

Awareness and use of peri conceptual folic acid supplements amongst pregnant women at a metropolitan hospital

Abstract

Background: Peri conceptual folic acid prevents 70% of neural tube defects. Worldwide and in Australia 30-64% of pregnant women adhere with current peri conceptual folic acid supplementation guidelines and 39-82% is aware of its timing.

Objectives: This paper focuses mostly on awareness of peri conceptual folic acid supplementation in pregnancy.

Design: Prospective cross-sectional interviewer-assisted survey.

Setting: Ipswich Hospital, Ipswich, Queensland, Australia.

Participants: 400 pregnant women, ≤ 20 week's gestation, attending their "booking in" visit.

Results: Full awareness of the importance of folic acid in pregnancy was evident in 70% of women and was significantly associated with its adherence ($P < 0.05$). Full awareness of the peri conceptual timing was evident in 47% of women and was significantly associated with its adherence ($P < 0.05$). Full awareness of both the importance and timing of folic acid was evident in 36.5% of women.

Conclusion: Full awareness of peri conceptual folic acid supplementation in pregnancy is low. More work is needed to address this so that women receive specific information regarding the importance of folic acid as well as its peri conceptual timing.

Keywords: folic acid, peri conceptual, awareness, pregnancy

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Introduction

Neural tube defects (NTD) result from a failure of the neural tube to close during embryonic development. This begins on day 18 and is complete by day 28 after fertilisation.^{1,2} There is clear evidence that women with a higher intake of folic acid (FA) in the peri-conceptual period (one month before and 3 months after conception) have a decreased risk of NTD.³ However, because so many pregnancies are unplanned, women may not initiate folic acid supplementation until some or all of the period of most benefit has already passed.⁴

Adequate use of peri-conceptual folic acid supplementation (PFS) varies considerably within Australia and worldwide^{5,6} and may be influenced by many maternal factors, including age, education, smoking and socioeconomic status.⁵ One strategy to optimise folic acid intake in women of childbearing age involves improving awareness and knowledge concerning the benefits of FA.⁵ Awareness of FA is strongly associated with its use.^{7,8} Awareness of folic acid in prevention of NTD varies from 50-73% internationally⁸⁻¹⁰ and is around 60% in Australia.¹¹ Within Australia in states such as Queensland where there has been no targeted public health campaign on NTD prevention the figure is likely to be much lower.

There is a dearth of research on FA awareness, awareness of it in NTD prevention and its specific use amongst pregnant women in Queensland.

This study was therefore conducted in an area of Queensland that has a higher socio-economic disadvantaged population compared to the Queensland average.¹¹ This paper will only focus on the awareness of folic acid and of its role in NTD prevention amongst pregnant women attending for antenatal care.

Methodology

This was a prospective cross-sectional survey, over a 7-month period, of women attending for their first booking in visit with the midwife at Ipswich Hospital, Ipswich, Queensland. During the year a total of 1830 women were seen at the antenatal clinic. Women were requested to participate if they spoke good English and were 20 weeks or less pregnant. Clinics were surveyed on each of the five working days of the week with the total of 75 clinic days over the study period. After obtaining informed consent women were interviewed in a private room. A piloted semi-structured interviewer-assisted questionnaire was used. Unprompted, open-ended questions were used throughout to minimise response bias and ensure women's awareness was comprehensively assessed.

Data entry and quantitative data analysis were performed using SPSS Statistics Version 19.0.¹² Bivariate analysis was performed using Pearson's chi-squared test. Logistic regression was performed to generate Odds Ratios, 95% Confidence Intervals and *P* values for all socio-demographic characteristics of respondents. Data from open-ended responses were coded and presented as themes.

Results

Over a period of 7 months 410 women were eligible; 8 women declined and 2 were excluded as the gestational age was subsequently noted to have been >20 weeks by ultrasound scan. Demographics data showed that 49.0% had high school or less education, 38.8% were unemployed, 20% had a total household income of < \$35000 per annum and 11.8% had private health insurance. Overweight or obesity was present in 59.8% and 31% (124/400) of respondents were still smoking.

