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Maternal knowledge, attitude and practice regarding folic acid intake during the periconceptional period

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Abstract

Objective: To study the knowledge, attitude and practice of pregnant women regarding periconceptional folic acid (FA) intake.
Design: Questionnaire-based prospective study.
Setting: Antenatal clinic of a District General Hospital.
Subjects: Three-hundred pregnant women in an antenatal clinic.
Results: Nearly all (298/300) had heard of FA. A majority (275/300, 91%) knew that FA could prevent neural tube defects, and married women ($P < 0.001$), those with higher education ($P < 0.001$), those of Social Classes 1–3 ($P < 0.01$) and women over 30 years of age ($P < 0.05$) were more likely to be thus aware. Knowledge about the correct timing of FA intake was seen in 76% and was more likely in those with higher education ($P < 0.001$), married women ($P < 0.001$) and women age over 30 years ($P < 0.05$). Intake of FA in the periconceptional period was seen in 134/300 (44.6%) women and was most likely in the married, Social Classes 1–3, women with higher education (all $P<0.001$), non-smokers ($P < 0.01$), women with a planned pregnancy and women aged 30 years and over ($P < 0.05$).
Conclusions: The knowledge of the correct timing of FA intake was present in only 76%. Less than half (44.6%) had taken FA in the periconceptional period, and this was far more common in the more 'privileged' classes. Low socio-economic status, age less than 30 years, lower educational status and unplanned pregnancy were high risk factors for not taking FA. The challenge to the medical profession for targeting this group cannot be over-emphasised.

Keywords
Folic acid
Neural tube defects
Prophylaxis

Hibbard and Smithells first published the association between folic acid (FA) deficiency and spina bifida in 1965[1]. Since then, it has been conclusively shown that maternal FA supplementation during the periconceptional period significantly reduces the risk of spina bifida and other neural tube defects (NTDs) by 86 to 72% in high-risk[2,3] and in normal pregnancies[4]. The results of these and similar studies were so convincing that they led the Department of Health in the UK[5] and the US Public Health Service[6] to declare almost simultaneously, in 1992, that all women planning to become pregnant should take at least 400 μg of FA before pregnancy and for 12 weeks thereafter.

Since then, early studies both in the UK[7,8] and the USA[9] showed a very poor knowledge and understanding of the use of FA in women of childbearing age. Later, similar studies tended to show improved knowledge[10]; the practice of actually taking FA in the periconceptional stage was still very low[11] despite media campaigns.

This study, carried out at the Queen's Hospital, Burton on Trent, was designed to assess the knowledge, attitude and practice of pregnant women with regard to FA intake during pregnancy.

Material and methods

Queen's Hospital, Burton is a District General Hospital, catering to the population of Burton on Trent, an industrial town in Staffordshire, and the neighbouring rural area of West Midlands. It has a delivery rate of 3000 per annum and pregnant women are seen in the antenatal clinic at 12 weeks and regularly thereafter.

The study was conducted between November 1997 and February 1998. A sample size of 300 was estimated based on a prevalence of periconceptional FA intake of 6%[10] with a range of 2.5% around the 95% confidence limits (CIs). Three-hundred-and-twenty-three consecutive pregnant women attending the Antenatal Clinic were given a

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letter explaining the purpose of the study. They were simultaneously given a questionnaire to fill in. The questionnaire consisted of three parts: (1) a demographic section that included age, marital status, social and economic profile, educational status and employment status of both self and partner; (2) a section on past pregnancies and other obstetric details; and (3) a section on the knowledge and actual use of FA in the current pregnancy. In all, there were 31 questions, all of which could be answered with a tick mark or a single line answer. No identification data were required. After the filled questionnaires were received, a leaflet on FA explaining its use in pregnancy was given to all women. The study was concluded when 300 completely filled questionnaires were obtained. Local Research Ethical Committee approval had been obtained for the study.

Analysis was done using the statistical software Epi-Info version 5.01b. Univariate analysis was done using the chi-square test to demonstrate the association of the socio-demographic variables with the knowledge and actual use of FA.

Results

Patient characteristics

Of the 323 questionnaires handed out, 300 were returned completely filled – a response rate of 92.8%. The age of the women ranged from 14 to 44 years (mean: 28 ± 5.9). Two-hundred-and-four (68%) of the women were married, 78 (26%) were single and 17 (6.0%) were divorced or separated.

