

EXECUTIVE SUMMARY

Maternal and child nutrition programme: The effectiveness of public health nutrition interventions provided to non-pregnant women of childbearing age that aim to improve pregnancy outcomes

Background

It has been recognised that a healthy pregnancy outcome can be influenced by a woman's health status, lifestyle and history prior to conception (Korenbrodt et al. 2002). The Food Standards Agency (FSA) provides dietary advice for women planning a pregnancy (Food Standards Agency, 2005). This advice includes:

- Following a healthy, varied and balanced diet
- Consuming plenty of iron-rich and folate-rich foods
- Taking a folic acid supplement of 400 µg per day
- Limit their alcohol and caffeine intakes

Folic acid is important both around the time of conception and during the first few weeks of pregnancy as it helps reduce the incidence of neural tube defects (NTDs) in the developing fetus. The Department of Health (DH) (1992) recommends that all women who are planning a pregnancy are advised to take a daily supplement of folic acid (400 µg) prior to conception until the 12th week of pregnancy. These women are also advised to eat foods rich in folic acid. This rapid review examined the effectiveness of public health interventions provided to women of childbearing age that aimed to improve pregnancy outcomes. Particular attention was given to folic acid. It should be noted that women planning a pregnancy may be amenable to guidance about nutrition but many pregnancies are unplanned and it may be unrealistic to expect all women that may become pregnant to follow guidance about appropriate nutrition during the pre-conception period.

Methods

Selection criteria

A search of the literature was conducted in June 2006 using a stepped approach. Initially, a worldwide search was conducted to identify potentially relevant systematic reviews (SRs) published from 1995 onwards, followed by searches for randomised controlled trials (RCTs) conducted in developed country settings and published from 1990 onwards, and other study types conducted in the UK and published from 1990 onwards.

A total of 4649 citations were independently screened by two reviewers, and full paper copies of 24 systematic reviews, 44 randomised controlled trials and 37 UK studies of any type were obtained and also independently assessed.

In total, 19 studies met the inclusion criteria (five SRs, seven RCTs published in eight papers and seven UK studies of any type published in eight papers). In addition, 11 relevant non-UK, non-RCT studies (identified in the RCT search strategy) were identified.

Of the 30 (19 plus 11) included studies, one SR evaluated nutrition interventions in childbearing women, nine studies (two SRs, four RCTs, three UK studies) plus three additional non-RCTs addressed pre- or peri-conceptual women (or pre-natal), and 17 studies addressed folic acid awareness or uptake (two SRs, three RCTs, four UK studies - plus eight additional non-RCTs). This material was used to answer the research questions posed.

In addition to the studies identified using this formal search strategy additional material was suggested by members of the Programme Development Group and the NICE team. These additional references were screened for relevance.

Interventions of interest

Interventions of interest were those that were delivered to non pregnant women of childbearing age, who are planning a pregnancy or who might become pregnant. The intervention must be started prior to conception and can be given up to any time during in pregnancy

Data sources

The literature search identified systematic reviews by searching the Cochrane Database of Systematic Reviews, DARE, the Health Technology Assessment database and the Ongoing Reviews Register.

In addition, a number of web sites were scanned/searched to identify possibly relevant reviews. These were:

SIGN Guidelines, National Guideline Clearinghouse, National Coordinating Centre for Health Technology Assessment NICE web pages (published appraisals, HSTAT, The Department of Health Research Findings electronic Register, TRIP, Clinical Evidence, Health Evidence Bulletins Wales ,Centre for Disease Control (Pre-conception pages).

Where no relevant reviews exist, a search for RCTs was conducted (from 1990 onwards). The following databases were searched: CENTRAL; EMBASE; PsycINFO; CINAHL and MEDLINE.

Data extraction and quality assessment

All of the studies that met the inclusion criteria were critically appraised by two reviewers in accordance with criteria described in NICE (2006). A study was graded using a code '++', '+' or '-', based on the extent to which the potential sources of bias had been minimised. If there was any discrepancy in a grade given to a study by the two reviewers, the opinion of a third reviewer was sought. The NICE criteria and the methodology checklist used in this review are presented in Appendix D. It is noted that these grades reflect the quality of the authors' reporting of their study.

Research Questions

1. What interventions are effective in increasing knowledge of the recommended intake of folate and folic acid among women of child bearing age who are planning a pregnancy or might become pregnant?
2. What interventions are effective in increasing uptake of folic acid supplements in women of child bearing age who are planning a pregnancy or might become pregnant?
3. What interventions are effective in increasing dietary folate in women of child bearing age who are planning a pregnancy or might become pregnant?
4. What interventions are effective in increasing health professional's knowledge and awareness of the recommendations for folate and folic acid in women of child bearing age who are planning a pregnancy or who might become pregnant?
5. What interventions (other than those about folate or folic acid) improve nutritional status of women of child bearing age who are planning a pregnancy or might become pregnant?

Results

What interventions are effective in increasing knowledge of the recommended intake of folate and folic acid among women of child bearing age who are planning a pregnancy or might become pregnant?

Few studies have evaluated ways to increase knowledge about recommended intake of folate and folic acid. A randomised community trial in Australia demonstrated a modest but significant increase in knowledge using leaflets, posters and other materials promoting awareness of the potential for folic acid and folate to reduce neural tube defects (Watson 1999 and Watson 2001). Evaluation of a large wide ranging three year multi media campaign in England to promote awareness found a substantial increase in both prompted and unprompted awareness of folate and folic acid (HEA 1998).

Evidence Statement 1

Evidence from one Randomised Community Trial (1+) and Media Campaign (2+) conducted in developed countries to promote the uptake of folic acid supplements using advertising; leaflets and promotional material were

effective in increasing awareness among women of child bearing age about the benefits of folic acid supplements.

