Wisconsin Association for Perinatal Care

WAPC

POSITION statement

FOLIC ACID: A POSITION STATEMENT FOR PROVIDERS

The purpose of this document is to:

- *Inform providers and consumers about the importance of adequate preconceptional folic acid consumption, 0.4 mg (400 mcg) daily, with respect to its support of healthy birth outcomes; and*
- *Promote incorporating information about folic acid use into health encounters with women of childbearing age.*

Promoting healthy birth outcomes begins with talking with patients about the value of folic acid.

The interaction between provider and patient offers a prime opportunity for both education and communication. This paper focuses on the critical role of providers as the link between the science and value of folic acid consumption and women's knowledge and adequate consumption of folic acid. The paper identifies opportunities in inpatient, outpatient, and community settings to educate people about the link between folic acid and healthy birth outcomes. It also describes what folic acid is, how to consume adequate amounts, and how it affects birth outcomes.

Problem

Each year in the United States, approximately 3,000 pregnancies are affected by neural tube defects (NTDs)*, including spina bifida and anencephaly; some end in miscarriage, stillbirth, or induced abortion (Mersereau et al, 2004). According to the CDC, folic acid consumption, before pregnancy and during the first few weeks of pregnancy, may reduce the incidence of children born with neural tube defects by 30-70% (Centers for Disease Control and Prevention, 1992). Furthermore, folic acid consumption that begins at least three months prior to conception has the optimal effect on reducing the risk for neural tube defects. Consequently, if all women of reproductive age took 400 micrograms (mcg) of folic acid daily, up to 70% of neural tube defects could be prevented. CDC recommendations released in 2006 point to adequate folic acid consumption as important to improving preconception and interconception health overall (Johnson et al, 2006).

In a 2005 telephone survey of women between the ages of 18 and 45 conducted on behalf of the March of Dimes, 84% of women reported they had heard of folic acid. During the same year, only 33% of women reported taking a vitamin supplement containing folic acid on a daily basis. Of all women surveyed, only 9% mentioned taking a multivitamin with folic acid as something they could do to help prevent birth defects, and only 7% knew that folic acid should be started before pregnancy (March of Dimes, 2005).

** Neural tube defects are birth defects of the brain and spine, which result from abnormal closure of the neural tube between the third and fourth week of embryologic development. Neural tube defects include anencephaly (an underdeveloped brain) and spina bifida (an open spine). Babies with spina bifida may have muscle weakness, paralysis, or loss of sensation in the legs and problems with bladder and bowel control.*

U.S. Public Health Service and Institute of Medicine Recommendations

The U.S. Public Health Service recommends that all women of childbearing age who are capable of becoming pregnant should consume 0.4 mg (400 mcg) of folic acid per day for the purpose of reducing their risk of having a pregnancy affected by spina bifida or other NTDs. Because the effects of higher intakes of folic acid are not well known, but include complicating the diagnosis of vitamin B12 deficiency, care should be taken to keep total folate consumption at less than 1 mg per day, except under the supervision of a physician. Women who have had a prior NTD-affected pregnancy are at high risk of having a subsequently affected pregnancy. The current recommendation for these women is that they consume 4 mg of folic acid per day (ten times the usual recommended amount) prior to conception (Centers for Disease Control, 1992).

In 1998, the Institute of Medicine recommended that all women of childbearing potential consume 400 mcg of synthetic folic acid per day from fortified foods and/or a supplement in addition to food folate from a varied diet (Institute of Medicine, 1998).

What is folic acid?

Folic acid is a synthetic B vitamin. Folate, the natural form of folic acid, is found in such foods as citrus fruits and juices, leafy green vegetables, beans, peanuts, broccoli, asparagus, peas, lentils, and whole-grain products. Synthetic folic acid is found in fortified foods and multivitamins. The bioavailability of folate from natural sources is 60%, compared to 100% for synthetic folic acid.

How does folic acid prevent birth defects?

Folic acid is necessary for cell division and is therefore important for healthy fetal and placental development. In addition to preventing neural tube defects, there is preliminary evidence to suggest that periconceptional folic acid use can reduce the risk for other major birth defects, including heart defects, limb abnormalities, facial clefts, and urinary tract abnormalities (Botto et al, 2004). However, it is not clear exactly by what mechanism folic acid prevents birth defects.

Why should women consume synthetic folic acid, in addition to eating foods rich in folate?

Folate and folic acid may come from natural sources, from fortified foods, or in vitamin pill form. Most women in the United States do not obtain adequate folate from natural sources. While eating foods rich in folate should be encouraged, neither natural intake nor fortified food sources are sufficient. Recent studies estimate that fortification assures a 200 mcg increase in folic acid consumption; however, this is only one half of the recommended amount (Quinlivan & Gregory, 2003). Women who are capable of becoming pregnant should consume the recommended amount of folic acid in a synthetic form through a daily vitamin as well as through foods fortified with folic acid. A multivitamin is a more reliable way to assure consumption of the recommended intake of 400 mcg of folic acid.

