Preconception counseling for preventable risks

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Abstract

Question A healthy woman of reproductive age complained that when she saw me before pregnancy I did not advise her that she could check her varicella immunity and get vaccinated. She contracted chickenpox and endured unnecessary anxiety. This led me to think that it would be useful to have a summary of all the preconception counseling advice we should give to our patients to ensure the best pregnancy outcomes possible. Could Motherisk provide such a summary?

Answer Although favourable pregnancy outcomes cannot be guaranteed, when a pregnancy is planned, many risk factors can be reduced and modified to enhance pregnancy outcomes. In the summary provided we will discuss optimization of diet, weight, and exercise; discontinuation of smoking and drinking; controlling chronic medical conditions; starting supplementation with multivitamins and folic acid; and ensuring proper immunization.

Engaging in a healthy lifestyle

It is ideal to encourage patients to adopt a healthy lifestyle while they are planning to conceive, as women will have increased motivation to improve their health. They should be encouraged to eat a well-balanced diet as recommended by Health Canada, exercise regularly, stop smoking, avoid alcohol intake, cease illicit drug use, eliminate exposure to environmental toxins, and reduce stress.

Cigarette smoking is known to be associated with decreased fertility and adverse pregnancy outcomes including miscarriage, premature delivery, and low birth weight. Moreover, smoking is associated with increased risk of sudden infant death syndrome. These risks seem to increase in a dose-response manner, with the greatest risk associated with more than 10 cigarettes per day. Recently, evidence of increased risk of oral cleft with maternal smoking has been presented. As smoking is a modifiable risk factor, women should discuss strategies with their doctors to quit smoking. Even decreasing their smoking is an effective mechanism for harm reduction.

Alcohol exposure has not only been found to have a negative effect on pregnancy outcome but it also might lead to fetal alcohol spectrum disorder, which is characterized by prenatal and postnatal growth retardation, facial dysmorphia, microcephaly, developmental delay, and complex behavioural issues. The adverse effects of alcohol consumption appear to be dose-dependent; heavy drinking (more than 10 to 18 g daily) has an increased risk of small size for gestational age, low birth weight, and
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Preterm birth. Although low-to-moderate alcohol consumption does not consistently result in serious adverse effects in many studies, methodologic weaknesses in some of these studies do not allow the authors to conclude that drinking at these levels is safe in pregnancy.

Maternal substance abuse negatively affects both maternal and infant health. Pregnancy complications include increases in sexually transmitted infections, placental abruption, and stunted growth; and increases in central nervous system and autonomic nervous system signs of withdrawal (neonatal abstinence syndrome) or toxicity. Cocaine is significantly associated with preterm birth (odds ratio [OR] 3.38; 95% CI 2.72 to 4.21), low birth weight (OR 3.66; 95% CI 2.90 to 4.63), and small size for gestational age (OR 3.23; 95% CI 2.43 to 4.30).

Numerous environmental toxins, categorized as air pollutants, heavy metals, organic solvents, and pesticides, might increase the risk of low birth weight, intrauterine growth restriction, preterm birth, and birth defects. While total elimination of exposure might not be possible in some situations, efforts should emphasize minimizing the risk. For example, women who consume high amounts of fish should be aware of the adverse effects of methylmercury on fetal brain development. Measurement of mercury in maternal blood or hair can direct dietary changes, if levels are above the toxic threshold.

More and more evidence suggests that psychosocial stress might negatively affect pregnancy outcomes. The results of maternal biological responses to stress, such as elevated cortisol and catecholamine levels, can adversely affect fetal growth and increase the risk of preterm delivery. Therefore, it is important for women with known psychological or psychiatric conditions to seek professional help when planning pregnancy in order to select medications that are safe in pregnancy and address associated unhealthy behaviour such as drinking and smoking.

Optimally managing chronic medical conditions

With many women today postponing starting a family, many already have chronic conditions such as diabetes, rheumatoid arthritis, and epilepsy. In numerous cases, uncontrolled maternal chronic conditions are associated with unfavourable fetal outcomes. It is important to have chronic conditions under control before conceiving, using medications known to be safe for the fetus.

Women who report very severe morning sickness in previous pregnancies are highly likely to have similar experiences in subsequent pregnancies. The option of treating morning sickness pre-emptively should be discussed with such patients.

Maintaining a healthy weight

Obesity before pregnancy increases the risk of subfertility and prolongs the time to pregnancy. Obesity in pregnancy is associated with numerous maternal and perinatal risks including miscarriage, hypertension, preeclampsia, gestational diabetes, deep vein thrombosis, and the need for cesarean section. Moreover, obese women are more likely to give birth to macrosomic babies and babies with congenital anomalies such as neural tube defects. Although less prevalent in Canada, being underweight is associated with intrauterine growth restriction.

