

Taking Preventive Strategies Reduces the Risks from Pregnancy to Childbirth

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Abstract

Pregnancy is a felicitic period, but also is a sophisticated and dynamic process, which could be very taxing on the mother's body. Although pregnancy is only a temporary condition, it can have lasting effects on the health of maternal and child. The purpose of this paper is to review the high-risks from pregnancy to childbirth and provide preventive strategies from planning for pregnancy to childbirth. Understanding this knowledge will help you to reduce maternal complications and promote the health of fetuses and newborns.

Key words

pregnancy and childbirth, the risks, preventive strategies, obstetrics and gynecology.

Introduction

Pregnancy and childbirth are physiological phenomena and cannot be called diseases. However, during this period, pregnant women's metabolic, immune, cardiovascular and renal systems will change greatly, causing a variety of complications easily, and even cause death. pregnant women from embryo development to delivery will be faced with all aspects of challenges, in order to ensure the

safety of pregnant women and the fetus, they must be in the pre-pregnancy preparation to understand the necessary knowledge such as risks and precautions.

The high-risks from pregnancy to childbirth include but not limited to: ectopic pregnancy, pregnancy-related hypertension, pregnancy with heart disease, gestational diabetes, amniotic fluid embolism, placental abruption, the pathogen infection. Above mentioned high-risks would have lasting adverse effects on the health of maternal or infant. Therefore, it is vital and meaningful for the couple to take precautions.

1. The risks from pregnancy to childbirth

1.1 Ectopic pregnancy

Ectopic pregnancy is abnormal, meaning the egg develops outside the uterine cavity¹. It most often occurs in a fallopian tube and sometimes occurs in the ovary, cervix or abdominal cavity¹. If the fertilized egg implants in fallopian tube and continues to grow, resulting in pregnancy abortion or rupture. There's a possibility of massive bleeding in the abdomen.

Ectopic pregnancy, a potentially life-threatening emergency, accounts for 2% of all pregnancies². If you have any symptoms such as severe abdominal or pelvic pain with vaginal bleeding, extreme dizziness or fainting, shoulder pain, you should call for emergency medical help right away². Despite advances in emergency medical care and technology, ectopic pregnancy still causes a tragedy. Owing to the lack of awareness of patients and their families, they did not seek medical treatment in time after the appearance of signs, and were sent to the hospital after massive bleeding and shock, which had lost the rescue time and eventually led to death. In general, ectopic pregnancy as long as early diagnosis and early treatment, can avoid death.

1.2 Pregnancy-related hypertension

Hypertensive disorders of pregnancy are characterized by proteinuria, edema and elevated blood pressure, which is a common obstetric disease, accounting for 5%-10% of all pregnancies, and is the second leading cause of maternal death³. Hypertensive disorders of pregnancy are a serious problem that needs to be recognized and treated immediately and appropriately. It is significant for the pregnant to monitor regular blood pressure.

1.3 Pregnancy complicated with heart disease

Pregnancy and childbirth put a strain on the cardiovascular system, specifically for the mother⁴. Pregnancy complicated with heart disease is a serious complication in obstetrics and is one of the main causes of maternal death. The contraction

of uterus and the whole skeletal muscle makes a large number of blood rush to the heart, causing postpartum circulation of blood volume increase, which is easy to have heart failure and cause heart disease⁵. Clinically, pregnancy is mainly accompanied by rheumatic heart disease, but also congenital, pregnancy-induced high heart disease, perinatal cardiomyopathy, anemic heart disease and so on.

1.4 Gestational diabetes

Pregnancy with diabetes is the most common metabolic disease and can affect up to 25% of women during pregnancy⁶. The incidence of diabetes among pregnant women is still escalating quickly, primarily due to higher obesity rates among the younger demographic, as well as more women delaying pregnancy until later in life⁷. Pregnancy is a sensitive period, due to the physical indicators are significantly different from those during non-pregnancy. Particularly, pregnant and breastfeeding women are the most affected by diabetes. What's more, pregnant women with gestational diabetes are at a higher risk of pregnancy-induced hypertension, miscarriage, urinary tract infections and even breast cancer⁶. Gestational diabetes mellitus may cause symptoms such as excessive amniotic fluid and postpartum hemorrhage. Gestational diabetes mellitus is a very important factor in the production of macrosomia, which is likely to lead to intrauterine growth retardation and low birth weight infants, and increase fetal malformation rate, fetal and neonatal mortality rate and maternal mortality rate⁸.

