



## **An Update on the Risk of Preterm Birth**

**R.P. Patange, Anjali Patil and Supriya Patil**

Department of Obstetrics and Gynaecology, Krishna Vishwa Vidyapeeth "Deemed To Be University",  
Karad

### **ABSTRACT**

*Studies have concluded that many people use the phrase "preterm birth"(PB) to refer to the delivery of a baby earlier than 37 weeks of gestation. Globally, studies have shown that PTL affects around 15 million infants per year, with a disproportionately high number of those born in countries with lower and moderate incomes (LMIC). Studies have concluded that it is responsible for about one million neonatal deaths each year and is a significant factor in the prevalence of childhood disease. Thus, in our review, we have discussed PTL in terms of etiology, pathophysiology, complications, differential diagnosis, management, risk factors, current trends and clinical implication.*

**Key words:** PTL, etiology, pathophysiology, complications, differential diagnosis, management, risk factors, current trends, clinical implications.

Received 20.09.2023

Revised 20.10.2023

Accepted 22.11. 2023

### **INTRODUCTION**

Studies have concluded that preterm labor (PTL) is a significant factor in the occurrence of perinatal morbidity and mortality.[1] Furthermore, according to studies, it is one of the most critical challenges that the public health system is confronting in the modern era in terms of mortality, disability, and the expenditure of health care.[1] In addition to this, studies have concluded that because the poor in India are unable to pay the high cost of caring for these preterm children, the scope of this problem in India is different from what it is in other countries. [1] Additionally, studies also revealed that there has been hardly any change in the percentage of people who have PTL during the last fifty years.[2] Various studies have shown that "effective preventive and therapeutic measures are still not readily available due to the continuous uncertainties around the measures that can be taken to prevent or treat PTL".[2] Studies have concluded that PBL refers to the occurrence of childbirth before the completion of 37 weeks of gestation.[3] Furthermore, studies have concluded that there are additional classifications for preterm births, including early and late preterm.[3] Additionally, studies have concluded that for a baby to be born PB, they must come into the world before 33 weeks.[4] On the other hand, studies have concluded that being born late preterm means arriving between 34 and 36 weeks.[4] Thus, in our review we have discussed about PTL.

### **ETIOLOGY**

Studies have concluded that "stress, pregnancy(PG), placental abruption(PA), placenta previa, vaginal use, history of PB or abortion(AB), inadequate prenatal care(IPC), smoking, maternal age 18 or >40, poor nutrition, low BMI, fetal anomaly (FA), fetal growth restriction(FGR), oligohydramnios, polyhydramnios, preterm labor rupture of membranes (PPROM), and environmental factors may all contribute to PTL".[5] Furthermore, studies have concluded that this list is not all-inclusive since PTL may result from a variety of factors. Studies have concluded that the vast majority of the reasons why individuals see physicians are covered by it.[5]

### **PATHOPHYSIOLOGY**

Studies have concluded that the "fetal inflammatory response syndrome (FIRS) is one of the important events that may occur in PTL, and it is considered to be a pathological occurrence".[6] A lot of research has shown that this "syndrome is marked by systemic inflammation(SI) and an increase in FP IL-6. It usually happens because of something like chorioamnionitis".[6] Researchers have found that the hypothalamus in the fetus sends a message that causes CRH to be released.[4] This, in turn, causes ACTH to be released, which in turn causes the fetal adrenal glands to make cortisol. This starts the process that

leads to labor and delivery.[4] Numerous other studies have found that “an influx of IC into the stroma of the cervical canal is what triggers the release of cytokines(CYT) and PGT, which accelerate cervical ripening”.[4] Researchers have found that these changes have an impact on the structure of collagen and glycosaminoglycans, two important building blocks of cervical tissue. In contrast to progesterone (PGT), estrogen promotes late-age collagen breakdown. As a result, PGT is used to stop or postpone the process of ripening.[4] Studies have also shown that both hormones may help control the formation of gap junctions and the increase in connexin 43 proteins, two important parts of the birthing process.[4]