Table 1. Preconception interventions for women of reproductive age

<table>
<thead>
<tr>
<th>INTERVENTION</th>
<th>EFFECT</th>
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<tbody>
<tr>
<td>Eat a well-balanced diet</td>
<td>Prevent malnutrition, and obesity and its consequences</td>
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<tr>
<td>Exercise regularly</td>
<td>Prepare body for pregnancy-related changes, prevent obesity and its consequences, reduce stress</td>
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<tr>
<td>Cease smoking</td>
<td>Reduce risk of miscarriage, premature delivery, low birth weight, and sudden infant death syndrome</td>
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<tr>
<td>Avoid alcohol intake</td>
<td>Prevent fetal alcohol spectrum disorder, and reduce risk of small size for gestational age, low birth weight, and preterm birth</td>
</tr>
<tr>
<td>Cease illicit drug use</td>
<td>Reduce risk of sexually transmitted infections and placental abruption</td>
</tr>
<tr>
<td>Minimize environmental toxin exposure</td>
<td>Reduce risk of low birth weight, intrauterine growth restriction, preterm birth, and birth defects</td>
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<tr>
<td>Reduce stress</td>
<td>Reduce risk of preterm delivery and adversely altered fetal growth</td>
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<tr>
<td>Manage chronic medical conditions</td>
<td>Prevent unfavourable outcomes depending on maternal medical conditions</td>
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<tr>
<td>Identify and treat women at risk of severe morning sickness</td>
<td>Reduce risk of severe nausea and vomiting of pregnancy and its consequences</td>
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<tr>
<td>Maintain a healthy weight</td>
<td>Prevent being underweight or overweight, and prevent obesity and its consequences</td>
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<tr>
<td>Take multivitamins and folic acid</td>
<td>Reduce risk of neural tube defects</td>
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<tr>
<td>Get vaccinations</td>
<td>Reduce maternal and perinatal infection</td>
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Multivitamins containing folic acid

Folic acid in combination with multivitamin supplements taken before and during pregnancy has been shown to reduce the risk of neural tube defects and other congenital anomalies. A minimum of 400 µg of folic acid daily is recommended to decrease the risk of neural tube defects, although women at higher risk might need up to 5 mg daily. These include women who have previous children with neural tube defects, women taking antifolate medications, women with diabetes, smokers, and those who have poor compliance with prenatal vitamins. Vitamin A is of special concern, as excess retinol (10 000 IU; 3300 retinol equivalents daily) might result in fetal malformation. In this context, beta-carotene is a preferential form of vitamin A over retinol.

Up-to-date vaccinations

Immunization status should be assessed before getting pregnant, as several vaccine-preventable diseases can harm both the mother and the fetus. In the absence of vaccination or infection history, antibodies can be checked to inform the physician on the need for subsequent vaccination in nonimmune women. Recommended vaccines include measles, mumps, and rubella; varicella; diphtheria, tetanus, and pertussis; and influenza. Rubella or varicella infections in pregnancy might result in serious congenital malformation. If a woman receives these live-attenuated vaccines, she should be advised to avoid conception for at least 4 weeks after vaccination owing to the theoretical risk of live virus reaching the fetus. Vaccination against influenza reduces the risk of complications in the mother if she is infected during pregnancy and provides passive protection to the newborn. The concept of “cocooning” the newborn by vaccinating the mother also applies to pertussis, which has increased in prevalence and has a high morbidity and mortality in newborns. Similarly, the tetanus vaccine substantially reduces the rate of tetanus related to parturition, although this condition is very rare in Canada.

Conclusion

Planning and preparation before starting pregnancy helps manage modifiable risk factors, leading to more favourable pregnancy outcomes.

Competing interests

None declared

References

31. Motherisk Team. Motherisk questions are prepared by the Motherisk Team at the Hospital for Sick Children in Toronto, Ont. Dr Chandranapongse is a pediatrician and a clinical fellow in the Division of Clinical Pharmacology and Toxicology at the Hospital for Sick Children. Dr Koren is Director of the Motherisk Program. Dr Koren is supported by the Research Leadership for Better Pharmacotherapy during Pregnancy and Lactation. He holds the Ivey Chair in Molecular Toxicology in the Department of Medicine at the University of Western Ontario in London.

Do you have questions about the effects of drugs, chemicals, radiation, or infections in women who are pregnant or breastfeeding? We invite you to submit them to the Motherisk Program by fax at 416 813-7562; they will be addressed in future Motherisk Updates. Published Motherisk Updates are available on the Canadian Family Physician website (www.cfp.ca) and also on the Motherisk website (www.motherisk.org).

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