Preterm Birth, Prevention, Prediction, Care

Monisola A. Popoola, Beatrice Ohaeri, Iyanuoluwa O. Ojo, and Oluwatoyin Babarimisa

ABSTRACT

Preterm delivery is defined by the World Health Organization (WHO) as occurring before 37 weeks of pregnancy or in less than 259 days following the start of a woman's last menstrual cycle. The mortality rate for children under the age of five is extremely concerning. Prematurity is the leading cause of death before the age of five around the world, and even when exceptional medical care is provided, children who survive still face long-term physical, developmental, neurological, and cognitive problems. According to the World Health Organization, 15 million babies are born prematurely each year, at least three weeks before their due dates. The top obstetricians, neonatologists, geneticists, microbiologists, immunologists, epidemiologists, health policy specialists, and bioengineers at Stanford are still conducting research to learn the main reason or causes of preterm delivery as well as the science of preterm birth.

This article reviewed how preterm birth occurs and the risk factors in pregnant women. The conclusion of the review may eventually help experts to detect and reduce preterm deliveries, giving more kids a safe arrival and a healthy start in life.

Keywords: Birth, contraction, newborn, neonate, nulliparity, primiparity, pregnancy, prematurity.

I. INTRODUCTION

Preterm delivery, commonly referred to as premature birth, is the birth of a child before 37 weeks of gestation, as opposed to full-term delivery, which typically occurs at around 40 weeks [1]. A premature birth is one that occurs before 37 weeks of pregnancy. It is divided into three categories: very early premature birth, that happens prior to 32 weeks’ gestation, early premature birth, that also happens between 32 and 36 weeks’ pregnancy and birth, late premature birth, which exists approximately 34 and 36 weeks’ pregnancy and birth, and early-term birth, which is delivered at 37 to 38 weeks’ gestation. Premature babies are those who arrive before 37 full weeks of pregnancy, as measured from the last menstrual cycle [2].

- Early delivery has significant financial repercussions [3].
- Preterm birth prevalence is estimated by the World Health Organization to range from 5% to 18% among 184 countries.
- Countries with highest numbers of preterm birth are India, China, and Nigeria.
- In Africa, precisely in Kenya, study shows that the rate of preterm birth was 18.3% in the National hospital in Nairobi [4].

A recent research show that mothers above 35 years who are rural dwellers and those with low haemoglobin level, as well as multigravida women who had less than four antenatal visits were more susceptible to preterm birth [5].

Studies revealed that women with some health challenges and whose age were less than 25 years have least one medical disorder during pregnancy. These ranged from maternal HIV infection and pregnancy induced hypertension. Early rupture of membrane from maternal with HIV infection and hypertension during pregnancy were factors found to have considerable relationship with unplanned preterm delivery [6], [7].

In another work conducted, it was revealed and concluded that spontaneous preterm birth is an issue that global attention. Factors such as being single, low education, low family income occasional alcoholic drink, and fewer antenatal visits were associated with preterm birth [6]. However, women who booked antenatal visits earlier than 20 weeks were less susceptible to preterm delivery.

A study conducted by [8] to ascertain the prevalence and risk factors for preterm delivery at Kenyatta National Hospital, in Nairobi, Kenya, the results showed the prevalence of preterm delivery in Kenyatta National Hospital was 18.3% maternal age 20 years parity >4, twin gestation, maternal urinary infections, pregnancy-induced hypertension, antepartum hemorrhage, and prolonged premature rupture of membranes were significantly associated with preterm delivery.

Furthermore, data from a retrospective study conducted by [7] to identify risk factors for preterm births at the Lagos University teaching hospital revealed that 16.8% of singleton live births occurred before 37 weeks, 4.5% before 32 weeks, and 7.7% after 34 weeks (35-36 weeks) preterm delivery. Hypertension (odd ratio =3.44) and older maternal
age (>35 years) Membrane rupture (4.03) was substantially linked to a higher probability of preterm delivery. Preterm birth risk was greatly decreased for women undergoing medication to prevent HIV from being passed from mother to child (0.70). An increased risk of all types of premature birth, including early (20.8), moderate (8.68), and late births is present in the 16% of this cohort who were not registered in the LUTH (2.15).