1.5 Placental abruption

Normally, the placenta is detached from the uterine wall after the fetus delivered and then excreted under the action of uterine contractions. Placental abruption refers to the partial or complete removal of the placenta from the uterine wall in the normal position before the fetus delivered. It is a serious complication of obstetrics, often with acute onset, rapid progression, dangerous and untimely treatment, which can often endanger the lives of mothers and children⁹. Abruption on more than 50% of the placental surface can lead to fetal death, because the placenta provides insufficient oxygen and nutrients. Placental abruption occurs associated with the key factors, such as vascular lesions in pregnant women, abdominal injury, premature rupture of fetal membrane and elevated uterine venous pressure.

The main symptom of mild placental abruption is vaginal bleeding, the amount of bleeding is generally large, dark red color, may be accompanied by mild abdominal pain or abdominal pain is not obvious, and the sign of anemia is not significant. The main symptoms of severe placental abruption are sudden and persistent abdominal pain and/or lumbago and lumbago. The degree varies with the size of the dissection surface and the amount of postplacental blood accumulation. The more blood accumulated the more intense the pain.

1.6 Amniotic fluid embolism

Amniotic fluid embolism (AFE) is a dangerous and life-threatening complication and occurs during delivery or shortly after giving birth. In fact, amniotic fluid enters the maternal blood circulation, the amniotic fluid has fetal fat, epithelial cells and other tangible substances, that can directly block blood vessels, but also as a strong coagulation substance, cause pulmonary embolism, serious hugh and blood coagulation, so that the occurrence of uncontrollable maternal bleeding¹⁰. AFE occurs suddenly and quickly and often without time to rescue. It has three major problems, the first problems are hypoxia and dyspnea; the second problems are hypotension and shock; the third problems are refractory coagulation disorder and DIC (diffuse intravascular coagulation). Owing to the symptoms can be similar to other serious complications during childbirth, AFE is an unpredictable and unpreventable complication of maternity so far¹¹.

1.7 The pathogen infection

The pathogen infection such as bacteria, parasites and viruses may cause fetal malformation, miscarriage, premature delivery and fetal growth restriction¹². The special note is TORCH, which refers to the pathogens that can cause congenital intrauterine infection and perinatal infection. It is a group of pathogenic microorganisms abbreviation of English name. Namely, TORCH infection including toxoplasma, other microorganisms (*Listeria monocytogenes*, *Treponema pallidum*, parvovirus B19, and Zika virus), rubella virus, cytomegalo virus and herpes virus is one of the important factors that seriously harm the health of newborn, resulting in perinatal malformation, multiple organ damage and a series of serious sequelae¹³. There are great differences in the influence of different pathogenic microorganisms on the mother, fetus and infant in different stages of pregnancy. In order to improve eugenics, doctors should make efforts to accurately diagnose whether there is TORCH infection and the degree of infection before birth¹⁴. There is no doubt that prenatal screening of TORCH infection is necessary and significant.

2. Taking preventive strategies

Fetal growth and development are also a complex and dynamic process that is affected by many factors, including the mother's nutrition and physical quality, the environment in the womb, and the hormonal balance between the mother and baby¹⁵. In order to reduce negative effects on maternal or fetal health, the couple must pay special attention to the preventive strategies as followings:

2.1 Treatment of gynecological diseases actively

Getting ready before pregnancy is the basis of pregnancy. If women occur menstrual disorders, irregular cycles or other gynecological diseases before pregnancy, these symptoms can't be ignored. Women must pay attention to therapy these diseases to ensure a smooth pregnancy, avoid to cause

miscarriage, or even premature birth.

2.2 Carrying out eugenics and fertility examination actively

Pre-pregnancy examination may be ignored by researchers. We searched for literatures containing the keywords "eugenics and fertility examination" and "prepregnancy examination" in PubMed, and very little relevant literature was retrieved. "Prevention is greater than treatment", which is also applicable to obstetrics and gynecology.

Both husband and wife should have the awareness of eugenic and fertility examination, preventing of many congenital diseases and improving the quality of human beings. Pre-pregnancy examination items for male eugenics and fertility examination include semen examination, genitourinary system, liver function, chromosomes and blood types. Pre-pregnancy examination items for female eugenics and fertility examination include:

- a. Comprehensive serological testing: Testing liver function, kidney function, lipid, blood sugar, etc. Knowing whether there is diabetes and liver, kidney and other basic diseases before pregnancy.
- b. Gynecological examination: Conducting the cervical cancer scraping, HPV testing and gynecological ultrasound to determine whether there is uterine fibroids, endometriosis, cervical lesions and other diseases affecting pregnancy.
- c. Leucorrhea routine: Examination for vaginal discharge and gynecological diseases, preventing premature delivery, abortion and so on.
- d. Oral examination: Pregnant women's damaged teeth must be extracted. What's more, it is essential to stay the balanced oral microbiome, avoiding pregnancy complications¹⁶.
- e. Chromosomal abnormalities: Venous blood is drawn to check for legacy diseases.
- f. Routine urine tests: Diagnose kidney disease early to prevent overloading during the pregnancy process.

