forms.
- Patient Questionnaire/Interview.

## 2.7. Study procedure

- This is a prospective observational study, where eligible patients are enrolled in to the study after obtaining their consent. The case report forms are used.
- This form mainly contains the demographic details of the patient mother and newborn [gestation period and birth weight respectively], and a medication chart.
- The study will be conducted at SVS Medical College hospital. All information relevant to the study will be collected from the time of admission till the date of discharge and the data will be analyzed using a suitable method for statistical analysis.

## 2.8. Does the study require any investigation to be conducted on patients?

- No.

## 2.9. Has ethical clearance been obtained from your institution in the case of the above?

- The ethical committee clearance will be obtained from the Institutional Ethical Committee of SVS MEDICAL COLLEGE HOSPITAL before initiating the study.

### 2.9.1. Duration of the study:

- The study will be conducted for a period of 6 months

### 2.9.2. Place of study

- The study will be conducted at SVS MEDICAL COLLEGE & HOSPITAL.

## 3. Results

### 3. 1. Prevalence of preterm births according to age

This prospective observational study was conducted at SVS Medical College and Hospital, and Sushrutha Hospital, Mahabubnagar. A total number of 80 patients were observed. More number of patients is in between the age group 17-23 years (49.0%) and less number of patients is in between the age group 35 - 45 years (24.0%) and zero

number of patients is present in the above 45 years age group (Table 2).

### 3. 2. Prevalence of preterm birth according to gestation

According to gestational age, the number of cases collected under Moderate Preterm is highest in number, followed by Late Preterm and the least are collected in Extreme Preterm.

**Table 2.** Preterm Births observed according to Gestational Age

Gestational Age	Number Of Cases	Percentage %
Late Pre-term	29	36.0
Moderate Pre-term	31	39.0
Very Pre-term	12	15.0
Extreme Pre-term	08	10.0

### 3. 3. Effect of maternal variables on preterm birth

According to Table 2, the pregnant women who were alcoholics tend to give birth to Very Preterm neonates the most when compared to the others, and pregnant women who were graduates tend to give birth to Moderately preterm birth more when compared to the others.

**Table 3.** Maternal variables that determine the number of preemies

Variable	Categories	Number	Percentage	Preterm Type
Social Status	Smoker	16	20.00	Moderate Preterm
	Alcoholic	29	36.25	Very Preterm
	Tobacco [chewer]	10	12.50	Extremely Preterm
	None	25	31.25	Late Preterm
Educational Status	Illiterate	29	36.25	Extremely Preterm
	Secondary	12	15.00	Very Preterm
	Under Graduate	31	38.75	Moderately Preterm
	Graduate	08	10.00	Late Preterm

### 3. 4. Co-morbidities observed during pregnancy

Among the collected cases, Previous Abortion is found to be the most commonly observed disease condition during pregnancy,

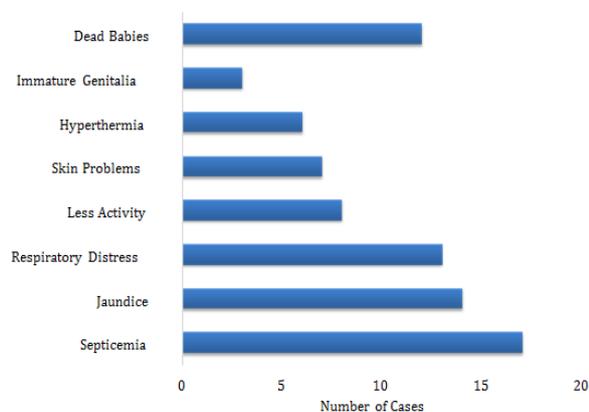
closely followed by the Polyhydramnios condition. Whereas Thyroid cases that affected the gestation age were observed to be the least (Table 4).

### 3. 5. Complications observed in preemie

The most common complication observed in the preterm neonates during our study was septicemia, which was closely followed by Neonatal Jaundice whereas the least common complication observed was Immature Genitalia (Figure 1).