Preterm delivery was 16% in prospective case-control research conducted in central hospital Warri and Delta state University teaching hospital Oghara to determine the prevalence of preterm birth and identify the associated risk variables. Preterm birth was substantially correlated with maternal age (p=0.002), parity (p=0.00), booking status (p=0.000), and socioeconomic class (p=0.000). Other conditions included multiple pregnancies (p=0.000), pre-eclampsia/eclampsia, anemia (p=0.000), and malaria (p=0.000) UTI (was zero for extreme preterm neonate and 100% at late preterm) [9].

Preterm births contribute 40 to 60 percent of all perinatal deaths in Nigeria. Extremely preterm births account for 52 percent of preterm births by gestational age (less than 28 weeks), while 32 to 36 weeks account for 85.3% (moderate to late preterm) [10].

A study was also conducted in 2016 at the Lagos University Teaching Hospital to identify risk factors for preterm birth. The findings showed that high blood pressure during pregnancy, early membrane rupture, and high-risk moms were predictive variables for preterm labor and delivery. Globally about 15 million preterm babies are born each year [10].

Currently, over 871,000 of them are born in Nigeria, accounting for 11% of our yearly births. 1853 babies were born in the labor ward of the UCH in Ibadan, according to statistics (Dr. Tongo, 2021). In the previous five years, there have been an average of 15 to 35 premature births per month at the UCH. Now, a noteworthy case is that of Baby A, who was born at 25 weeks gestational age and was hospitalized due to preterm. Baby A was successfully nursed and sent home at 34 weeks weighing 1.5 kg. Lists of care provided from birth through discharge, which include the followings, were credited with the success story.

- Clearance of the airways immediately after birth
- Provision of adequate warmth after delivery
- Maintenance of hand hygiene in care
- Immediate transfer of baby to intensive care unit
- Maintenance of the optimal temperature while nursing the infant beneath a radiant warmer
- Administration of Low-dose oxygen to prevent retinal damage
- Adequate and prompt feeding
- Administration of parenteral antibiotics
- Appropriate lodging through kangaroo mother care

II. PREVENTIVE MEASURES FOR PRETERM BIRTH

A. Antenatal Visits

For a successful pregnancy and to address the growing issue of preterm delivery, it is crucial to attend an antenatal clinic for at least 4 sessions. According to research, women who obtain antenatal care services before giving birth are less likely to give birth prematurely than those who do not. Around 80% of prenatal treatment is covered worldwide (at least one visit), with coverage levels declining to roughly 50% for four or more visits [9]. With coverage percentages of four or more antenatal care visits averaging around 40% for the least developed nations, coverage inequities are persistent.

Prenatal visits are an ideal opportunity to identify high risk mothers and provide immediate care to all pregnant women because many nations throughout the world record high coverage levels of antenatal care. Identifying pregnant women at high risk of preterm birth, screening for and treating sexually transmitted diseases like HIV and other infections like tuberculosis, malaria, bacterial vaginosis, and bacteriuria, detecting and addressing malnutrition, counseling on nutrition and multiple micronutrient supplementation, and counseling on birth preparation are just a few of the fundamental services that can be provided during antenatal care with a potential impact on lowering preterm birth rates, as well as behavioral and social support measures including interventions to discourage smoking and measures to stop violence against women [11].

B. Screening of Low-risk Women

In order to lower the rate of preterm birth, women could be examined and treatment for asymptomatic bacteriuria and pylonephritis could be started. The best screening and treatment methods to avoid preterm birth are not yet clearly defined, so additional study is required.

There has been a lot of research on routine bacterial vaginosis testing and treatment to prevent premature birth. Antimicrobial therapy can completely cure bacterial vaginosis, however meta-analyses and reviews have demonstrated that this medication has no effect on the likelihood of preterm birth in women at low risk, hence it is not advised.

Prenatal care can identify women who are more likely to give birth prematurely based on their obstetric history (for instance, a known uterine or cervical abnormality or prior pregnancies). Preterm delivery, pre-existing problems (such as chronic diseases) or displaying pregnancy-related symptoms (such as hypertension, diabetes, multiple gestations, or bleeding) [12].

