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facts on

Folic Acid and the Prevention of Neural Tube Defects

What is folate?
Folate is one of the B vitamins and is found naturally in foods such as leafy green vegetables, citrus fruits, 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, the synthetic form of folate, can be found in fortified breakfast cereals, enriched grain products, and supplements. In Canada, multivitamins with folic acid are usually available in: 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. The effect of folic acid is most significant during the first few weeks of pregnancy.

Can a woman get enough folate from diet alone?
In 1998, the Canadian government made it mandatory for white flour, enriched pasta, and cornmeal to be fortified with folic acid, resulting in a significant reduction of neural tube defects (NTD). Even when consuming fortified foods, it is difficult for most women 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, women 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; often before pregnancy is confirmed. 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 spinal cord and its coverings protrude through openings between the individual bones that make up the backbone, resulting in a bulge or "sac". This can occur anywhere along the back, from the neck to the buttocks, although the majority of the sacs appear on the lower back. 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.

How does an NTD affect a child?
A child born with spina bifida may have permanent paralysis of the lower limbs and may lack bowel and bladder control. An excessive accumulation of spinal fluid in the brain may occur, leading to enlargement of the head and impairment of brain functions.

How many children are born with NTDs?
In Saskatchewan, approximately one out of every thousand babies born is diagnosed with an NTD; that is 10-20 babies born with this condition every year in the province.

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What causes NTDs?
The cause of NTDs is largely unknown. Experts believe that the cause is related to both genetic and environmental factors.

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.

How much folic acid should be taken to reduce the risk of NTDs?
The amount of folic acid a woman should take before and during pregnancy is dependent on a number of maternal and paternal risk factors. The Society of Obstetricians and Gynaecologists of Canada classify women as either low risk, moderate risk, or high risk for having a baby with an NTD.

Women are considered low risk when they and their male partner have no personal or family history of folic acid-sensitive congenital anomalies (limited to specific anomalies). Low-risk women should begin taking one multivitamin daily containing 0.4 mg of folic acid for at least 2 to 3 months before conception. Women should continue taking this multivitamin with 0.4 mg of folic acid throughout the remainder of pregnancy and for 4 to 6 weeks postpartum or as long as breastfeeding continues.

Women are considered moderate risk when they fit any of the following scenarios:
1) family history of an NTD in a woman or her male partner's first or second degree relative;
2) personal positive or family history of other folate sensitive congenital anomalies (limited to specific anomalies) in a woman or her male partner's first or second degree relative;
3) maternal pre-existing diabetes;
4) maternal teratogenic medications; or
5) maternal gastrointestinal malabsorption condition(s).

Moderate-risk women should begin taking one multivitamin containing 1.0 mg of folic acid, at least 3 months before conception and up until 12 weeks' gestational age. The woman should continue taking 0.4 mg - 1.0 mg of folic acid multivitamin supplementation from 12 weeks' gestational age, continuing throughout the remainder of pregnancy and for 4 to 6 weeks postpartum or as long as breastfeeding continues.

Women are considered high risk when they or their male partner have a personal NTD history or a previous NTD in pregnancy. High-risk women should begin taking one multivitamin containing 1.0 mg folic acid as well as three additional 1.0 mg folic acid tablets (containing only folic acid) to achieve 4.0 mg of folic acid for at least 3 months prior to conception and up until 12 weeks' gestational age. A woman's healthcare provider may choose to prescribe her a daily multivitamin containing 5.0 mg of folic acid, depending on her insurance coverage and/or to minimize the number of tablets required to consume daily. Starting at 12 weeks' gestational age, the woman should take 0.4 mg - 1.0 mg of folic acid multivitamin supplementation continuing throughout the remainder of pregnancy and for 4 to 6 weeks postpartum or as long as breastfeeding continues.

Prior to becoming pregnant, women 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 women 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.

Are there tests to detect NTDs?
Prenatal screening tests are offered to detect those at increased risk of having a baby with an NTD. These tests pose no risk to the baby and determine what the chance is that an NTD will be present. Women who receive results that they are at increased risk will be offered the option of having a diagnostic test to confirm if an NTD is present. These tests have some risk associated and will identify almost all NTDs.

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