**Table 4.** Co-morbid Conditions in Pregnancy

Disease	Number Of Cases	Percentage %
Hypertension	10	12.5
Type II DM	09	11.25
Anaemia	05	6.25
Thyroid	04	1.56
Seizures	05	6.25
Oligohydramnios	09	11.25
Polyhydramnios	12	15.0
Previous Abortion	18	22.5
Both DM and HTN	05	6.25



**Fig. 1.** Distribution of Complications observed in Preemie

### 3. 6. Prevalence of preemie birth weight

Neonates with Low Birth Weight (48.75%) were in higher number, whereas the least cases recorded were comprised of Extremely Low Birth Weighed (8.75%) neonates.

### 3. 7. Prevalence of preemie deaths

The most number of deaths was observed in extreme preterm neonates (50%), & least

number of deaths were recorded in Late (14%) and moderate (14%) preterm neonates.

### 3. 8. Maternal variables affecting preemie weight

Women with little gap between pregnancies tend to give birth more to very low birth weight babies as women with a higher gap between pregnancies tend to give birth more to normal birth weight babies. Women who underwent vaginal delivery gave birth to slightly low birth weight babies whereas women who underwent cesarean section tend to give birth to very low birth weight babies (Table 5).

**Table 5.** Maternal variables that determine the birth weight

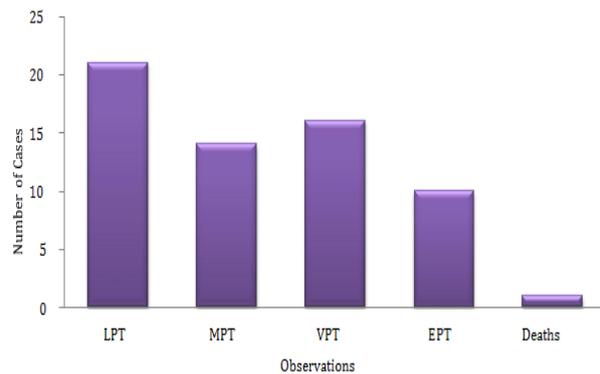
Variables	Categories	Number	Percentage%	Baby Weight
The gap between Pregnancy [in months]	< 18 m	31	40.96	1.61± 0.05
	18-30 m	20	24.09	2.05 ± 0.08
	> 30 m	29	34.94	2.63 ± 0.06
Type of Delivery	Normal	57	68.68	2.01± 0.04
	C - section	26	31.32	1.18 ± 0.06

### 3. 9. Effect of maternal conditions on preemie birth

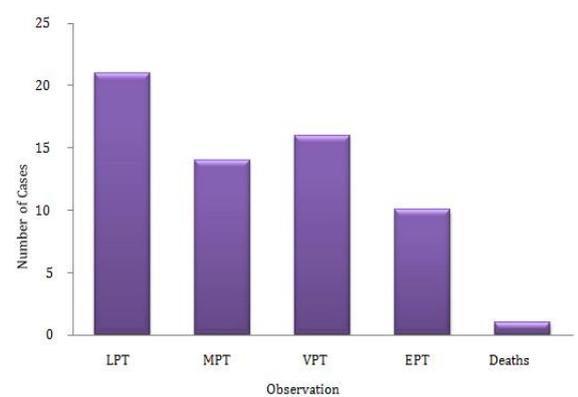
Women who had irregular menstrual cycles before pregnancy (14.46%) gave birth to preemies more when compared to the women who had regular menstrual cycles (85.54%). Women who took proper medical advice during their pregnancy (71%) gave birth to less number of preterm neonates when compared to the women who did not take or follow any medical advice (29%).

### 3. 10. Abortion History

Women with abortion history (Figure 2) gave more birth to extremely and very preterm neonates and women with no abortion history (Figure 3) gave birth more to late preterm neonates.



**Fig. 2.** History of Abortion [yes] and number of deaths recorded



**Fig. 3.** History of Abortion [no] and number of deaths recorded

#### 4. Discussion

A total 80 number of premature birth cases were collected from various health centers of the Mahabubnagar district. The centers include SVS medical college and hospital, Government hospital, and Sushrutha hospital. Among total cases it was found that 29 cases were late pre-term i.e. 36%, 12 cases are moderate pre-term i.e. 39%, 12 cases are very preterm i.e. 15% and 8 cases are extreme pre-term i.e. 10% respectively. After enrollment of the confirmed cases of premature birth maternal parameters and co-morbid to have an impact on premature birth were collected through structural format questionnaires and CRF forms.