2.3 Eating a healthy diet

Maternal diet is a potentially modifiable risk factor for controlling low birth weight, obesity and chronic disease in childhood. If you are underweight, overweight, or obese, talk with your doctor about ways to reach and maintain a healthy weight before you get pregnant. Achieving and maintaining the healthy weight is a lifestyle that includes healthy eating and regular physical exercise. To be honest, short-term dietary changes is not wise. The nutritional needs of the mother and fetus should be improved. Considering what we know now, it's best to have a diet that consists of whole grains, fruits, vegetables, and certain types of fish¹⁷.

While enhancing nutrition, they should also pay attention to combine the reasonable diet with proper exercise to avoid obesity, because the obese pregnant are more likely to have problems like cardiovascular diseases, high blood pressure, and gestational diabetes¹⁸. Not only does the obese pregnant face adverse outcomes, but her offspring are more likely to have long-term health problems, which could lead to a cycle of obesity and insulin resistance being passed down through the generations. In addition, maternal obesity may raise the risk of health issues in the later generations such as congenital heart¹⁹, obesity, stroke, diabetes, and asthma²⁰.

2.4 Supplementation of folic acid, vitamins and calcium

Not only women should take the folic acid, but men should too, because folic acid supplementation in the first 3 months of pregnancy can effectively prevent the baby from developing neural tube defects in the future²¹. In addition, the couple eat more fresh fruits and vegetables, for men and women who are deficient in calcium should be properly supplemented with calcium, especially women, to ensure that there is no calcium deficiency after pregnancy.

2.5 Getting mentally healthy

Good maternal mental health contributes to the physical and mental health of the baby, as well as to the maternal own physical condition and natural delivery. Maternal psychological problems not only directly affect their own health, but also increase the risk of obstetric and neonatal complications, and affect the mother-child connection, infant health and psychological adaptability. Maternal psychological problems, if not timely intervention, will be a major burden on women, families, health systems and society, and even lead to serious consequences²². There is a need for greater integration of physical and mental healthcare for the mother, which could help women to optimize their health. In a word, it is very significant to adjust the emotions and mentality of the maternal timely.

2.6 Staying a healthy lifestyle

Keeping a healthy lifestyle is an important guarantee to achieve eugenics. Pregnant women must have adequate sleep, reasonable diet to strengthen nutrition and good living environment. Stop drinking alcohol, smoking, and using certain drugs²³. Especially, avoid radiation and risky substances. It is currently recommended that pregnant women get moderate intensity exercise, maintaining a regular exercise at least 30 minutes, 5 days a week²⁴. Of specific note that pregnant women should avoid high impact exercise. Additionally, keeping a healthy lifestyle could lower the risk of postpartum depression. In short, staying a healthy lifestyle is beneficial to the health for the pregnant mother and offspring.

2.7 Consulting obstetrician and gynaecologist regularly

The pregnant mothers should seek their gynaecologist actively, tell their family medical history honestly for the first time,

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and consult their whole doubts and problems. According to their own actual situation, the doctor will help them to develop the customized intervention or program, involving the personalized diet plan, individualized health data, the convenient online communication, intervention measure of education of potential complications and so on. In this way, the doctor could guide pregnant women through the process. To be honest, it is vital to be aware of the changes of the pregnant women and to communicate with the medical professional when needed. The doctor could help pregnant women to solve the problems as soon as possible.

Conclusions and future perspectives

The risks during and after pregnancy are important factors for maternal and infant morbidity and mortality all over the world. Following the guidelines and preventive strategies is helpful for having a healthy baby to some extent. However, millions of newborn and maternal deaths occur globally each year, leading to a great number of families have suffered the pain and torment. Adverse events in obstetrics and gynecology remain a global problem with an overwhelming burden of disease.

Problems in obstetrics and gynecology necessitate cooperative and joint action from governments, medical institution, doctors and individuals. First of all, the government should pay more attention to the area of obstetrics and gynecology and give strong support. Secondly, the hospital should provide more convenient and advanced emergency healthcare facilities to deal with adverse consequences. Thirdly, the doctors should provide advice to expectant mothers, prompt identification of medical conditions and adopt rapid medical intervention. As an individual, pregnant women should follow some preventive strategies positively to have a healthy body and achieve eugenics. In this way, the risk can be greatly reduced by a concerted effort from all sides.

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Conflict of interest

The authors declare that they have no conflict of interest.