The impact of fortification

In 1998, United States Food and Drug Administration (FDA) regulations went into effect requiring the addition of folic acid to several enriched grain products. Although grain fortification has improved the folate intake of the general American population, the present level of fortification is inadequate in itself to prevent many NTDs. Even with grain fortification, substantial variations in folate intake based on age, gender, and race/ethnicity persist (Bentley et al, 2006).

Since fortification began, the prevalence of spina bifida in the United States has decreased by 31% while the prevalence of anencephaly has decreased by 16% (Williams et al, 2002). Significant decreases in birth defects other than neural tube defects have also been found. Since fortification began, decreases in birth prevalence for transposition of the great arteries (12%), cleft palate only (12%), pyloric stenosis (5%), upper limb reduction defects (11%), omphalocele (21%), renal agenesis (28%), obstructive genitourinary defects (12%), and Down syndrome (7%) have been documented (Canfield et al, 2005). The magnitude of these improvements varies among different races and ethnic groups (Williams et al, 2005). While fortification appears to be effective in reducing NTDs, which of these other birth defects showing modest reduction are causally linked to folic acid intake remains uncertain (Botto et al, 2006).

The recommendation for synthetic folic acid is based on three factors:

1. Dietary folate intake is insufficient for almost all women,
2. Bioavailability of food folate is 60% compared to 100% for synthetic folic acid, and
3. Food processing and preparation may destroy over half of the folate in food.

Solution

In addition to formal preconception and pregnancy planning visits, each provider-patient interaction offers an opportunity to educate women and their families about the benefits of folic acid and the need for supplementation. Opportunities for education about the health benefits of folic acid exist in outpatient, hospital, and community settings. Such one-to-one education complements population health strategies, such as fortifying foods.

Opportunities in Outpatient Settings

- Acute care appointments
- Alcohol, tobacco, and other drug abuse programs
- Annual examinations
- Any time a pregnancy test is requested
- Diagnosis or follow-up of chronic health problems
- Dietary counseling
- Family planning and sexually transmitted infection visits
- Formal preconception appointments
- General health examinations for insurance, school, athletics, or employment
- Infertility visits

Opportunities in Hospital Settings

- After a birth
- After a miscarriage or stillbirth
- After the birth of a child with a neural tube defect
- Community education programs
- Dietary counseling
- Health resource centers
- Women's centers

Food	Micrograms (mcg)
**Breakfast cereals fortified with 100% of the DV, 3/4 cup	400
Beef liver, cooked, braised, 3 ounces	185
Cowpeas (blackeyes), immature, cooked, boiled, 1/2 cup	105
**Breakfast cereals, fortified with 25% of the DV, 1/2 cup	100
Spinach, frozen, cooked, boiled, 1/2 cup	100
Great Northern beans, boiled, 1/2 cup	90
Asparagus, boiled, 4 spears	85
**Rice, white, long-grain, parboiled, enriched, cooked, 1/2 cup	65
Vegetarian backed beans, canned, 1cup	60
Spinach, raw, 1 cup	60
Green peas, frozen, boiled, 1/2 cup	50
Broccoli, chopped, frozen, cooked, 1/2 cup	50
**Egg noodles, cooked, enriched, 1/2 cup	50
Broccoli, raw, 2 spears (each 5 inches long)	45
Avocado, raw, all varieties, sliced, 1/2 cup sliced	45
Peanuts, all types, dry roasted, 1 ounce	40
Lettuce, Romaine, shredded, 1 cup	40
Wheat germ, crude, 2 Tablespoons	40
Tomato juice, canned, 6 ounces	35
Orange juice, chilled, includes concentrate, 1/2 cup	35
Turnip greens, frozen, cooked, boiled, 1/2 cup	30
Orange, all commercial varieties, fresh, 1 small	30
**Bread, white, 1 slice	25
**Bread, whole wheat, 1 slice	25
Egg, whole, raw, fresh, 1 large	25
Cantaloupe, raw, 1/4 medium	25
Papaya, raw, 1/2 cup cubes	25
Banana, raw, 1 medium	20

DV=Daily Value

*The bioavailability of folate from natural sources is 60%, compared to 100% for synthetic folic acid.
**This food is fortified with folic acid as part of the Folate Fortification Program.

Table adapted from the National Institutes of Health Office of Dietary Supplements Fact Sheet on Folate (revised 08/22/05, accessed 03/30/07)

Opportunities in Community Settings

- Educational programs for community groups
- Home visits
- Parish health services
- Public health programs such as WIC and prenatal care coordination
- Schools' human growth and development, consumer science, and science curricula
- School-based clinics
- Weight loss clinics and programs

Summary

The challenge to providers is to be aware of the value and benefits of preconceptional consumption of folic acid, and to take advantage of every opportunity to incorporate that information into health encounters with women of childbearing age. Through a concerted approach by providers, consumers of health care would repeatedly hear and see the message that daily folic acid intake is a simple way to reduce the risk of birth defects.

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