Women’s awareness of folic acid supplementation (incorporating awareness of importance of folic acid as well as its peri-conceptual timing) was classified as “full awareness” in 36.5% (146/400; 95%CI, 31.8-41.2%) and 87.7% (128/146) of these women were aware of FA prior to pregnancy. “Medium awareness” was present in 24.3% (97/400) and “poor awareness” in 39.3% (157/400) of respondents. Awareness of PFA was significantly associated with its adherence ($P<0.001$) with higher awareness increasing adherence (Figure 1). Additionally, awareness of FA prior to pregnancy was significantly associated with use ($P=0.024$).

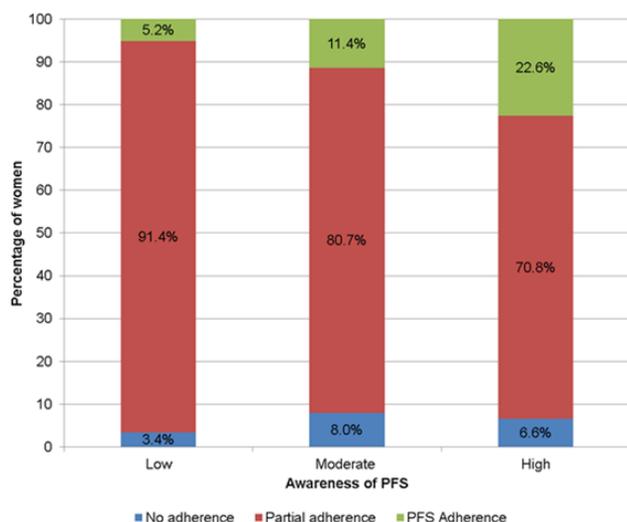


Figure 1 Relationship between peri conceptual folic acid (PFA) awareness and its adherence.

When asked, “Have you heard of folate or folic acid?” 91.3% (365/400) of women responded positively. Having heard of FA was not significantly related to PFS adherence. Of the women who had heard of FA, 81.1% (296/365) had heard of it prior to pregnancy. Having heard of FA prior to pregnancy was significantly associated with PFS adherence ($P=0.024$). Women who had not heard of folate or FA were excluded from further analysis of awareness.

Awareness of what substance folic acid

When asked what substance folate or folic acid the various responses are shown in Table 1. Themes that emerged were categorised as high, moderate and low levels of awareness. A high awareness was present in 32.6% (119/365) of women, who identified it as a B vitamin or vitamin. A moderate level of awareness was present in 15.3% (56/365) of respondents, whilst the largest proportion, 52.0% (190/365), had a low level of awareness. The majority of women with a low level of awareness, 23.8% (87/365), responded that they were unsure what folate or FA was.

Table 1 Awareness of what folic acid

Substance	n	%
Total	365	100
High	119	32.6
Vitamin	117	32.1
B Vitamin	2	0.5
Moderate	56	15.3
Tablet/ Supplement	32	8.8
Vitamin or Mineral	23	6.3
In green leafy vegetables	1	0.3
Poor	190	52
Unsure	87	23.8
Mineral	38	10.4
Iron	13	3.6
Protein	11	3
In vegetables	10	2.7
Carbohydrate	8	2.2
Nutrient	5	1.4
Fat	5	1.4
Calcium	3	0.8
Acid	2	0.5
Fruit	2	0.5
In baby formula	1	0.3
Fibre	1	0.3
By-product of chemical reaction	1	0.3
Trace element	1	0.3
In fruit and vegetables	1	0.3
Pain medication	1	0.3

Awareness of the importance of folic acid supplements

When asked if FA supplements are important for women to take 98.4% (359/365) of women replied affirmatively. These women were asked to explain their reasoning. The themes that emerged from these responses are shown (Table 2). High level awareness of the role of FA in preventing NTD was evident in 70.5% (253/359). High awareness was significantly associated with adequate PFS use ($P=0.002$). Poor awareness was present in 25.3% (91/359) women - the most common responses were that folic acid was important for growth of the baby 14.5% (52/359) and for pregnancy 7.2% (26/359). The most common incorrect reasons provided for the importance of FA in pregnancy were prevention of Down’s syndrome (17 women), cerebral palsy (6 women), cystic fibrosis (2 women) and to help iron levels (9 women).