In research, the frequency and evaluates the factors associated with low birth weight was calculated. This is a retrospective study with information obtained with data from records of pregnant women between 2011 and 2014 who returned for an evaluation of their newborn after birth. The pre-term birth is associated with the factors like perinatal

care, socioeconomic factors, multiple births, and gestational age, past history and housing conditions also. The data of 794 pregnant women and their newborns were analyzed. The age of the pregnant women varied from 13-44 years[29]. The significant predictors of birth weight are maternal height, gestational age, parity, third-trimester maternal weight gain rate and fetal gender. The other important variable found significant in our study was gestational age in weeks. It is very well known that birth weight is a product of gestational age and intrauterine growth[30]. In the present study, Gestational age was categorized into 4 groups i.e. in between 34-37 weeks categorize as late pre-term, in between 32-34 weeks categorized as moderate pre-term, <32 weeks categorized as very pre-term and <28 weeks categorized as extreme pre-term.

In a study, a premature birth is defined as the onset of labor before the 37th week of pregnancy accompanied by multiple pathogenic causes. The primary risk factors of pre-term birth is multiple pregnancies, history of pre-term birth, congenital uterine abnormalities, history of conical resection, cervical dilation>2cm secondary risk: History of miscarriage, history of acute pyelonephritis, bleeding in the 2nd trimester. Maternal causes and conditions in pregnancy related to pre-term birth like socio-economic and racial factors, maternal age, burdened obstetric history, previous abortions, history of infertility, smoking, alcohol and illegal drug use. Pre-term neonates and prematurity complications are newborn respiratory distress syndrome, cardiovascular disorders, neurological disorders, neonatal brain hemorrhage, metabolic disorders and hematological disorders[31]. In the present study, maternal variables are social status and educational status determines the number of pre-term birth divided into two variables social status and educational status. Among the socio-status smoker categories have 16 cases i.e. 20% has moderate pre-term birth, alcoholic category have 29 cases i.e. 36.25% has very pre-term birth, tobacco has 25 cases i.e. 12.50% has extremely pre-term birth and none of the social statuses have the 25 cases i.e. 36.25% has late preterm birth. Among the educational status illiterate category has 29

cases i.e. 36.25% has extremely pre-term birth, the secondary category has 12 cases i.e. 15% has 31 cases i.e. 38.75% has moderate preterm delivery and the graduate category have 8 cases i.e. 10% has late preterm delivery.

The major cause and risk factor of delivering a premature baby are giving birth in between the age group 17 to 35, being underweight or overweight before pregnancy, smoking or use of illegal drugs, having multiple miscarriages or abortions, having diabetes or high blood pressure or having infection during pregnancy. The common premature baby complications are breathing problems, low blood sugar, heart problems, and vision problems, hearing problems, asthma, infections and problems with feeding[32-34]. In the present study, Among all the 80 cases collected different co-morbid conditions of drug pregnancy that cause pre-term birth was identified. Among all the cases Hypertension has 10 cases i.e. 12.5%, Type-2 diabetes mellitus has 9 cases i.e. 11.25%, Anemia has 5 cases i.e. 6.25%, Thyroid has 4 cases i.e. 5%, Seizures has 5 cases i.e. 6.25%, Oligohydramines has 9 cases, i.e. 11.25%, Previous abortions is the highest condition which is having 18 cases i.e. 22.5%, Polyhydraminos has 12 cases i.e. 15% and both DM and HTN have 5 cases i.e. 6.25%.

In some studies on respiratory distress syndrome, the earliest recognized complication associated with premature birth is RDS. Sepsis is a systemic inflammatory response resulting from infection with such bacteria. Studies suggest that 25% of very low birth weight infants have been delivered due to premature delivery. Necrotizing enterocolitis is the most serious gastrointestinal complication effectively pre-term infants. Intraventricular hemorrhage and periventricular leukomalacia are the most significant forms of perinatal brain injury observed in premature infants [35, 36]. In the present study, The most common complications observed in the pre-term neonates was Septicemia which includes 17 cases i.e. 21.2%, Jaundice includes 14 cases i.e. 17.5%, Respiratory distress includes 13 cases i.e. 16.25%, Less activity includes 8 cases i.e. 10%, Skin problems include 7 cases i.e.8.75%,

Hyperthermia includes 6 cases i.e. 7.5%, Immature genitalia includes 3 cases i.e. 3.75% and Dead babies include 12 cases i.e. 15%.

