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Folic Acid and the Prevention of Neural Tube Defects

facts on

What is folate?

Folate is one of the B vitamins and is found naturally in foods such as dark green leafy vegetables, citrus fruits, eggs, nuts, and legumes. Folate is very susceptible to excessive heat, with up to 70% being lost during prolonged cooking. Naturally occurring folate is not as easily absorbed in the body as folic acid.

What is folic acid?

Folic acid is the synthetic form of folate. It can be found in fortified breakfast cereals, enriched grain products, supplements, and multivitamins. In Canada, multivitamins with folic acid are available as regular over-the-counter multivitamins with 0.4 - 0.6 mg of folic acid, prenatal over-the-counter multivitamins with 1.0 mg of folic acid, and prescription multivitamins with 5.0 mg of folic acid.

Folic acid and/or folate are essential for the normal development of a baby's brain, spine, and skull and for the prevention of neural tube defects. The effect of folic acid on a baby's development is most significant during the first few weeks of pregnancy.

Can pregnant people and those planning a pregnancy get enough folate from diet alone?

In Canada, it is mandatory for white flour, enriched pasta, and cornmeal to be fortified with folic acid, which has resulted in a significant reduction of neural tube defects. Even when eating fortified foods, it is difficult for most people to consume the recommended level of folic acid from diet alone. Health Canada recommends that in addition to eating a well-balanced diet that includes foods high in folate, people who could become pregnant should take a daily multivitamin containing folic acid.

What are neural tube defects (NTDs)?

NTDs are congenital malformations of the neural tube - the embryonic structure that develops into the brain and spinal cord. Every unborn baby's spine is open when it first forms and normally closes by day 26 to day 28 post-conception. This is before most people know they are pregnant. In the case of an NTD, the backbone and spinal cord never completely close.

The most common NTDs are anencephaly and spina bifida. Anencephaly is a fatal condition in which a baby is born with a severely underdeveloped brain and skull. Spina bifida involves a malformation of the vertebrae and possible damage to the nervous system. The term spina bifida can apply to a variety of conditions that range from relatively minor problems that can be surgically corrected to severe physical disabilities and developmental delays.

What causes NTDs?

The cause of NTDs is largely unknown. Experts believe that the cause is related to genetic, nutritional, and environmental factors. Most NTDs happen in the first four weeks of pregnancy, before many people know they are pregnant.

Can NTDs be prevented?

Studies show that women who consume recommended doses of folic acid can reduce the risk of having a child with an NTD by 50% - 70%. However, it is important to note that not all NTDs can be prevented by maternal intake of folic acid.

Are there tests to detect NTDs?

Maternal blood tests and prenatal ultrasounds can be used to screen for NTDs. These tests pose no risk to the baby and help determine what the chance is that an NTD will be present. If results indicate an increased risk, further tests like amniocentesis will be offered. Because amniocentesis uses a needle to remove a sample of fluid from around the fetus, there are some risks associated with it.

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How much folic acid should be taken to reduce the risk of NTDs?

The amount of folic acid to be taken before and during pregnancy is dependent on a number of maternal and paternal risk factors. The Society of Obstetricians and Gynaecologists of Canada classify the risk of having a fetus with an NTD as low, moderate, or high.

The risk is considered **low** when neither partner has any personal or family history of an NTD or other birth defects related to folic acid. People with a low risk level should take one multivitamin daily containing 0.4 mg of folic acid for at least 2 to 3 months before conception. They should continue taking this multivitamin with 0.4 mg of folic acid for the remainder of pregnancy and for 4 to 6 weeks after delivery or as long as breastfeeding continues.

The risk is considered **moderate** in the following scenarios:

1) either partner has family history of an NTD or other birth defect related to folic acid;
2) woman has type I or type II diabetes;
3) woman is taking medications known to impact metabolism of folic acid;
4) woman has a condition that reduces absorption of folic acid (e.g., Crohn's, celiac disease).

People with moderate risk should take one multivitamin containing 1.0 mg of folic acid for at least 3 months before conception and up until 12 weeks' gestational age. After 12 weeks' gestational age, 0.4 mg - 1.0 mg of folic acid multivitamin supplementation should be taken for the remainder of pregnancy and for 4 to 6 weeks after delivery or as long as breastfeeding continues.

The risk is considered **high** when either of the partners have a personal NTD history or a previous NTD in pregnancy. Those at high risk level should take one multivitamin containing 1.0 mg folic acid as well as three single 1.0 mg folic acid tablets to achieve 4.0 mg of folic acid per day. They should do this for at least 3 months prior to conception and up until 12 weeks' gestational age. After 12 weeks' gestational age, 0.4 mg - 1.0 mg of folic acid multivitamin supplementation should be taken for the remainder of pregnancy and for 4 to 6 weeks after delivery or as long as breastfeeding continues.

Prior to becoming pregnant, individuals should talk with their healthcare provider about their level of risk and the amount of folic acid they should be taking before and during pregnancy. As many pregnancies are unplanned, this applies to all people who could become pregnant. Optimal perinatal intake of folic acid, in the time around pregnancy, is the single most important way to reduce the risk of NTDs.

For information about other important nutrients before and during pregnancy, visit https://skprevention.ca/prenatal-nutrition/.

Select References

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The Saskatchewan Prevention Institute provides services to all those living on Treaty Lands 2, 4, 5, 6, 8, and 10, and the homeland of the Métis. The Saskatchewan Prevention Institute is dedicated to moving forward on a shared path of reconciliation and partnership. We are all Treaty people.

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