

EXECUTIVE SUMMARY

The effectiveness of public health nutrition interventions provided to pregnant women that aim to improve pregnancy outcomes

Background

The nutrition of pregnant women is important as dietary intake during pregnancy is likely to have a positive impact on a woman's health during pregnancy and post-partum and may also have beneficial effects for the baby, not only around the time of birth but also in early and late childhood, and possibly in adult life.

In the UK the Food Standards Agency provides dietary advice for women during pregnancy. This includes general dietary advice which includes eating a varied diet, lean meat, fish twice a week of which one should be oily, plenty of starchy food, fibre and fruit and vegetables. It also offers advice regarding particular minerals and vitamins which includes taking a daily 400 microgram (mcg) folic acid supplement from the time you stop using contraception until the 12th week of pregnancy, making sure you have plenty of iron-rich foods, and taking supplements containing 10mcg of vitamin D each day. It also advises about avoiding taking supplements containing vitamin A, limiting alcohol consumption and avoiding cheeses with rinds and uncooked eggs.

Studies conducted in the UK have shown that the diets of pregnant women are inadequate in a number of key nutrients (Rogers et al., 1998) and potential exists for improving health through maternal nutrition interventions. This review looks at nutrition interventions provided to pregnant women that aim to improve pregnancy outcomes but does not cover iron and vitamin D which are covered in other reviews.

Methods

Selection criteria

The method used to answer the above research questions involved a series of searches of the literature. An initial review was undertaken that searched the literature to answer the following question: What nutrition interventions for low-income women delivered in primary care settings during pregnancy are effective in improving maternal health in the short and long term, and what, if any, are the effects on birth weight? The resulting review included nutrition studies from around the world and many of these studies took place in populations that had nutrition levels that were different to the UK. As such many of the findings from this initial search of the literature and review were not useful for making recommendations for pregnant women in the UK.

Three broad research questions were used to inform the searches of a second search of the literature which looked for systematic reviews, randomised controlled trials and UK studies. These were:

1. What is the effectiveness of food support programmes in improving nutrient intakes among pregnant women?
2. What is the effectiveness of interventions designed to promote the uptake of folic acid supplements in the first trimester of pregnancy?

3. What is the effectiveness of interventions to reduce alcohol consumption during pregnancy?

The Centre for Reviews and Dissemination, University of York conducted the searches in October 2005, with input from the review team. This involved an initial scoping search which was undertaken in order to direct and refine the final search strategy and a final search which was conducted using a stepped approach. This began with a worldwide search to identify potentially relevant systematic reviews (from 1995 onwards) followed by randomised controlled trials (1990 onwards) and other study types (conducted in the UK and published from 1990 onwards). In June 2006, an additional systematic search of the literature was conducted to identify studies for three new key questions. These were questions about oily fish and omega-3 supplements, interventions to increase the uptake of food safety advice and interventions to increase the uptake of allergy prophylaxis advice. Overall, the searches for SRs, RCTs and UK studies identified 21,147 citations. These citations were screened, and full paper copies of relevant systematic reviews, randomised controlled trials and UK studies of other designs were obtained and assessed. This core dataset was used to answer the research questions described above.

Data sources

Three sets of literature searches were undertaken to identify: systematic reviews, randomised controlled trials, and other study types.

The Cochrane Database of Systematic Reviews (CDSR) and DARE were searched to identify systematic reviews. A second set of searches were conducted on the Cochrane Central Register of Controlled Trials, MEDLINE, EMBASE, CINAHL and PsycINFO databases to identify randomised controlled trials. A third set of searches were conducted on the MEDLINE, EMBASE, CINAHL and PsycINFO database to identify other study types.

Data extraction and quality assessment

Two reviewers independently screened titles and abstracts for relevance. Retrieved studies were assessed for inclusion by one reviewer and checked by another reviewer. Data extraction and study quality were also assessed by one reviewer and checked by another. Disagreements were resolved through discussion. Findings were synthesised into a narrative summary and data tables.