C. Nutritional Supplements

On the basis of low incidence of preterm birth in populations with a high dietary consumption, studies of supplementary omega-3 polyunsaturated fatty acids have been conducted. The proposed mechanism is that omega-3 polyunsaturated fatty acids lower pro-inflammatory cytokine concentrations. A randomized trial of omega-3 supplements conducted in women at risk of preterm delivery revealed a 50% decrease in preterm birth rate, and dietary supplementation with omega-3 polyunsaturated fatty acids has been linked to decreased production of inflammatory mediators.

In a later randomised trial of fish oil supplementation, the rate of recurrent preterm birth was found to be lower (RR 0.54; 95% CI 0.30–0.98) [13].

DOI: http://dx.doi.org/10.24018/ejmed.2023.5.1.1441

Vol 5 | Issue 1 | January 2023
D. Improved Care for Women at Risk

More intense prenatal care, including social support, home visits, and education, has not decreased the likelihood of preterm birth in other women, although maybe being useful in teenagers.

E. Progesterone

It has been demonstrated that giving progesterone to high-risk women with a history of preterm delivery helps to prolong pregnancy, reduce the prevalence of low birth weight, and prevent future preterm births in these women. In two trials of progesterone supplementation, which included weekly intramuscular injections of 250 mg of 17-20 hydroxyprogesterone caproate and daily vaginal progesterone, the risk of preterm birth was lowered by nearly one-third [14]. According to meta-analyses, there was a 40–55% reduction in the incidence of recurrent preterm birth (RR 0.58, 95% CI 0.48–0.70 and 0.45, 0.25-0.80) [15].

The benefits of progesterone have not been consistently seen in all populations at risk. A randomized, placebo-controlled trial found that 17-hydroxyprogesterone caproate had no effect on the rate of preterm birth in 600 women carrying twins, in contrast to a placebo-controlled trial that found that women receiving vaginal progesterone had a lower rate of preterm birth in 250 women with short cervixes [16].

Current recommendations and expert opinion advise giving vaginal progesterone to women who are carrying singletons and have short cervical lengths in order to decrease preterm birth and perinatal morbidity and mortality.

F. Cervical Cerclage

A suture is wrapped around the cervix during a surgical technique called a "cervical cerclage" to stop it from opening prematurely. It also goes by the name Shirodkar [16].

III. NEW TRENDS IN THE PREVENTION OF PRETERM BIRTH

It is crucial for a pregnant woman to abstain from using drugs on the street and abusing prescription medications in order for her pregnancy to be carried to term. She should also avoid smoking tobacco, using cigarettes, and being around smoke. Eating a balanced diet that contains both iron and folic acid is crucial. Nigerian mothers should also strive to stay away from violent situations and hard jobs because they frequently result in premature labour, and birth. Prior to becoming pregnant, a diet high in traditional vegetables like broccoli, cabbage, and green beans may help lower the chance of preterm birth [17].

Traditional vegetables have also been found to be high in antioxidants or anti-inflammatory elements, both of which have a significant role in lowering the risk of premature birth [14].

Additionally, pregnant women should make an effort to improve their marriages and develop positive interpersonal relationships.

They should also aim to strike a balance between work and rest in order to reduce their stress. Waiting for healthy infants is worthwhile.

A. Management of Preterm Delivery

According to [15], premature birth can be controlled by doing the following.

1) Corticosteroid Therapy

Corticosteroid usage is linked to lower newborn morbidity and mortality rates. When compared to infants whose mothers did not get antenatal corticosteroids, those whose mothers did have a lower risk of respiratory distress syndrome, intra ventricular hemorrhage, and necrotizing entero colitis. A single course of corticosteroids is the sole treatment available after preterm labor is identified and proven to be present in order to improve infant outcomes. When a woman is expected to give birth within seven days, regardless of the condition of her membranes, betamethasone, two 12 mg doses administered intramuscularly 24 hours apart, or dexamethasone, four 6-mg doses administered intramuscularly every 12 hours, are advised between 24 and 34 weeks of gestation.