### HOW MUCH SERIOUS PTL IS?

Studies have concluded that the incidence of PTL is often between 6 and 15% of the population. Studies have concluded that the incidence of PTL at our institution (JNMC) was 10.2% during 2006–2007.[2] According to studies, 50% of PTL occur on their own, 25% occur due to a low risk of PPROM, and 25% occur as a result of medical care. Various other studies have concluded that it is the primary cause of NNM and impairment (both ST and LT), notably cerebral palsy, deafness, blindness, and CLD .[2] Studies have concluded that one of the primary reasons for rising mortality in developing nations is that treatment for PTL is very costly and out of reach for the poor.[2]

### DIFFERENTIAL DIAGNOSIS[4]

1. “Abruptio placentae
2. FGR
3. MF- PG pregnancy
4. Preeclampsia
5. PPROM
6. PTL”

### MANAGEMENT[4]

1. “CCB (Nifedipine)
2.  $\beta$ - adrenergics (terbutaline)
3. COX inhibitors (indomethacin)
4. Weaker drugs
  - a. Atosiban (oxytocin-vasopressin receptor antagonist)
  - b. Glyceryl trinitrate”

### COMPLICATION

**Maternal Complication** = Studies have found that going into PTL before due date is linked to an unclear risk for cardiovascular morbidity and mortality. Studies have concluded that cardiovascular morbidity usually shows up years after delivery for this reason.[4]

**Infant Complication**= Studies have shown that both PTL and delivery are linked to problems with neurodevelopment. These problems include thinking and movement issues, cerebral palsy, and loss of sight and hearing. Studies have concluded that the possibility of these risks happening also rises with a shorter gestational age. Studies have concluded that anxiety, sadness, disorders on the autism spectrum, and attention deficit hyperactivity disorder are all associated with preterm labor.[4]

**Neonatal complication**= In addition to having problems from birth, these conditions have been studied and found to include necrotizing enterocolitis (NEC), intraventricular hemorrhage (IVH), bronchopulmonary dysplasia(BPD), retinopathy of immaturity(ROI), and weak growth.[4]

### RISK FACTOR[4]

- a. “Multiple PG
- b. Uterine distension
- c. Anomalies
- d. CI
- e. Bacterial vaginosis(BV)
- f. Bleeding in early PG
- g. Poor SES
- h. Elderly & adolescent group
- i. Tobacco use (smoking and smokeless)”

## **PREVENTIVE MEASURES**

### **1. Antenatal Visit Care (ANVC)**

Studies have also concluded that “it is essential to go to an AN clinic for at least four sessions in order to improve the chances of having a healthy PG and to combat the growing problem of PTB”. [7] Studies have also concluded that there has also been an “increase in the proportion of women giving birth before the 37th week of PG. According to the findings of many studies, women who receive ANVC before giving birth have a lower risk of having a PTB compared to women who do not receive such services”. [7] Furthermore, studies have also concluded that this was shown to be the case when comparing the two groups of women to one another. Studies have also concluded that PTB are more likely to occur in women who do not receive such services. Additionally, studies have also concluded that “approximately 80% of PNT is covered worldwide (with at least one appointment), while coverage levels drop to roughly 50% when there are four or more V”. [8] Studies have concluded that indicating that there are still differences in coverage, the number of women who live in the world's least developed countries and get four or more antenatal care visits is somewhere between 30 and 40 percent. [7]

Studies have also concluded that since “many countries throughout the globe record high coverage levels of ANVC, PNV give an ideal chance to identify moms who are at a H-R and to provide timely care to all PG women”. [7] In addition, studies have also concluded that “prenatal (PN) visits provide an excellent opportunity to identify mothers who are at greater risk”. [7] Studies have also found that “some of the most important PNC services are finding PG women who are at a high risk (H-R) of giving birth early, screening and treating STDs like HIV and infections like TB, malaria, BV, and bacteriuria (BU), finding and treating malnutrition (MN), counseling on N and multiple MNS, and counseling on PTB”. [9]