It was carried out the study on Low birth weight. According to their study, low birth weight is considered as a sensitive index of a Nation's health and development. Prevalence of low birth weight babies among institutional deliveries and its association with socio-cultural and maternal risk factors. A hospital-based cross-sectional study was undertaken comprising of 220 postnatal mothers. Out of 220 respondents, LBW was 23.6%. The risk factors are dietary intake, pre-term deliveries and period of gestation associated with low birth weight [37-39]. In the present study, the Body weight of premature babies is categorized into three categories. <2500g is categorized as low birth weight, <1500g is considered as very low birth weight and <1000g is considered as extremely low birth weight. Among them low birth weight has the highest number of cases therefore 39 i.e. 50%, very low birth weight has 32 cases i.e. 41% and extremely low birth weight has the least number of cases with 7 i.e. 9%.

Limitations and recommendations can be as follow: The time period of our study was very limited. As the study was very time-consuming we could not conduct our study in a large population. Our study can be further followed to study different types of complications seen in the infant. We can also carry on this study in depth based on causes of the preterm birth.

## 5. Conclusion

Among all the cases collected, 31% of cases comprised of moderate preterm neonates, whereas 10% of cases comprised of extremely preterm neonates. A maternal variable [social status and educational status] also impacts the deliveries. Alcoholics had the highest number of very pre-term deliveries i.e. 36.25%. And among undergraduates, moderate preterm deliveries were in a predominant number, i.e. 38.75%. Among the cases collected, 22.5% of women who have previous abortions had the highest number of preterm births with 31 cases and 5% of women with thyroid had the least number of pre-term births. LBW neonates comprised of

50% of the entire cases, VLBW neonates comprised of 41% and ELBW neonates comprised of 9% of the cases. More number of preemie births was observed in the gestational gap of < 18 months i.e. 41% while the least were recorded in > 30 months i.e. 24%. In between two types of deliveries normal and c-section, more preemie births were observed in the cesarean section i.e. 69% and normal delivery includes 31%.

### Conflict of Interest

The authors hereby declare that they have no conflict of interest.

### Author's contributions

All authors equally participated in designing experiment analysis and interpretation of data. All authors read and approved the final manuscript.

### Consent for publications

All authors have read and approved the final manuscript for publication.

### Availability of data and material

The authors have embedded all data in the manuscript.