2) Magnesium Sulfate

Because of its neuroprotective impact, prenatal magnesium sulfate administration has been linked to a reduction in the frequency and severity of cerebral palsy in babies.

3) Tocolysis

Nonsteroidal anti-inflammatory drugs, calcium channel blockers, beta mimetics, and atosiban [a receptor antagonist for vasopressin] are some of the pharmaceuticals that may be helpful in postponing delivery. This period of time may be long enough to allow the pregnant lady to be sent to a facility that manages preterm births and provide corticosteroids to lessen newborn organ immaturity. Tocolytic drugs so delay delivery so that prenatal corticosteroids and maybe magnesium sulfate can be given, and the woman can be sent to a tertiary care center with a newborn critical care unit.

4) Antibiotics

Given that intrauterine bacterial infections are linked to preterm labor, particularly before 32 weeks' gestation, routine antibiotic administration to all pregnant women at risk for preterm labor lowers the baby's risk of contracting group B streptococcus infection and has been shown to lower related mortality rates. Obstetrical management monitors for the onset of labor and indications of infection when membranes burst early. When the membranes break before 34 weeks, prophylactic antibiotic therapy prolongs pregnancy and reduces newborn morbidity. Amoxicillin or erythromycin have been advised due to worries about necrotizing enterocolitis, but not amoxicillin + clavulanic acid (co-amoxiclav).

IV. RECOMMENDATIONS

Based on the foregoing review the following recommendation are drawn

- Pregnant women shouldn't take illicit substances and shouldn't abuse prescription medications.
- It's important to encourage and advise pregnant women to eat a balanced diet or items rich in iron and folic acid.
A pregnant woman should stay out of alcohol, tobacco, smoking, e-cigarettes, and secondhand smoke.

Referrals to tertiary centers for prenatal care should be made for all high-risk pregnancies in order to considerably lower negative birth outcomes, such as preterm births.

Social marketing strategies that emphasize the need for early, targeted antenatal care and are directed at young people who plan to have children will be an effective tactic to lower the number of complex non-booked moms and premature newborns.

V. IMPLICATIONS TO NURSING RESEARCH AND EDUCATION

- Despite receiving high-quality obstetric treatment, the rate of preterm birth has been rising.

- Regardless of the fact that PTB cannot always be prevented, neonatal nurses frequently interact with mothers who have a history of the condition and are therefore at risk. Prenatal care can identify and reduce maternal risk factors, as well as promote optimum health prior to conception.

- The Institute of Medicine defines quality prenatal care as ongoing risk assessment, health promotion, and intervention to reduce medical and psychological risk.

- Prenatal care from a specialist in maternal and fetal medicine is necessary for women who are at high risk of PTB.

- Women should be familiar with the typical non-obvious symptoms of PT labour to be able to identify symptoms and seek treatment as soon as possible.

- Women at high risk can make wise decisions regarding future pregnancies and curtailments with the help of neonatal nurses, who can give them vital information and proactive assistance.

- It is our responsibility to emphasize the importance of public education efforts by the government to educate people about premature delivery and its long-term effects.

VI. CONCLUSIONS

Premature birth prevention and reduction are significant objectives for governments and medical practitioners everywhere. The best method to assure lasting health advantages and give babies the best start in life is to prevent premature delivery. We have a responsibility to promote healthy lifestyles. In order to further prevent multiple premature births, healthcare professionals, especially nurses, must persuade their peers in the health sector to only utilize ART techniques when necessary and to execute single-embryo transfers in cases of in vitro fertilization. In order to reduce the frequency of premature deliveries brought on by curtailments, they should also convince their colleagues to implement a more conservative strategy in cases of abortion or nonviable pregnancies. It is our responsibility to emphasize the importance of public education efforts by the government to educate people about premature delivery and its long-term effects. To ensure that newborns have the best start in life, we must compel fundraisers to contribute to research on how to stop premature deliveries.

CONFLICT OF INTEREST

Authors declare that they do not have any conflict of interest.

REFERENCES


[33] Mayor S. Antibiotics are recommended in preterm labour to stop group B streptococcal transmission. BMJ. 2017; 358.