References

- Hendriks, E., Rosenberg, R. & Prine, L. Ectopic Pregnancy: Diagnosis and Management. *American Family Physician* 101, 8 (2020).
- Tonick, S. & Conageski, C. Ectopic Pregnancy. *Obstetrics and Gynecology Clinics of North America* 49, 537-549 (2022).
- Wilkerson, R. G., Ogunbodede, A. C. Hypertensive Disorders of Pregnancy. *Emergency Medicine Clinics of North America* 37, 301-316 (2019).
- Parsonage, W. A., Zentner, D., Lust, K. et al. Heart Disease and Pregnancy: The Need for a Twenty-First Century Approach to Care.... *Heart, Lung and Circulation* 30, 45-51 (2021).
- Brown, H. L. & Smith, G. N. Pregnancy Complications, Cardiovascular Risk Factors, and Future Heart Disease. *Obstetrics and Gynecology Clinics of North America* 47, 487-495 (2020).
- Choudhury, A. A. & Devi Rajeswari, V. Gestational Diabetes Mellitus-A Metabolic and Reproductive Disorder. *Biomedicine & Pharmacotherapy* 143, 112183 (2021).
- Sushko, K., Menezes, H. T., Strachan, P. et al. Self-management Education among Women with Pre-existing Diabetes in Pregnancy: A Scoping Review. *International Journal of Nursing Studies* 117, 103883 (2021).
- HAPO Study Cooperative Research Group et al. Hyperglycemia and Adverse Pregnancy Outcomes. *Obstetrical & Gynecological Survey* 63, 615-616 (2008).
- Riihimäki, O., Metsäranta, M., Paavonen, J. et al. Placental Abruption and Child Mortality. *Pediatrics* 142, e20173915 (2018).
- Shamshirsaz, A. A. & Clark, S. L. Amniotic Fluid Embolism. *Obstetrics and Gynecology Clinics of North America* 43, 779-790 (2016).
- Rath, W. H., Hofer, S. & Sinicina, I. Amniotic Fluid Embolism: An Interdisciplinary Challenge: Epidemiology, Diagnosis and Treatment 111,126-132 (2014).
- Adams Waldorf, K. M. & McAdams, R. M. Influence of Infection during Pregnancy on Fetal Development. *Reproduction* 146, R151-R162 (2013).
- Costa, M. L., de Moraes Nobrega, G. & Antolini-Tavares, A. Key Infections in the Placenta. *Obstetrics and Gynecology Clinics of North America* 47, 133-146 (2020).
- Singh, L., Mishra, S., Prasanna, S. et al. Seroprevalence of TORCH Infections in Antenatal and HIV Positive Patient Populations. *Medical Journal Armed Forces India* 71, 135-138 (2015).
- Kawasaki, M., Arata, N., Miyazaki, C. et al. Obesity and

- Abnormal Glucose Tolerance in Offspring of Diabetic Mothers: A Systematic Review and Meta-analysis. *PLoS One* 13, e0190676 (2018).
16. Saadaoui, M., Singh, P. & AlKhodor, S. Oral Microbiome and Pregnancy: A Bidirectional Relationship *Journal of Reproductive Immunology* 145, 103293 (2021).
 17. Lowensohn, R. I., Stadler, D. D. & Naze, C. Current Concepts of Maternal Nutrition. *Obstetrical & Gynecological Survey* 71, 413–426 (2016).
 18. Pfaller, B., Siu, S. C., D'Souza, R. et al. Impact of Obesity on Outcomes of Pregnancy in Women With Heart Disease. *Journal of the American College of Cardiology* 77, 1317–1326 (2021).
 19. Helle, E. & Priest, J. R. Maternal Obesity and Diabetes Mellitus as Risk Factors for Congenital Heart Disease in the Offspring. *Journal of the American Heart Association* 9, e011541 (2020).
 20. Godfrey, K. M., Reynolds, R. M., Prescott, S. L. et al. Influence of Maternal Obesity on the Long-term Health of Offspring. *The Lancet Diabetes & Endocrinology* 5, 53–64 (2017).
 21. Suliburska, J., Chmurzynska, A., Kocylowski, R. et al. Effect of Iron and Folic Acid Supplementation on the Level of Essential and Toxic Elements in Young Women. *IJERPH* 18, 1360 (2021).
 22. Keep mental health in mind. *Nature Medicine* 26,631 (2020).
 23. Banderali, G., Martelli, A., Landi, M. et al. Short and Long Term Health Effects of Parental Tobacco Smoking during Pregnancy and Lactation: a Descriptive Review. *Journal of Translational Medicine* 13, 327 (2015).
 24. Lende, M. & Rijhsinghani, A. Gestational Diabetes: Overview with Emphasis on Medical Management. *International Journal of Environmental Research and Public Health* 17, 9573 (2020).