### Ethics approval and consent to participate

The authors did not use human or animals in the research

### References

1. Yang H, Kramer MS, Platt RW, Blondel B, Bréart G, Morin I, Wilkins R, Usher R (2002) How does early ultrasound scan estimation of gestational age lead to higher rates of preterm birth? *American journal of obstetrics and gynecology* 186 (3): 433-437. doi:<https://doi.org/10.1067/mob.2002.120487>
2. Savitz DA, Stein CR, Siega-Riz AM, Herring AH (2011) Gestational weight gain and birth outcome in relation to prepregnancy body mass index and ethnicity. *Annals of epidemiology* 21 (2): 78-85. doi:<https://doi.org/10.1016/j.annepidem.2010.06.009>
3. Pécheux O, Garabedian C, Drumez E, Mizrahi S, Cordiez S, Deltombe S, Deruelle P (2019) Maternal and neonatal outcomes according to gestational weight gain in twin pregnancies: Are the Institute of Medicine guidelines associated with better outcomes? *European Journal of Obstetrics & Gynecology and Reproductive Biology* 234): 190-194. doi:<https://doi.org/10.1016/j.ejogrb.2019.01.010>
4. Baer RJ, Chambers BD, Coleman-Phox K, Flowers E, Fuchs JD, Oltman SP, Scott KA, Ryckman KK, Rand L, Jelliffe-Pawlowski LL (2022) Risk of early birth by body mass index in a propensity score-matched sample: A retrospective cohort study. *BJOG: An International Journal of Obstetrics & Gynaecology* 129 (10): 1704-1711. doi:<https://doi.org/10.1111/1471-0528.17120>
5. Peila C, Spada E, Giuliani F, Maiocco G, Raia M, Cresi F, Bertino E, Coscia A (2020) Extrauterine growth restriction: Definitions and predictability of outcomes in a cohort of very low birth weight infants or preterm neonates. *Nutrients* 12 (5): 1224. doi:<https://doi.org/10.3390/nu12051224>
6. Brinkis R, Albertsson-Wikland K, Tamelienė R, Aldauskienė I, Rimdeikienė I, Marmienė V, Šmigelskas K, Verkauskienė R (2022) Impact of Early Nutrient Intake and First Year Growth on Neurodevelopment of Very Low Birth Weight Newborns. *Nutrients* 14 (18): 3682. doi:<https://doi.org/10.3390/nu14183682>
7. Lin C-W, Ko H-Y, Huang C-C, Yeh C-Y, Chiu Y-C, Chen H-L (2022) Body Weight Gain Status during the Incubator Weaning Process in Very Low Birth Weight Premature Infants. *Children* 9 (7): 985. doi:<https://doi.org/10.3390/children9070985>
8. Ofek Shlomai N, Reichman B, Zaslavsky-Paltiel I, Lerner-Geva L, Eventov-Friedman S, Network\* IN (2022) Neonatal morbidities and postnatal growth failure in very low birth weight, very preterm infants. *Acta Paediatrica* 111 (8): 1536-1545. doi:<https://doi.org/10.1111/apa.16380>
9. Hsu Y-C, Pan C-Y, Lin Y-H, Lin M-C, Wang T-M (2022) The association between duration of postnatal weight loss and neurodevelopment outcomes in very low

- birth weight infants. *Pediatrics & Neonatology* 63 (1): 33-40. doi:<https://doi.org/10.1016/j.pedneo.2021.06.016>
10. Engle WA A recommendation for the definition of "late preterm"(near-term) and the birth weight-gestational age classification system. In: *Seminars in perinatology*, 2006. vol 1. Elsevier, pp 2-7. doi:<https://doi.org/10.1053/j.semperi.2006.01.007>
  11. Sentenac M, Chaimani A, Twilhaar S, Benhammou V, Johnson S, Morgan A, Zeitlin J (2022) The challenges of heterogeneity in gestational age and birthweight inclusion criteria for research synthesis on very preterm birth and childhood cognition: An umbrella review and meta-regression analysis. *Paediatric and perinatal epidemiology* 36 (5): 717-725. doi:<https://doi.org/10.1111/ppe.12846>
  12. Lundebjerg KM, Heen E, Mosa M, Abdi A, Størdal K (2020) Neonatal morbidity and mortality in Hargeisa, Somaliland: an observational, hospital based study. *The Pan African Medical Journal* 37 (3): PMID: PMC7501748. doi:<https://doi.org/10.11604/2Fpamj.2020.37.3.24741>
  13. Kiplagat S, Ravi K, Sheehan DM, Srinivas V, Khan A, Trepka MJ, Bursac Z, Stephens D, Krupp K, Madhivanan P (2022) Sociodemographic patterns of preterm birth and low birth weight among pregnant women in rural Mysore district, India: A latent class analysis. *Journal of Biosocial Science* 2022): 1-15. doi:<https://doi.org/10.1017/S0021932022000037>
  14. AlQurashi M (2021) Survival rate of very low birth weight infants over a quarter century (1994–2019): A single-institution experience. *Journal of Neonatal-Perinatal Medicine* 14 (2): 253-260. doi:<https://doi.org/10.3233/NPM-200595>
  15. Yadav A, Siddiqui N, Debata PK (2021) Two-hourly vs Three-hourly Feeding in Very Low Birthweight Neonates: A Randomized Controlled Trial. *Indian Pediatrics* 58 (4): 320-324. doi:<https://doi.org/10.1007/s13312-021-2189-3>
  16. Kao Y-H, Chen H-C, Lien S (2022) The Effect of High Humidity Environments on Very Low Birth Weight Preterm Infants: A Systematic Review. *Hu li za zhi The Journal of Nursing* 69 (4): 88-98. doi:[https://doi.org/10.6224/jn.202208\\_69\(4\).11](https://doi.org/10.6224/jn.202208_69(4).11)
  17. Boos V, Berger F, Cho M-Y, Photiadis J, Bühner C, Pfitzer C (2022) Outcomes in very low birthweight infants with severe congenital heart defect following cardiac surgery within the first year of life. *European Journal of Cardio-Thoracic Surgery* 62 (1): ezab494. doi:<https://doi.org/10.1093/ejcts/ezab494>
  18. Ilardi D, Sanz JH, Cassidy AR, Sananes R, Rollins CK, Shade CU, Carroll G, Bellinger DC (2020) Neurodevelopmental evaluation for school-age children with congenital heart disease: recommendations from the cardiac neurodevelopmental outcome collaborative. *Cardiology in the Young* 30 (11): 1623-1636. doi:<https://doi.org/10.1017/S1047951120003546>
  19. Suff N, Story L, Shennan A The prediction of preterm delivery: What is new? In: *Seminars in Fetal and Neonatal Medicine*, 2019. vol 1. Elsevier, pp 27-32. doi:<https://doi.org/10.1016/j.siny.2018.09.006>
  20. Hidalgo-Lopezosa P, Jiménez-Ruz A, Carmona-Torres J, Hidalgo-Maestre M, Rodríguez-Borrego M, López-Soto P (2019) Sociodemographic factors associated with preterm birth and low birth weight: A cross-sectional study. *Women and Birth* 32 (6): e538-e543. doi:<https://doi.org/10.1016/j.wombi.2019.03.014>
  21. Korevaar TI, Derakhshan A, Taylor PN, Meima M, Chen L, Bliddal S, Carty DM, Meems M, Vaidya B, Shields B (2019) Association of thyroid function test abnormalities and thyroid autoimmunity with preterm birth: a systematic review and meta-analysis. *Jama* 322 (7): 632-641. doi:<https://doi.org/10.1001/jama.2019.10931>
  22. Quenby S, Gallos ID, Dhillon-Smith RK, Podsek M, Stephenson MD, Fisher J, Brosens JJ, Brewin J, Ramhorst R, Lucas ES (2021) Miscarriage matters: the