Research Questions

Folate/Folic Acid

1. What interventions are effective in increasing awareness and knowledge among pregnant women of the recommended daily intake of folate and folic acid?
2. What interventions other than folic acid fortification of food are effective in increasing dietary folate intake of pregnant women?
3. What interventions are effective in increasing the uptake of folic acid supplements in pregnant women?

4. What interventions are effective in increasing health professionals knowledge and awareness about recommendations for folate and folic acid in pregnant women?

Omega 3 supplements/fish oils

5. a) What interventions are effective in increasing awareness and knowledge among pregnant women about the benefits of eating recommended amounts of oily fish and vegetarian sources of omega-3 supplements during pregnancy?

b) What interventions are effective in altering oily fish consumption among pregnant women?

Alcohol

6. Excluding interventions that are aimed specifically at problem alcohol users what interventions are effective in reducing alcohol intake among the general population of pregnant women?

Food safety advice

7. a) What interventions are effective in increasing awareness and knowledge about food safety advice among pregnant women?

b) What interventions are effective in changing food safety practice among pregnant women?

Education and counselling to improve nutrition

8. a) What educational interventions that are aimed at all pregnant women are by themselves effective in improving dietary intake and nutritional status?

b) What educational interventions that are targeted at a defined group of pregnant women, for example, low income or ethnic minorities are by themselves effective in improving their dietary intake and nutritional status?

Food support programmes, financial incentives and multiple interventions to improve nutrition

9. a) Do interventions that include the provision of food or vouchers or incentives to buy specific foods improve dietary intake and nutritional status of pregnant women?

b) What interventions either by themselves or in addition to counselling and educational support are effective in improving the dietary intake and nutritional status of pregnant women?

Results

Folic acid and dietary folate

No randomised trials were found that attempted to increase awareness about folic acid among women that were already pregnant. The crucial period for preventing neural tube defects is the early stages of pregnancy. Therefore awareness campaigns focus on the need to take folic acid around the peri-conceptual period. The HEA folic acid campaign (HEA 1998) and a randomised community trial in Australia (Watson 1999) described in the preconception review indicate that widespread media campaigns are successful in increasing awareness.

No randomised trials or UK studies were found that measured dietary folate in pregnant women before and after an intervention. This is likely to be because of the formidable difficulties involved in randomising pregnant women.

Interventions to increase use of folic acid supplements have been covered in the preconception review. It is probable that wide spread media campaigns and the provision of free supplements along with advice about when to take them will increase the use of folic acid supplements.

Omega 3 supplements/fish oils

What interventions are effective in increasing awareness and knowledge among pregnant women about the benefits of eating recommended amounts of oily fish and vegetarian sources of omega-3 supplements during pregnancy?

What interventions are effective in altering oily fish consumption among pregnant women?

Only one relevant study was found, (Odent, 1996). In this case control study cases were counselled at around 20 weeks gestation about the benefits of eating oily fish and were also provided with recipe cards that included fish recipes. The controls did not get the intervention. The impact of this intervention on birth outcomes were measured and no significant differences between the two groups found.

Evidence statement 1

An observational case control study did not find a significant difference in birth outcomes among women given counselling about the benefits of eating sea fish at 20 weeks gestation and women not given this advice.

Alcohol

Excluding interventions that are aimed specifically at problem alcohol users what interventions are effective in reducing alcohol intake among the general population of pregnant women?

A number of studies have evaluated interventions that aim to reduce drinking during pregnancy. A systematic review rated 2+ (Schorling 1993) found that many studies were of poor quality but also noted a consistent finding that reported alcohol use falls as pregnancy progresses. A randomised trial in the USA rated 1+ (Chang 2005) which evaluated a session given by trained clinicians which included knowledge assessment and feedback, contracting and goal setting and behavioural modification in a single 20 – 25 minutes session could not demonstrate a significant reduction in reported alcohol consumption when compared to a control group. However in both the control and intervention groups reported alcohol consumption fell.