About three-quarters (223/300, 74%) belonged to the Church of England, 25 (9%) were Catholics, 31 (10.3%) were 'Others' (including Muslims, Hindus, Jews, Sikhs, etc.) and 21 (7%) stated that they did not to belong to any religion. A majority, 285 (95%), were Caucasian and 15 (5%) were 'Others' including Pakistanis, Afro-Caribbean, Indian, Filipino and Thai.

Two-thirds (200/300) of the women lived with their husbands, 71 (24%) with their partners, 15 (5%) with parents, 4 alone and 10 'Other'.

The break-up of the educational and employment status was as follows: 42 (14%) had studied in university, 195 (65%) had some education/qualification after school and 63 (21%) had studied only at school. One-hundred-and-seventy-one (57%) were in some form of employment (including full-time, part-time, self-employed), 79 (26%) were unemployed/students and 50 (17%) were housewives by choice.

The social classes of the women based on the professions of the husbands/partners/fathers were as follows: Class 1, 28 (9%); Class 2, 72 (24%); Class 3, 92 (30%); Class 4, 68 (23%); Class 5, 17 (6%); and Class 6, 23 (8%).

A majority of the women, 237/300 (79%), were non-smokers, but 63 (21%) smoked. Although a large number of the smoking women (50/63, 79%) claimed to have reduced or stopped smoking during this current pregnancy, the remainder (13/63, 21%) continued to smoke as usual.

One-hundred-and-eighty-nine (63%) of the women stated that the current pregnancy was planned. One-hundred-and-twenty women (41%) were pregnant for the first time, 164 (55%) had had one to three earlier pregnancies, and 16 (5%) had had more than three previous pregnancies.

Knowledge about FA

Nearly all (298/300) of the women had heard of FA, and their sources of information included the doctor (51%), nurse/midwife (9.3%), friends/relatives/colleagues (23.5%), media/leaflets/magazines (44.3%) and own knowledge through education (0.5%). Many had heard from more than one source.

Two-hundred-and-eight (69%) knew that FA was a vitamin, but 74 (25%) thought that it was a mineral supplement and 18 (6%) stated that they did not know what FA was. Knowledge that FA is a vitamin supplement was not related to age, class, marital status, parity, race, education or smoking habits.

Two-hundred-and-seventy-five of the women (91%) knew that FA could prevent NTDs, but 14 (5%) did not know the use of FA and 7 (2%) thought that it prevents heart defects or premature deliveries. Women over the age of 30, married women and those from Social Classes 1–3 were more likely to be correctly informed on this issue (Table 1).

Two-hundred-and-thirty-one women (76%) correctly knew that it was most appropriate to take FA just before and soon after conception, but 15 (3.5%) felt it should be taken throughout pregnancy, and 5 (2%) thought that it could be taken any time during pregnancy but for a minimum of 6 weeks. A small minority, 4 (1%), thought that it does not need to be taken because it is present in food. Forty-five (15%) answered 'Don't know' to this question. Married women, those over 30 years of age, those with higher education and those with planned pregnancies were more likely to answer this question correctly (Table 2).

A majority, 263 (88%), of the women had 'knowingly'

Table 1 Factors associated with the knowledge that folic acid prevents NTDs

Variable	Relative risk	95% CI	*P* value
Planned pregnancy	1.1	0.96–1.27	0.09
Age >30 years	1.09	1.02–1.11	0.02
Smoker	0.095	0.86–1.05	0.25
Social Class 1–3	1.13	1.03–1.24	<0.01
Primigravida	1.09	1.02–1.16	0.18
Married	1.17	1.06–1.29	<0.001
Higher education	1.2	1.11–1.24	<0.001

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Table 2 Factors associated with knowledge of the correct timing of FA intake

Variable	Relative risk	95% CI	*P* value
Planned pregnancy	1.26	1.01–1.57	<0.05
Age >30 years	1.09	1.01–1.18	<0.05
Smoker	0.93	0.83–1.06	0.21
Social Class 1–3	1.06	0.96–1.17	0.2
Primigravida	0.97	0.89–1.06	0.53
Married	1.18	1.05–1.32	<0.001
Higher education	1.2	1.16–1.48	<0.001

taken FA sometime during the current pregnancy. Amongst women of Social Classes 1–3, 93% (178/192) had taken FA during the current pregnancy as against only 75% (81/108) of women from Social Classes 4–6. This difference was statistically significant ($P < 0.01$). Forty-one (14%) women had not taken FA at all during the current pregnancy, and the stated reasons for this were 'Not recommended by doctor/nurse' (5/41), 'Did not know/bother' (6/41), 'Unplanned pregnancy' (5/41), 'Severe nausea' (6/41) and 'Eat foods containing FA' (3/41); 16/41 did not state the reason.