- epidemiological, physical, psychological, and economic costs of early pregnancy loss. *The Lancet* 397 (10285): 1658-1667. doi:[https://doi.org/10.1016/S0140-6736\(21\)00682-6](https://doi.org/10.1016/S0140-6736(21)00682-6)
23. Winata IGS, Kusuwardiyanto P, Aryana MBD, Mulyana R (2021) Cervical hydatidiform moles pregnancy: diagnosis and treatment. *Open Access Macedonian Journal of Medical Sciences* 9 (C): 291-296. doi:<https://doi.org/10.3889/oamjms.2021.7562>
  24. Chae SH, Shim S-H, Lee SJ, Lee JY, Kim S-N, Kang S-B (2019) Pregnancy and oncologic outcomes after fertility-sparing management for early stage endometrioid endometrial cancer. *International Journal of Gynecologic Cancer* 29 (1). doi:<http://dx.doi.org/10.1136/ijgc-2018-000036>
  25. Algameel A, Elhawary M, Amin S, Abd Elmenem M (2020) Outcome of late preterm newborns in Upper Egypt. *Egyptian Pediatric Association Gazette* 68 (1): 11. doi:<https://doi.org/10.1186/s43054-020-00023-1>
  26. Sureshbabu RP, Aramthottil P, Anil N, Sumathy S, Varughese SA, Sreedevi A, Sukumaran SV (2021) Risk factors associated with preterm delivery in singleton pregnancy in a tertiary care hospital in south India: a case control study. *International Journal of Women's Health* 13: 369. doi:<https://doi.org/10.2147%2FIJWH.S282251>
  27. Valipour M, Ayubi E, Shiravand N, Moradi Y, Abbaszadeh A, Amrai F, Mokhtari S, Bahmanpour K, Mansori K (2020) Determination of maternal risk factors of preterm delivery: adjusted for sparse data bias; results from a population-based case-control study in Iran. *Obstetrics & gynecology science* 63 (2): 117-125. doi:<https://doi.org/10.5468/ogs.2020.63.2.117>
  28. La-Orpipat T, Suwanrath C (2019) Pregnancy outcomes of adolescent primigravida and risk of pregnancy-induced hypertension: a hospital-based study in Southern Thailand. *Journal of Obstetrics and Gynaecology* 39 (7): 934-940. doi:<https://doi.org/10.1080/01443615.2019.1581736>
  29. Gebreslasie K (2016) Preterm birth and associated factors among mothers who gave birth in Gondar town health institutions. *Advances in Nursing* 2016): Article ID: 4703138. doi:<http://dx.doi.org/10.1155/2016/4703138>
  30. Anitha C, Nair M, Rajamohanam K, Nair S, Shenoy K, Narendranathan M (2009) Predictors of birthweight—a cross sectional study. *Indian Pediatr* 46): 59-62
  31. Tsikouras P, Bothou A, Gerede A, Apostolou I, Gaitatzi F, Deuteraiou D, Chalkidou A, Anthoulaki X, Michalopoulos S, Dragoutsos G (2021) Premature Birth, Management, Complications. *Global Women's Health*: 180 Pages
  32. De Bernabé JV, Soriano T, Albaladejo R, Juarranz M, Calle MaE, Martínez D, Domínguez-Rojas V (2004) Risk factors for low birth weight: a review. *European Journal of Obstetrics & Gynecology and Reproductive Biology* 116 (1): 3-15. doi:<https://doi.org/10.1016/j.ejogrb.2004.03.007>
  33. Heaman M, Kingston D, Chalmers B, Sauve R, Lee L, Young D (2013) Risk Factors for Preterm Birth and Small-for-gestational-age Births among Canadian Women. *Paediatric and perinatal epidemiology* 27 (1): 54-61. doi:<https://doi.org/10.1111/ppe.12016>
  34. Bailey BA, Byrom AR (2007) Factors predicting birth weight in a low-risk sample: the role of modifiable pregnancy health behaviors. *Maternal and child health journal* 11 (2): 173-179. doi:<https://doi.org/10.1007/s10995-006-0150-7>
  35. Randis TM, Puri KD, Zhou H, Diacovo TG (2008) Role of PI3K $\delta$  and PI3K $\gamma$  in inflammatory arthritis and tissue localization of neutrophils. *European journal of immunology* 38 (5): 1215-1224. doi:<https://doi.org/10.1002/eji.200838266>
  36. Randis TM (2008) Complications associated with premature birth. *AMA Journal of Ethics* 10 (10): 647-650. doi:<https://doi.org/10.1001/virtualmentor.2008.10.10.cprl1-0810>