Evidence statement 2

Studies undertaken in the USA and Europe have consistently found that women enrolled into studies that measure self reported alcohol consumption during pregnancy reduce their reported alcohol consumption as pregnancy progresses. This reduction is found in both control groups and intervention groups.

Evidence statement 3

A brief intervention from a trained counsellor to reduce alcohol consumption among women who were drinkers involving goal setting and including a woman's partner did not lead to a significant reduction in reported alcohol consumption when compared to a control group that did not receive the intervention. However in both the control and intervention groups reported drinking fell.

Food safety advice

The search strategy found no studies that had evaluated different ways of providing food safety advice to pregnant women. Given the importance of food safety during pregnancy this appears to be an area where research is required. A study from the USA was identified which indicated that warnings about the mercury content of some types of fish resulted in a fall in fish consumption (Oken 2003). This suggests that specific government warnings about the safety of a particular food result in a fall in consumption of that food.

Education and counselling to improve nutrition

- a) What educational interventions that are aimed at all pregnant women are by themselves effective in improving dietary intake and nutritional status?
- b) What educational interventions that are targeted at a defined group of pregnant women, for example, low income or ethnic minorities are by themselves effective in improving their dietary intake and nutritional status?

The evidence to answer these questions came from two systematic reviews (Van Teijlingen 1998 and (D'Souza et al., 2005) which included two UK studies (Anderson 1995 and Doyle 1992). Across the two reviews ten studies were reviewed but many studies were not of high quality and many of the studies were small. Also the educational interventions varied considerably as did the populations studied. The populations included for example, Mexican immigrants in the USA, Cree Indians, and rural Greek women. The applicability of the findings from these non-UK studies to UK women is doubtful and no evidence statements were generated. The two UK studies were a non randomised trial in Scotland which was rated 2+ (Anderson 1995) and a non randomised trial in the East end of London which was rated 2+ (Doyle 1992). In Anderson's study the control population received usual care which included nutrition advice and women in the intervention group received usual care and also a nutrition education pack from the midwife at study entry. The intervention group then received a second pack posted to them at 26 weeks gestation. At 30 weeks both groups were invited to fill in specific questionnaires about food knowledge and attitudes and record their food intake. The intervention group had higher scores for knowledge but did not score higher for attitudes about good nutrition or for their reported nutrition.

In Doyle's study the control population received no intervention and usual care and women in the intervention group had 3 weekly dietary counselling during the second and third trimester either alone or along with two different types of food supplement. There were no differences in outcomes between the intervention groups that

received and did not receive food supplements. However there was a small but statistically significant impact on the birth-weight of babies born to the intervention group as a whole when compared to the control group.

Evidence statement 4

A non-randomised control trial in Scotland demonstrated that written educational materials aimed at improving knowledge practical skills and diet of pregnant women provided to pregnant women at an initial meeting during the first trimester and again with an accompanying personalised letter at six months gestation produced a small but significant increase in women's nutrition knowledge but failed to improve women's attitudes about diet or their reported nutrition.

Evidence statement 5

A non-randomised trial in London comparing intervention groups that received multiple episodes of nutrition counselling alone or with two different types of food supplement during the second and third trimester to a control group found no significant differences among the groups when measuring maternal weight gain, length of gestation, babies head size or babies length. The study found a small but statistically significant increase in the mean birth-weight of babies born to women in all intervention groups combined compared to women in the control population.

Food support programmes, financial incentives and multiple interventions to improve nutrition

Do interventions that include the provision of food or vouchers or incentives to buy specific foods improve dietary intake and nutritional status of pregnant women?

