PERINATAL PERIOD AND MATERNAL RISK FACTORS

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1. DEFINITION OF PERINATAL PERIOD

The World Health Organization and the Society of Obstetricians and Gynaecologists of Canada (SOGC) define the perinatal period from 22 weeks of gestation to 7 days after birth.

Inadequate maternal care in developing countries leads to high risks for mothers and children; possibly causes birth complications for mothers and newborns such as: Hypoxic-ischemic Encephalopathy (HIE), hypoglycemia, indirect hyperbilirubinemia, and severe infections...

2. HOW DOES THE PERINATAL ENVIRONMENT AFFECT THE NEWBORN?

The fetus is completely dependent on the environment in the mother's womb for respiration, nutrition, closely related to the mother's metabolism, circulation and environmental factors affecting the mother.

In particular, newborns are not able to adapt and change to suit their surroundings or stresses of their mothers. Therefore, if mothers have psychological trauma, the illness may affect during pregnancy and even after birth. High-risk mothers have a marked effect on the fetus, hence regular prenatal care is routine.

The key point in prenatal care is to detect possible problems at birth so that preventive measures or prompt intervention can be taken.

Following up the newborns after birth is also very important to be able to support them when needed.

In the perinatal period, the relationship between mother and child through the placenta is key, so providing adequate nutrition and oxygen through the placenta is essential and to achieve that, the mother's nutritional source must be ensured. Firstly, the placenta secretes endocrine hormones that change the mother's metabolism, especially increase the metabolism of glucose and amino acids passed to the fetus, especially in the second half of pregnancy. The placenta then transports essential nutrients from the mother through the fetal circulation and vice versa carries waste products back to the mother's system.

This is the only route from the fetus to the mother.

Fetal respiration also depends entirely on the function of the placenta, O_2 and CO_2 through the placental membrane by diffusing the ratio of maternal PO_2, PCO_2. The placenta is the mediator for transporting nutrients from mother to fetus, and mother isa reserve. The mother-fetus metabolism is completely dependent on the maternal circulation, the effect of which is due to the maternal cardiovascular system and placental perfusion and function. The placenta may not grow under the influence of ethanol that reduces or interrupts the placenta's perfusion, causing the placenta to become small, broken and abnormal placental functions. Maternal nutrition and illness also affect the size of the placenta and its transport function.

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3. FACTORS FROM THE MOTHER'S SIDE

In developing countries where pregnant mothers do not have adequate access to health services, chronic maternal diseases leading to complications during pregnancy often go undetected. Most commonly, it can lead to premature birth, or some diseases that are left untreated can lead to a delay in the child's psychomotor development. It is necessary to perform maternal screening, including:

Babies of diabetic mothers: often associated with fetal macrosomia due to hyperinsulinemia, high risk of asphyxia, hypoglycemia and untreated mothers may havestillbirth. The rate of maternal and fetal diabetes increases worldwide, 2-7% of pregnant mothers in the US have diabetes.

Maternal thyroid disease: also affects the fetus. The fetus is completely dependent on T3 and T4 concentrations in the first trimester of pregnancy. At 8-10 weeks, the fetal thyroid begins to accumulate iodine and T4. From the 4th month, the fetus is completely independent of the mother's condition. Around 24 weeks of gestation, Abs TSH, TSIs receptors cross the placenta and stimulate the fetal thyroid gland, and iodine is transported to the fetus through the placenta. Maternal thyroid hormone plays an important role in fetal neurodevelopment during the first trimester. If the mother has hypothyroidism, she needs to receive areplacement therapy. It will be well absorbed by the fetus and thus reduce the risk to the baby. Maternal iodine deficiency will directly affect the fetus and can be the cause of stillbirth.

Phenylketonuria (PKU) is a recessive genetic disease belonging to the group of monogenic inherited diseases caused by a deficiency of enzyme phenylalanine hydroxylase, babies often have low birth weight, possiblyassociated with heart defects,…If not treated early, they will have nerve damage, causing cerebral palsy, retardation of mental and motor development. Mothers with this disease need to adhere to the diet, ensure that the blood phenylalanine level is within the range of 2-8 mg/dL before 3 months of pregnancy and throughout the pregnancy.