37. Bansal P, Garg S, Upadhyay HP (2019) Prevalence of low birth weight babies and its association with socio-cultural and maternal risk factors among the institutional deliveries in Bharatpur, Nepal. Asian Journal of Medical Sciences 10 (1): 77-85
38. Sutan R, Berkat S (2014) Does cultural practice affects neonatal survival-a case control study among low birth weight babies in Aceh Province, Indonesia. BMC pregnancy and childbirth 14 (1): 1-13.
39. Xi C, Luo M, Wang T, Wang Y, Wang S, Guo L, Lu C (2020) Association between maternal lifestyle factors and low birth weight in preterm and term births: a case-control study. Reproductive Health 17 (1): 1-9. doi:<https://doi.org/10.1186/s12978-020-00932-9>
- doi:<https://doi.org/10.1186/1471-2393-14-342>



Copyright © 2022 by the author(s). This is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<https://creativecommons.org/licenses/by/4.0/>).

#### How to Cite This Article:

Koteswari P, Lakshmi PA, Yaseen M, sultana S, Tabassum A, Soumya P, Kawkab A (2022) Preterm birth: causes and complications observed in tertiary care hospitals. Cellular, Molecular and Biomedical Reports 2 (4): 202-2012. doi:10.55705/cmbr.2022.362506.1068

#### Download citation:

[RIS](#); [EndNote](#); [Mendeley](#); [BibTeX](#); [APA](#); [MLA](#); [HARVARD](#); [VANCOUVER](#)