### **2. Screening of Low-Risk Women**

Studies have also concluded that, “to minimize the rate of PTB, women may be tested and treated for asymptomatic BU and pyelonephritis”. [7] There is still a need for more research in order to discover the screening and treatment methods that are most effective in preventing PTB. [7] There has been a large amount of research conducted on the topic of “regular PTB testing and treatment for bacterial vaginosis in order to find ways to reduce the risk of PMB”. [7] Furthermore, research has shown that “antimicrobial therapy (AMT) can completely cure BV. However, meta-analyses and reviews have shown that “this medicine has no effect on the chance of PTB in women who are at L-R, so it should not be used in these patients”. [7] Studies have also concluded that women who have a history of obstetric conditions, such as known uterine or cervical abnormalities or prior PG, may be identified during PNC as having an increased risk of giving birth prematurely. Thus, in order to see whether there are any abnormalities, the woman's cervix and uterus were examined in a study. [7] Furthermore, studies revealed that PTD, preexisting problems (such as CD), or presenting PG-related symptoms (such as high BP, DM, multiple gestations, or bleeding) are all R/F for PTB. Another risk factor for PTB is having more than one PG. [7]

### **3. Nutritional Supplements**

Researchers have also found that more research has been done on omega-3 polyunsaturated fatty acids (30PSFA) because of the lower rate of preterm birth in places where people eat a lot. Furthermore, studies have also concluded that it is hypothesized that omega-3 polyunsaturated fatty acids lower the levels of pro-inflammatory (PI) cytokines that are found in the body. [7] According to the results of a randomized trial of “30PSFA done in women who were more likely to give birth early, taking extra 30PSFA has been linked to a lower production of inflammatory mediators”. [10] Another study with random participants found that taking fish oil supplements L-R of having another early birth (rate ratio = 0.54; 95% confidence range = 0.30–0.98). [10] This was proved by the use of statistical analysis. The conclusion was backed up by a confidence interval that went all the way up to 0.98, and it varied from 0.30 to that number. [10]

### **4. Improves care for women at risk**

Researchers have also found that more intensive prenatal care, such as social support, home visits, and education, may be useful with teenagers even while preterm birth rates have not reduced among other women. [7]

### **5. PGT**

Researchers have also found that “giving PGT to H-R women who have a history of PTB helps to prolong PG, decrease the incidence of LBW, and avoid subsequent PG, according to the research that has been carried out”. [7] In two clinical trials of “PGT supplementation, participants received weekly IT-MI of 250 mg of 17–20 hydroxprogesterone caproate (HPGTC) in addition to daily PGTS, which reduced the risk of PTB by about one-third. According to meta-analyses, there was a decrease in the incidence of recurrent PTB that varied from 40 to 55%. This reduction was evidenced by a relative risk (RR) of 0.58, with a 95% confidence interval (CI) between 0.48 and 0.70 and 0.45, 0.25–0.80”. [11] Additionally, researchers have discovered that there hasn't been enough evidence to prove that everyone who is at risk can benefit from

PGT.[7] In a randomized, placebo-controlled trial with 600 women who were expecting twins, 17-hydroxyprogesterone caproate did not change the number of early births. This was in contrast to the results of a randomized controlled trial that used a placebo and found that women who received vaginal PGT had a L-R of PTB in a group of 250 women who had short cervixes.[12] Women who were pregnant with twins participated in both of these trials. Researchers have also found that current guidelines and expert opinion say that single PG women with short cervical lengths should give themselves progesterone vaginally to lower the risk of PN morbidity and mortality as well as PTB.[7]

## **6. Cervical Cerclage**

Researchers have also found that a surgical technique called "cervical cerclage" involves placing a suture across the cervix to avoid premature opening. The name Shirodkar is an alternative designation for it.[13]

## **CURRENT TRENDS IN PREVENTION**

Researchers have also found that in order for a PG woman to have a successful PG and give birth to a healthy child, it is essential that she refrain from misusing prescription pharmaceuticals and illegal narcotics during the whole of her PG.[7] Studies have also concluded that, aside from this, it is in her best interest to steer clear of activities that put her in the path of secondhand smoke, such as the use of tobacco products or the smoking of cigarettes.[7] Studies have also concluded that it is essential to have a healthy diet that is well-balanced and includes both iron and folic acid in order to keep one's health in the best possible condition.[7] Studies have also concluded that expectant moms in Nigeria should make every effort to stay away from hard working conditions and unsafe scenarios because of the high incidence of PTL & PTB that is associated with these types of environments.[14] Before getting PG, studies revealed that "a DH in traditional vegetables like broccoli, cabbage, and green beans may lower the risk of PTB".[14] Researchers have also found that "traditional vegetables have a high concentration of antioxidants or anti-inflammatory substances, both of which play a significant role in lowering the risk of PTB".[12] Additionally, studies have also concluded that "women who are pregnant should make an effort to strengthen their marriages and establish strong interpersonal bonds".[12] This is especially important for women who are expecting their first child. Studies have also concluded that they need to strike a balance between the time they spend working and the time they spend relaxing in order to reduce the amount of stress they experience.[7] Studies have shown that , PB risk can be controlled by doing following.[11]