What interventions are effective in increasing uptake of folic acid supplements in women of child bearing age who are planning a pregnancy or might become pregnant?

The HEA folic acid campaign measured changes in prescription rates and sales of folic acid supplements. Both of these indicators suggest that the large media campaign increased folic acid use. A systematic review found that media campaigns were effective in increasing the proportion of women reporting using folic acid (Ray 2004). However the same systematic review also reports that only a minority of women of child bearing age regularly take folic acid supplements and that use of folic acid supplements is lower in women who do not have a regular partner, young women, women with low levels of formal education, and immigrants.

Evidence Statement 2

Evidence from one systematic review (2+) that included studies on interventions and media campaigns conducted in developed countries to promote the uptake of folic acid supplements using advertising, leaflets and promotional material reports that these campaigns were effective in increasing the proportion of women of child bearing age that regularly take folic acid supplements.

Evidence Statement 3

A large proportion of women of child bearing age who are planning a pregnancy or may become pregnant do not regularly take folic acid supplements. Evidence from one systematic review (2+) that included 30 studies that reported risk factors for low pre-conception folic acid use found that low levels of formal education, young maternal age, lack of a partner, immigrant status and unplanned pregnancy are associated with lower odds of using folic acid around the time of conception.

A randomised trial from the USA found that free folic acid supplements given along with counselling from a physician significantly increased reported weekly use of folic acid and modestly increased daily use (Robins 2005).

Evidence Statement 4

Evidence from a RCT (1+) based on a southern population in the USA who received brief counseling from a physician about the benefits of folic acid along with the provision of free folic acid supplement tablets found that this was effective in increasing folic acid supplement use.

What interventions are effective in increasing dietary folate in women of child bearing age who are planning a pregnancy or might become pregnant?

No systematic reviews, randomised controlled trials or UK studies were identified that measured dietary folate consumption before and after an intervention. It is uncertain if strict adherence to a diet rich in folate is sufficient to reduce the incidence of neural tube defects but it is unlikely that whole populations would be able to regularly eat a diet that provided the recommended intake. The National Diet and Nutrition Survey of Adults 19-64 (Henderson, 2003) reports that only 8-16% of women aged 19 to 49 years reached intakes from food and supplements of 400µg, the level recommended by the Department of Health.

What interventions are effective in increasing health professional's knowledge and awareness of the recommendations for folate and folic acid in women of child bearing age who are planning a pregnancy or who might become pregnant?

The most relevant information comes from the evaluation of the HEA folic acid campaign. Interviews and surveys undertaken before and after the campaign had begun found that the campaign modestly increased awareness but that health professionals still had gaps in their knowledge about the timing and dosage of folic acid that is recommended. The interviews also found that advice about folic acid was not perceived as being advice that would be provided to all women of child bearing age it was mainly perceived as something that would only be provided to women that were pregnant or actively planning to have a baby.

Evidence Statement 5

There is evidence from a large survey (2+) of health professionals working in England that folic acid advice is not perceived by them as being part of general health advice for women of child bearing age. The survey also found that many health professionals working in England have gaps in their knowledge about the appropriate dosage and timing of folic acid for women.

What interventions (other than those about folate or folic acid) improve nutritional status of women of child bearing age who are planning a pregnancy or might become pregnant?

No well designed nutrition and dietary intervention studies that aimed to measure pregnancy outcomes or improvements in nutrition prior to becoming pregnant undertaken in non-pregnant women in developed countries were found. Three studies that might have been relevant were identified and reviewed these were Fine 1994, Doyle 1999 and Doyle 2001. Each study was found to have flaws and was unsuitable for deriving evidence statements. The difficulties included a lack of statistical power and very high drop out rates.

References

Doyle W, Crawford MA, Srivastava A et al. (1999) Interpregnancy nutrition intervention with mothers of low-birthweight babies living in an inner city area: a feasibility study. *Journal of Human Nutrition and Dietetics* 12 (6): 517-27.

Doyle W, Srivastava A, Crawford MA et al. (2001) Inter-pregnancy folate and iron status of women in an inner-city population. *British Journal Of Nutrition* 86(1): 81-7.

Fine, G A, Conning DM, Firmin C, et al (1994) Nutrition education of young women. *British Journal of Nutrition*, Vol 71(5):789-798

Health Education Authority (1998). Changing Preconceptions: The HEA Folic Acid Campaign 1995-1998

Henderson L, Irving K, Gregory J, Bates CJ, Prentice A, Perks J, Swan G & Farron M (2003) The National Diet and Nutrition Survey: Adults Aged 19 to 64 Years. vol. 3: Vitamin and Mineral Intake and Urinary Analytes. London: The Stationery Office.

Korenbrodt CC, A Steinberg, C Bender, S Newberry (2002). Pre-conception care: a systematic review. *Maternal and Child Health Journal* Vol 6 (2):75-88

Ray JG, Singh G, Burrows RF (2004) Evidence for suboptimal use of periconceptual folic acid supplements globally. *BJOG: an International Journal of Obstetrics and Gynaecology* 111: 399-408.

Robbins JM, Cleves MA, Collins HB et al. (2005) Randomized trial of a physician-based intervention to increase the use of folic acid supplements among women. *American Journal of Obstetrics and Gynecology* 192(4): 1126-32.

Watson MJ, Watson LF, Bell RJ et al. (1999) A randomized community intervention trial to increase awareness and knowledge of the role of periconceptual folate in women of child-bearing age. *Health Expectations* 2(4): 255-65.

Watson M, Watson L, Bell R et al. (2001) The increasing knowledge of the role of periconceptual folate in Victorian women of child-bearing age: follow-up of a randomised community intervention trial. *Australian & New Zealand Journal of Public Health* 25(5): 389-95.