Maternal kidney disease: during pregnancy, the mother's kidney function changes very early with an increase in renal perfusion from 35-60% in the first trimester of pregnancy and gradual decrease from the 4th month until delivery. These changes include an increase in glomerular filtration rate, increasein perfusion and decrease in renal vascular resistance and stimulation of the renin-angiotensin-aldosterone system.

Kidney damage is often caused by urinary tract infections, glomerulonephritis and high blood pressure. The most common complication is preeclampsia. Acute renal failure in pregnant women can lead to maternal and fetal death.

Maternal neurological diseases: Maternal pregnancy may be a predisposing factor for the underlying neurological diseases or a combination. In terms of physiology during pregnancy, hormonal changes can affect pre-existing chronic neuromuscular disorders such as epilepsy, multiple sclerosis of the nervous system, etc. These diseases can lead to high risks for fetuses and newborns,increase rates of miscarriage, premature birth, growth retardation for gestational age and birth defects. Babies of mothers taking anticonvulsants may have respiratory depression, myotonusdecrease, tremor, hyperventilation, possibly coagulopathy and hemorrhage.

Maternal multiple sclerosis: there are often myelin foci scattering throughout the white matter of the central nervous system, is an autoimmune disease of T-cells of the nervous system. Babies of these mothers have a high risk of birth defects, low birth weight and perinatal care, it is necessary to pay attention to the mothers' ability to raise babies on their own to prevent risks to the child's safety.

Maternal lupus: **is an autoimmune disease, affecting many organs, mothers can have kidney failure, increasing the risk of preeclampsia, miscarriage, stillbirth, premature birth and intrauterine growth retardation. Affecting fetal heart rate is often slow, it is likely to atrioventricular block, it is necessaryto put pacemaker immediately after birth.**

Maternal heart disease: **During pregnancy, circulatory function changes, blood volume increases, red blood cells increase, heart rate increases output, systemic vascular resistance decreases, these changes lead to increase in uterine perfusion, increase oxygen supply to the fetus. When the mother has heart disease, the above changes increase the burden on the heart and reduce perfusion of the fetus and especially the fetus will be affected by the mother's medications.**

Maternal respiratory disease: **During pregnancy, the mother's respiratory function changes to adapt to decrease in lung volume and increase in oxygen reserve, increase inair ventilation and respiratory rate. When respiratory function decreases, the fetus is deprived of oxygen. One of the diseases that most often affects the fetus is asthma. The more severe the mother's disease is, the greater the impact on the fetus is with the risks of low birth weight, premature birth and cesarean section.**

Maternal pulmonary cystic fibrosis also poses risks to the baby, intrauterine growth retardation, stillbirth, premature birth, etc., due to maternal genetics and infections.

Mother's actions: smoking, inhalation of cocaine, alcohol drink:

Maternal smoking: **can lead to maternal malnutrition, anemia, high risk to the baby due to poor placental perfusion, placental vascular spasm, increase in levels of nicotine, carbon monoxide leading to chronic hypoxia in the fetus,intrauterine growth retardation. It is necessary to advise the mother to stop smoking in the first 3 months of pregnancy and the baby can develop normally.**

Maternal alcohol addiction: **high risk of growth retardation, miscarriage, stillbirth, facial deformities, neurological dysfunction and other malformations. Fetal alcohol syndrome (FAS) usually manifests as: asphyxia, growth retardation, abnormal facial features, low chin, low nose, thin upper lip, jaw hypoplasia, heart, nerve, ear defects, etc. babiesmaysuffer from convulsion, difficulty in swallowing, abnormal movement, long-term effects on babies later.**

Maternl cocaineaddiction: **the cocaine stimulates the nervous system to increase vasoconstriction, rapid breathing and hypertension in both mother and fetus. Babies often have growth retardation, small head circumference, reproductive system abnormalities, placental damage, stillbirth, respiratory failure, and neonatal abstinence syndrome (NAS) which shows that babies are always irritable and have digestive dysfunction cerebral infarction,...**

Maternal nutrition: **Adequate nutrition should be provided during pregnancy as recommended by WHO. Maternal malnutrition directly affects the fetus, babies are at risk of low birth weight,and suffer from many complications at birth. Obese mothers BMI>40 are prone to high blood pressure, diabetes, cardiovascular disease, risk of amniotic fluid inflammation, stillbirth, eclampsia, postpartum bleeding,... Babies are at risk of large fetus, asphyxia, meconium aspirationand antenatal asphyxia.**

4. RISKS IN THE PERINATAL PERIOD AFFECTING GIVING BIRTH

High blood pressure (pre-eclampsia or eclampsia) is the cause of serious illness with long-term consequences. Babies can suffer from neurological sequelae. Pre-eclampsia can lead to poor nutrition and risk of premature birth.