Overall, 134 (44.6%) of women had taken FA for at least 6 weeks prior to becoming pregnant and had continued to take it during the early part of the pregnancy for at least 6 weeks after conceiving. Age over 30 years, planned pregnancy, Social Classes 1–3, married status and non-smoking status were strongly correlated with preconceptional FA intake (Table 3).

Discussion

Although the Department of Health Expert Advisory Group has recommended that all women should take 400 μg of FA before conception and during the early months of pregnancy[5], this study shows that only 44.6% of pregnant women were actually following this advice. This figure is, however, much higher than the figures of 6%[10], 31.5%[11] and 16%[12] reported earlier. The high percentage of planned pregnancies in this study partly explains this difference. Differences in socio-economic status in the different populations of women are probably responsible for some of these differences as well.

We found that an overwhelming majority of the pregnant women (298/300) had heard of FA, which was greater than the figures of 64%[13], 67%[14] and 75%[12] from earlier studies. It is also higher than the figures from the USA where, in a 1997 survey[15], only 66% of women had heard of FA.

In our study, only two-thirds (69%) actually knew that FA is a vitamin. Age, parity, Social Class or smoking habits did not influence this knowledge.

A majority of the women (91%) knew that FA prevents NTDs and this knowledge was more likely to be present amongst the married, in women over the age of 30 years and in those with higher education and higher social class. This figure is again much higher than the 21% and 17% reported by Sayers and co-workers[10,13].

Over three-quarters of women were aware of the correct timing for taking FA and married women, those over the age of 30 and those with higher education were more often aware of this. These figures are higher than the 58% reported by Sayers *et al.*[13].

Although a majority of the women (88%) had taken FA at some point in the early pregnancy, only 44.6% had taken it before becoming pregnant. This was again strongly associated with age over 30 years, planned pregnancy, higher social class, married status, non-smoking status and higher educational status. Both of these figures are higher than those reported by McGovern *et al.*, who gave values of 57% and 21%, respectively, in a similar study in Glasgow[16]. McDonnell *et al.*[12] reported in 1999 that only 16% had taken FA before pregnancy in a study in Dublin.

The incidence of neural tube defects has been decreasing since the early 1970s. Kadir *et al.*[17] showed that although a larger number of women probably took folic acid in the 1990s than before, the rate of decline in the true incidence of neural tube defects has not been as dramatic as expected. They speculated that supplementation may not be taken at the right time, or may not be taken by those women who are at the highest risk, or the recommended dose may be too low. Commenting on Kadir *et al.*'s study, Alberman and Nobel[17] stated that FA intake by 15% of pregnant women during their period of observation was not sufficient to demonstrate a decline.

In conclusion, although a vast majority of the pregnant women in this study had heard of FA (99.3%) and many knew about its usefulness (91%), only three-quarters of them actually knew the correct time to take this prophylaxis. Also, 88% had taken FA during the current pregnancy but only slightly more than half of them had taken it before becoming pregnant. Though these figures show an overall improvement from the studies reported earlier[11–13], they are still too low and need to be raised. Because lower socio-economic status, lower educational status, lower age and non-married status have been shown to be risk factors, both in this study and in others[11–13], the challenge for the medical profession to specifically target these groups for further education and

Table 3 Factors associated with the actual intake of FA in the periconceptional period

Variable	Relative risk	95% CI	*P* value
Planned pregnancy	1.54	1.05–2.19	<0.05
Age >30 years	1.35	1.05–1.73	<0.05
Smoker	0.66	0.4–0.91	<0.01
Social Class 1–3	2.93	1.92–4.45	<0.001
Primigravida	1.22	0.96–1.56	0.112
Married	2.18	1.52–3.12	<0.001
Higher education	2.22	1.7–2.68	<0.001

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action cannot be over-emphasised. Food fortification with adequate quantities of FA has been suggested[18] as an alternative strategy.

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