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Folic Acid and the Prevention of Neural Tube Defects

A summary guide for health professionals

Introduction

The Health Education Authority is undertaking a major folic acid campaign, over the next two and a half years, funded by the Department of Health. This is in response to the report of a UK Expert Advisory Group which recommended that to reduce the risk of first-time occurrence of neural tube defects (NTDs) all women, prior to conception and during the first 12 weeks of pregnancy, should increase their folic acid and folate intake by 400 micrograms (0.4 milligrams) a day.

Neural tube defects: description and prevalence

Neural tube defects (NTDs) include anencephaly, encephalocele and spina bifida. Anencephaly is a condition where most of the brain and skull are absent and stillbirth or death very soon after birth is inevitable. Encephalocele, where the brain protrudes through a defect in the skull, is rare.

Spina bifida occurs when the spinal canal in the vertebral column is not closed (although it can be covered by skin). Infants with spina bifida usually develop a wide range of physical disabilities. Although in some cases the disabilities can be minor, often the suffering experienced by individuals with spina bifida and their families is substantial and long-term.

The prevalence of NTDs at birth in the UK is now less than 0.3 per 1000 total births per annum compared with about 4 per 1000 births 20 years ago. This decrease is largely due to improved screening techniques in mid-pregnancy, which have resulted in an increase in selective terminations. Termination at this stage can lead to considerable distress for the parents and families concerned.

Current advice on folic acid, folates and the prevention of neural tube defects

There is now clear evidence that folic acid and folates have a major role to play in the prevention and recurrence of NTDs (see 'Further Reading').

Recommendations for the prevention of first-time occurrence of NTDs

Over 95 per cent of pregnancies resulting in a baby with NTD are first-time occurrences. The 1992 Expert Advisory Group for the Department of Health recommended that to reduce the risk of first-time occurrence of NTDs all women, prior to conception and during the first 12 weeks of pregnancy, should increase their folic acid and folate intake by *an additional 400 micrograms (0.4 milligrams) a day*. Current average intake from diet is about 200 micrograms (0.2 milligrams) per day and so total intake would thus average at least 600 micrograms (0.6 milligrams) per day.

To achieve this increased intake the Group recommended that:

- 1** women who are planning a pregnancy should eat more folate-rich foods and avoid overcooking them
- 2** the range of breads and breakfast cereals fortified with folic acid should be increased
- 3** women should take a 400 microgram (0.4 milligram) folic acid supplement from the time they begin trying to conceive until the twelfth week of pregnancy.

The role of the health professional

Health professionals have an integral part to play in the folic acid campaign. Local action and support is essential to its overall effectiveness.

Given that at least one-third of pregnancies are unplanned and not all parents will seek pre-pregnancy advice, health professionals will need to look at every opportunity they have to promote the folic acid message. It is important to ensure that all staff and colleagues are well informed and aware of the key recommendations on folic acid so they can advise women accordingly. Opportunistic information should be offered whenever possible; this could be verbal, reinforced with written information including poster displays.

Some examples of the opportunities available to the different health professionals to incorporate the folic acid message into everyday practice are as follows:

Health professional	Opportunities for intervention
School nurses	<ul style="list-style-type: none"> ● Rubella information sessions ● Sexual health promotion ● Healthy eating advice
Pharmacists	<ul style="list-style-type: none"> ● All women and partners buying ovulation predictor kits or requesting pregnancy tests
Family planning nurses	<ul style="list-style-type: none"> ● All women attending and requesting pregnancy tests ● Women stopping contraception
Midwives	<ul style="list-style-type: none"> ● Early antenatal advice on dietary supplements
GPs/practice nurses	<ul style="list-style-type: none"> ● Advice when requesting pregnancy test ● Well woman clinics ● General dietary advice
Health visitors	<ul style="list-style-type: none"> ● Advice if parents are thinking of having another baby ● Information and advice if a woman has previously had a baby with a neural tube defect
Genito-urinary medicine clinics	<ul style="list-style-type: none"> ● During discussion on sexual health matters
Dietitians	<ul style="list-style-type: none"> ● Advice on special dietary needs in pregnancy
Health promotion professionals	<ul style="list-style-type: none"> ● Ensure library stocks of relevant information are ordered ● Give information support for health professionals ● Arrange distribution of campaign materials to all relevant health professionals ● Organise campaign briefing for health professionals ● Coordinate media coverage on the campaign in local press and radio.

Recommendations for the prevention of recurrence of NTDs

The Expert Advisory Group also made recommendations to reduce the risk of recurrence of NTDs. All women with spina bifida, or with a history of a previous child with a neural tube defect, who may become pregnant should be advised to take a 5 milligram folic acid supplement, to be continued until the twelfth week of pregnancy.

The high-dose folic acid preparations recommended for the prevention of second occurrence NTDs (5 milligrams) are available on prescription only.

Concerns about increasing folic acid intake

There have been no reported adverse effects from taking folic acid supplements in women of reproductive age. Women on anticonvulsant drugs for epilepsy need special consideration. They are both more likely to be folate deficient and more likely to have babies with congenital abnormalities. They should seek specialist advice because they will be more likely to need a higher dose of folic acid daily.

Research commissioned by the Department of Health and carried out by the Central Office for Information Research Unit in 1995 has shown that relatively few women are aware of these government recommendations. Only 9 per cent of women were reported as having spontaneous knowledge about folic acid and only 8 per cent of women had taken folic acid when trying to become pregnant.