### **1. Corticosteroid Therapy (CCST)**

Researchers have also found that there is a correlation between the use of corticosteroids and lower rates of morbidity and death in newborns.[11] Studies have also found that babies whose mothers took corticosteroids before they got pregnant had a lower risk of RSS , IVH & NEC than babies whose mothers did not take CCST before they got PG.[11] Studies have also concluded that newborns whose mothers did not receive antenatal corticosteroids during pregnancy were at higher risk.[7] Thus, studies showed that this was the case for all three of these different circumstances. When preterm labor has been identified and confirmed to be present, the only treatment option that is available is a single round of corticosteroids.[7] This course of treatment is being undertaken in order to enhance the general well-being of the baby. Studies showed that between 24 and 34 weeks of pregnancy, women who are due to give birth in the next seven days should take either betamethasone (two doses of 12 milligrams given intramuscularly 24 hours apart) or dexamethasone (four doses of 6 milligrams given intramuscularly every 12 hours) at any time between 24 and 34 weeks of gestation.[7,11]

### **2. Magnesium Sulphate (Mg<sub>2</sub>SO<sub>4</sub>) Therapy**

Researchers have also found that "prenatal Mg<sub>2</sub>SO<sub>4</sub> supplementation has been linked to a reduction in the frequency and severity of cerebral palsy in infants. This is likely due to the neuroprotective effects of the substance".[7,11]

### **3. Tocolysis Therapy**

Researchers have also found that "This amount of time may be adequate to allow the PG woman to be transferred to a facility that handles PTB and gives CCST to lower the degree to which the newborn organs are underdeveloped".[7] Studies also show that tocolytic drugs are used to put off giving birth so that the woman can get prenatal care and magnesium sulfate, and then she can be taken to a tertiary care facility with a NNICU.[11]

### **4. Antibiotic Therapy**

Researchers have also found that the "intrauterine bacterial infection (IUBI) are linked to PTL, particularly before 32 weeks of gestation, routine antibiotic administration to all PG women at risk for PTL lowers the risk of the baby contracting group B streptococcus infection and has been shown to lower related mortality rates. This is because IUBI are linked to PMB".[11] Some studies have also proved that this is due to the fact that IUBI are linked to PTL.[11] In addition to this, studies concluded that when an

early rupture of the membranes takes place, obstetrical treatment will watch for the commencement of labor as well as any indicators of infection.[7] Thus, research suggests that antibiotic therapy may extend the pregnancy and lower the risk of morbidity in the newborn if the membranes rupture before 34 weeks of pregnancy. However, studies also suggested that amoxicillin combined with clavulanic acid (co-amoxiclav) is not one of these alternatives due to worries about NEC. [7,11]

### **CLINICAL IMPLICATION [7]**

Researchers have also found that “neonatal nurses(NN-N) often interact with mothers who have a history of the condition and are thus at R”. [7] Thus, studies have also concluded that despite the “availability of H-Q obstetric treatment, the rate of PTB has been steadily rising”. [7] In spite of the fact that studies said “PTB is not always avoidable, NN-N interact with mothers who are in this condition on a regular basis”. [7] Additionally, studies have also shown that it is “feasible for PTC to identify and reduce M-R/F, as well as promote optimum health prior to the conception of a child”. [7] In addition to this, studies also concluded that the “Institute of Medicine(IOM) defines "prenatal quality care" as continual RA, HP, and intervention to reduce both medical and psychological risk throughout PG”. [7] Studies have also concluded that “women who are at a H-R of PTB are required to get PNC from a physician who specializes in maternal and fetal medicine”. [7] Researchers have also found that “women must be familiar with the typical non-obvious symptoms of PT labor in order to be able to notice symptoms and seek treatment as soon as is practically possible”. [7] Additionally, studies revealed that “it is our duty to emphasize the significance of public education efforts made by the government to educate people about PMD and its LTE”. [7] Furthermore, studies have also concluded that “women at high risk can make wise decisions regarding future PG’S and curettages with the assistance of NN-N, who can provide them with vital information and proactive assistance”. [7]