Infection: STDs, streptococcus B: cause of early neonatal infection and increased perinatal mortality.

Trauma: at birth, it is common with large fetus, maternal obesity, breech presentation, mother's pelvic abnormalities or episiotomy at birth.... Birth trauma is not a common cause, but with intraventricular hemorrhage, the likelihood of sequelae is high. Some peripheral nerve injuries such as brachial plexus paralysis, etc. can heal but take a long time.

Obstetric complications

Bleeding during pregnancy: it occurs in the 2nd stage of pregnancy, may lead to premature rupture of membranes, premature birth, low birth weight,placenta previa, premature rupture of membranes, low lying, placental anomaly, eclampsia, HELLP syndrome (Hemolysis, Elevated, Liver enzymes,low platelets), abnormal kidney function can cause maternal bleeding and high risk offetal anemia, asphyxia.

Perinatal infection

STIs: Herpes infection often lead to neurological sequelae. If mothers infected with gonorrhea are not treated, up to 30-50% ofbabies from these mothers will have gonorrhea, 30% of babieswhose mothers have chlamydia is one of the causes of blindness later in life if not treated early. About 1000-4000 born babies every year in the world have mug because of the above reasons.

Mother-to-fetus infection during pregnancy and at birth through the genital tract is a cause of early neonatal sepsis and an increased risk of mortality in developing countries.

B-hemolytic streptococcal infection is estimated at 0-3.06/1000 live birth-giving case in developing countries. GBS infection often leaves sequelae of convulsion, mental retardation, deafness, cerebral palsy, etc. It is necessary to screen for risk in mothers with antenatal fever, premature birth <35 weeks, rupture of membranes >18 hours and chorioamnionitis.

Listeria infection is often caused by the mother's diet of undercooked, unclean food. The mother can be infected with influenza, viruses during pregnancy, which can lead to neonatal infection, meningitis and sequelae. This rate is often high in Latin American countries due to eating unclean food.

Premature birth

Premature birth (<37 gestational age) is a global problem. Risk factors for premature birth include: urinary system abnormalities, placental bleeding, maternal addiction, chronic maternal disease, high blood pressure, amniotic membranes, premature rupture of membranes and genital tract infections. Multiple pregnancy is also one of the causes of a high rate of complications during pregnancy and childbirth.

Every year, about 15 million babies are born prematurely worldwide, one in 10 prematurely born babies. Over 60% of prematurely born babies in African and South Asian countries, the poorerit is, the higher the risk is.

Corticosteroids should be used for pregnant women from 24-34 weeks who are at risk of premature birth. Dose: it is needed to use 2 doses of betamethasone 12mg/IM/24hrs or 4 doses of dexamethasone 6mg/IM/12hrs/time.

10 countries with the highest number of premature birth cases in 2010	
India	3 519 100
China	1 172 300
Nigeria	773 600
Pakistan	748 100
Indonesia	675 700
United States of America	517 400
Bangladesh	424 100
The Philippines	348 900
The Democratic Republic of the Congo	341 400
Brazil	279 300

Risks from birth to the fetus:

Uterine contraction: strong uterine contraction reduces fetal perfusion, affecting O_2 exchange across the placenta.

Antenatal care, inadequate immunization, uncontrolled maternal genital infections... are the causes affecting the abnormal development of prematurely born babies.

5. WHEN IS IT NECESSARY TO SCREEN FOR INFECTION IN PREGNANT WOMEN?

Consider when the mother has the following signs:

- **Fever**
- **Redness**
- **Stomachache**
- **Malaria**
- **Vomiting, diarrhea**
- **Vaginal discharge with a foul odor**
- **Less urination**
- **Athritis**

The sequelae of babies later and especially in the neonatal period are heavily influenced by the perinatal period due to inadequate prenatal care, not detected for prompt prevention and treatment. Perinatal care should be well organized for mothers at high risk and should be screened before birth and early detection of babies at risk for intervention.

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