The Health Education Authority campaign

The Health Education Authority is launching a major public education campaign, over two and a half years, to increase awareness of the importance of folic acid and its role prior to, and in the early stages of, pregnancy in the prevention of neural tube defects.

The overall aim of the campaign is to increase the average intake of folic acid and folates in women who may become pregnant by at least 400 micrograms. This will be done through the three routes of folic acid supplements, foods containing natural folates and food fortified with folic acid. The main target audiences are women of childbearing age, especially those trying to become pregnant; their partners; and young women as part of their general health education.

Further aims of the campaign are to ensure that relevant health professionals are armed with the appropriate knowledge of folic acid and its benefits, to encourage the food industry to increase the range of fortified breads and breakfast cereals, and to increase the range of appropriate folic acid supplements.

These three routes to increasing folic acid intake each have their own strengths and weaknesses:

Dietary folates. Foods do not naturally contain folic acid, but products known as folates which are in the B vitamin group. Food sources of folate include green leafy vegetables (such as Brussels sprouts and spinach), potatoes, pulses and yeast extract products. Any diet that is rich in other B vitamins and vitamin C is usually rich in folate. Folates are vulnerable to heat and dissolve in water so that cooking may cause a considerable reduction in the folate content of food. There may also be a gradual loss with prolonged storage. The measured folate content of food can only provide an approximate indication of the dietary intake.

Please note that although liver is a rich source of folate, pregnant women and those intending to become pregnant are advised not to eat liver, or liver products because of the risk of possible adverse effects from consuming excess vitamin A.

Foods fortified with folic acid. Currently about 50 per cent of all breakfast cereals and 5–10 per cent of breads are fortified. At present levels of fortification, it would be necessary to eat 10–12 slices of bread per day, or 6 slices of bread and 2 bowls of fortified cereal, to achieve the recommended intake of folic acid.

Folic acid supplements. Folic acid supplements of the recommended 400 microgram dosage are available on prescription. However, a wider choice is available on general sale and, unless a woman qualifies for free prescriptions, or large quantities are prescribed, it will normally be cheaper for her to buy folic acid herself. Tablets of folic acid come in various pack sizes and a typical price is between £3–£4 for 100 daily tablets of 400 micrograms – a 3-month supply.

Please note that not all multivitamin tablets contain folic acid, nor in sufficiently large quantities. Excessive intake of other vitamins may result if the recommended dose of folic acid is achieved by consuming several multivitamin pills. For this reason, folic acid-only preparations of 400 micrograms are the preferred supplementary source.

Women should be encouraged to adopt all three of the above routes.

Women who have not been supplementing their folate/folic acid intake and who suspect they may be pregnant should start supplements immediately and continue until the twelfth week of pregnancy.

Women who are at a later stage in their pregnancy should be given reassurance that the incidence of neural tube defects is extremely small (in 1992 there were 146 live or stillborn infants with spina bifida in England and Wales) and, if appropriate, advised on the availability of ultrasound and serum screening. They should also be advised on the importance of increasing folic acid intake prior to any subsequent pregnancy.

Further reading

The MRC Vitamin Study Group (1991) 'Prevention of neural tube defects: results of the Medical Research Council Vitamin Study', *Lancet*. no. 238, pp. 131-7.

Ceizal, A.E., Dudas, I. (1992) 'Prevention of the first occurrence of neural tube defects by periconceptional vitamin supplementation', *New England Journal of Medicine*. no. 327, pp. 1832-5.

Department of Health (1992) *Folic acid and the prevention of neural tube defects*. Report of an Expert Advisory Group for the Department of Health. Available from Health Publication Unit, PO Box 410, Wetherby LS23 7LN. Tel 019371 840250.

Sutcliffe, M., Scolah, C.H., Parry, A., Wild, J. (1993) 'Prevention of neural tube defects', *Lancet*. no. 342, p. 1174.

Smith, R.B., Davies, N., Davies, J. (1994) 'Prevention of neural tube defects', *Lancet*. no. 343, pp. 123-4.

Clark, N.A.C., Fisk, N.M. (1994) 'The minimal compliance with the Department of Health recommendation for routine folate prophylaxis to prevent fetal neural tube defects'. *British Journal of Obstetrics and Gynaecology*. vol. 101, pp. 709-710.

Voluntary organisations and support groups

ASBAH (Association for Spina Bifida and Hydrocephalus) 42 Park Road, Peterborough, Cambridgeshire PE1 2UQ. Tel 01733 555988.

The National Childbirth Trust (NCT) Alexandra House, Oldham Terrace, London W3 6NH. Tel 0181 992 8637.

GIG (Genetic Interest Group) Farringdon Point, 29-35 Farringdon Road, London EC1M 3JB. Tel 0171 430 0090.

SATFA (Support Around Termination For Abnormality) 73 Charlotte Street, London W1P 1LB. Tel 0171 631 0285.

Maternity Alliance 45 Beech Street, London EC2P 2LX. Tel 0171 588 8582.

A more detailed guide on folic acid and the prevention of neural tube defects is available free of charge to health professionals from the HEA.

For further information please contact the Health Education Authority on 0171 413 2025.

For information on activities in Wales, Scotland and Northern Ireland please contact Health Promotion Wales: 01222 752222; Health Education Board for Scotland: 0131 447 8044; and Health Promotion Agency for Northern Ireland: 01232 311611.