### **CONCLUSION**

Studies have concluded that the perinatal outcome, health care costs, and quality of life are all significantly impacted by successful prediction, prevention, and treatment of preterm labor. It is challenging to accurately forecast, reliably prevent, and effectively treat preterm labor since the root cause of the condition is still a mystery. With varied efficacy, antibiotics, tocolytics, and corticosteroids are now used in the treatment of PTL. Studies have concluded that the treatment of PTL should have as its primary objective the improvement of perinatal outcomes along with the reduction of morbidity and mortality.

### **REFERENCES**

1. Chandraharan, E., & Arulkumaran, S. (2005). Recent advances in management of preterm labor. *J Obstet Gynecol India*, 55(2), 118-24.
2. MB Bellad, Hema Dhumale & Jyotsna C Shrivage. (2009). Preterm Labor : A review. *J.south asian federation Obstet Gynecol*, 1(3), 1-4.
3. American College of Obstetricians and Gynecologists. (2016). Practice Bulletin No. 171: management of preterm labor. *Obstetrics and gynecology*, 128(4), e155-e164.
4. Suman, V., & Luther, E. E. (2019). Preterm labor.
5. Johansson, S., Sandström, A., & Cnattingius, S. (2018). Maternal overweight and obesity increase the risk of fetal acidosis during labor. *Journal of Perinatology*, 38(9), 1144-1150.
6. Gotsch, F., Romero, R., Kusanovic, J. P., Mazaki-Tovi, S., Pineles, B. L., Erez, O., ... & Hassan, S. S. (2007). The fetal inflammatory response syndrome. *Clinical obstetrics and gynecology*, 50(3), 652-683.
7. Popoola, M. A., Ohaeri, B., Ojo, I. O., & Babarimisa, O. (2023). Preterm Birth, Prevention, Prediction, Care. *European Journal of Medical and Health Sciences*, 5(1), 6-10.
8. Zini, M. E., & Omo-Aghoja, L. O. (2019). Clinical and sociodemographic correlates of preterm deliveries in two tertiary hospitals in southern Nigeria. *Ghana medical journal*, 53(1), 20-28.
9. Gebreslasie, K. (2016). Preterm birth and associated factors among mothers who gave birth in Gondar town health institutions. *Advances in Nursing*, 2016.
10. Olsen, S. F., Secher, N. J., Tabor, A., Weber, T., Walker, J. J., & Gluud, C. (2000). Randomised clinical trials of fish oil supplementation in high risk pregnancies. *BJOG: An International Journal of Obstetrics & Gynaecology*, 107(3), 382-395.
11. Rundell, K., & Panchal, B. (2017). Preterm labor: prevention and management. *American family physician*, 95(6), 366-372.
12. Hassan, S. S., Romero, R., Vidyadhari, D., Fusey, S., Baxter, J. K., Khandelwal, M., ... & Pregnant trial. (2011). Vaginal progesterone reduces the rate of preterm birth in women with a sonographic short cervix: a multicenter, randomized, double-blind, placebo-controlled trial. *Ultrasound in Obstetrics & Gynecology*, 38(1), 18-31.
13. Shirodkar, V. N. (1955). A new method of operative treatment for habitual abortions in the second trimester of pregnancy. *Antiseptic*, 52, 299-300.

14. Gete, D. G., Waller, M., & Mishra, G. D. (2020). Effects of maternal diets on preterm birth and low birth weight: a systematic review. *British Journal of Nutrition*, 123(4), 446-461.

#### **CITATION OF THIS ARTICLE**

R.P. Patange, Anjali Patil, Supriya Patil. An Update On The Risk Of Preterm Birth.. *Bull. Env. Pharmacol. Life Sci.*, Spl Issue [2]: 2023: 318-323.