The evidence to answer this question comes from evaluations of the WIC programme in the USA. A large evaluation of WIC undertaken by Rush and colleagues was reviewed (Rush 1988). Unfortunately this study has two flaws that might lead to important bias. The first is that a quarter of the control population enrolled in WIC and had to be excluded from the analysis. The impact of this self selection is unknown. The second is that information from hospital delivery records was unavailable for 25% of the study population. This study was therefore graded with a minus to indicate these flaws and no evidence statements were produced from this study. A study by Metcoff compares two groups of women who were assigned as being at risk of low and high birth-weight babies. Women in the intervention group received WIC Vouchers exchangeable for milk, eggs and cheese providing 40-50g/day protein and 900-1000kcal/day. Women in the control population did not get these vouchers. The study measured birth outcomes and maternal weight gain. It found that the intervention increased maternal weight gain but did not significantly effect the proportion of babies of low birth weight or the mean birth-weight. The Metcoff study recruited women at mid-pregnancy and therefore offers no evidence about the impact of food support throughout a whole pregnancy. Whilst it is possible that the WIC programme produces important benefits for participants there is insufficient high quality evidence from evaluation studies to demonstrate that this is the case.

Evidence statement 6

One randomised control trial found no significant increase in the mean birth weight of babies or a significant reduction in low birth weight babies born to women recruited into the USA's WIC programme at mid-pregnancy compared to women in a control population who received no free dietary supplements.

Evidence statement 7

One randomised control trial found a statistically significant maternal weight gain among pregnant women recruited into the USA's WIC programme at mid-pregnancy compared to women in a control population who received no free dietary supplements.

Multiple interventions

What interventions either by themselves or in addition to counselling and educational support are effective in improving the dietary intake and nutritional status of pregnant women?

The studies considered were identified by the D'Souza systematic review (D'Souza 2006). Two randomised control trials were identified that evaluated home support. The first study was of African American women and was graded 1+ (Graham 1992). In this study women attending a clinic were initially screened for family stress and their need for support. Those included in the study were randomised to a group that received peer support from trained members of their peer group at four home visits during the second and third trimesters. The support included psychosocial support and encouragement to the family to increase support to the mother, to be present for the home visit, clinic visits, maternity classes and delivery; efforts to reduce family stress by referral to community services and acting as an advocate when needed; information about health risks of smoking and alcohol and referral to groups for cessation; increased awareness of community resources; and nutrition education and information about prenatal care and birth. The study evaluated birth outcomes in the control and intervention groups and found no significant difference in the proportion of babies of low birth-weight.

Evidence statement 8

One randomised control trial in the USA with pregnant inner city black women found that four home visits during the second and third trimester from a woman of a similar peer group who was trained to deliver a complex intervention including psychosocial/social support, nutrition education and referral to other services found no statistically significant impact on the rates of low birth weight compared to a control population receiving usual care.

The second study targeted young mothers and was undertaken in the Appalachian region of New York State (Olds 1986). The study was a four armed trial with complex interventions including efforts to give up smoking, nutrition counselling and practical help to pregnant women. Group 1 (Control) received health & developmental screening for the child at age 1 and 2 years; Group 2 (Control) received health & developmental screening for the child at age 1 and 2 years plus free transportation to regular prenatal and well child clinics; Group 3 (Intervention) Health & developmental screening for the child at age 1 and 2 years plus free transportation to regular prenatal and well child clinics plus prenatal nurse home visits and Group 4 (Intervention) health & developmental screening for the child at age 1 and 2 years plus free transportation to regular prenatal and well child clinics plus prenatal nurse home visits plus nurse home visits during child's first two years. The intervention group received an average of 9 home visits made during each pregnancy. These spanned the prenatal period until the child was 2 years old. Visits encouraged prenatal social support; participation in other services including WIC; over 2/3rd of visit time was spent on nutrition education. The study found no significant difference in the mean birth weight of babies or rates of low birth weight

between intervention and control groups and no significant difference in maternal weight gain between intervention and control groups. The study also reports significantly lower rates of premature delivery in smokers in the intervention groups, significantly greater use of WIC vouchers in the intervention group and significantly more women stopped smoking in the intervention group.

The findings of this study need to be treated with some caution because the study does not present a power calculation. Many of the group sizes were small and the sub-group analysis was based on small numbers. The study was therefore given a minus grading and no evidence statement was produced.

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