Awareness of the recommended timing of peri-conceptual folic acid supplementation

In response to the question “When should women take FA supplements?” 47.3% (189/365) of women’s responses were adequate as they encompassed the recommended PFS timing, for at least one

month prior to conception and for at least the first trimester. Adequate awareness of PFS timing was significantly associated with PFS adherence ($P < 0.001$). Moderate awareness was present in 32.0% (117/365) of women who had nonspecific responses that covered the correct time period. Poor awareness in the remaining 16.2% (59/365) of women encompassed time periods that did not include all of the recommended peri conceptual timing of supplementation (Table 3).

Table 2 Awareness of the importance of Folic acid supplements

Themes	n	%
Total	359	100
High	253	70.5
Prevents neural tube defects	21	5.8
Prevents spina bifida	191	53.2
Development of/ preventing defects of the baby's brain/ spinal cord/ back	41	11.4
Moderate	15	4.2
Prevents birth defects	15	4.2
Poor	91	25.3
Growth of baby pregnancy	52	14.5
Important for women	26	7.2
Important for Iron levels/ prevent anaemia	5	1.4
Was recommended to me - don't know why though	3	0.8
Other	1	0.3
Unsure	2	0.6
	2	0.6

Table 3 Awareness of peri conceptual timing amongst women who have heard of folic acid.

	n	%
Total who have heard of folic acid	365	100
Adequate	189	47.3
For at least one month prior to conception and for at least the first trimester		
Moderate	117	32
Prior to conception and during pregnancy		
Poor	59	16.2
During pregnancy	24	6.6
During pregnancy and breast feeding	10	2.7
First trimester	4	1.1
Unsure	12	3.3
All the time	3	0.82
If anaemic	1	0.27

Awareness of the recommended dose of peri conceptual folic acid supplementation

Recommended dose of PFS was known by only 9.3% (34/365) of women, whilst 12.3% (45/365) gave an incorrect dose and 78.4% (286/365) did not know the recommended dose.

Awareness of folate-rich foods

Women were prompted to identify which food groups are good sources of folate. The most frequently identified food groups were vegetables (90.7%), fruit (71.5%), cereals (65.5%) and beans/pulses/legumes/nuts (64.7%). The food group though lowest in folate was alcohol (97.5%) and most respondents were unsure about offal (47.4%) as a source of folate.

Awareness of folic acid food fortification

Nearly 60% (218/365) of women who had heard of folate were aware of food fortification. The most commonly identified fortified foods were cereals 57.8% (126/218) and bread 41.3% (90/218).

Socio-demographic and health characteristics related to folic acid awareness

Socio-demographic factors significantly related to lower FA awareness on univariate analysis were age <25years (OR 2.46, 95%CI 1.54-3.91, $P < 0.001$), neither married nor de facto (OR 3.18, 95%CI 1.60-6.31, $P = 0.001$), lower education level (\leq Grade 10 OR 3.41, 95%CI 1.68-6.93, $P = 0.001$ and lack of private health insurance (OR 2.94, 95%CI 1.37-4.40, $P = 0.001$). In the adjusted model only age <25years (OR_{adj} 2.06, 95%CI 1.20-3.52, $P = 0.009$) and lack of private health insurance (OR_{adj} 2.36, 95%CI 1.13-4.94, $P = 0.023$) remained significant.

Health characteristics that were significantly related to lower FA awareness were unplanned pregnancy (OR 2.28, 95%CI 1.31-3.96, $P = 0.004$) and not actively avoiding pregnancy (OR 2.01, 95%CI 1.25-3.22, $P = 0.004$) and pregnancy confirmed at a late gestation (5-8weeks OR 1.91, 95%CI 1.20-3.04, $P = 0.006$; ≥ 9 weeks OR 4.08, 95%CI 1.28-12.99, $P = 0.017$).

Discussion

This study has shown that nine out of ten women had heard of folic acid, which is amongst the highest reported worldwide⁸. However, having simply heard of FA was not sufficient knowledge; only one in three women were aware that folate or FA is a vitamin, with over half of the women citing an incorrect answer or that they were unsure of what substance FA was.

A more specific awareness of FA during pregnancy was quite low at 70%. Matsuo et al.¹³ also evaluated awareness of FA use among 836 young female college students in Japan. He observed that although 42% of them had some knowledge of FA, only 9% had a detailed understanding of the preventive role of FA. This was similar to that reported in South Australia (77% for NTD/spina bifida prevention).¹⁴ An increasing trend in the percentage of women who are aware of the benefits of folic acid to up to 85% has been reported from US.¹⁵

In addition two in every three women had only a moderate or poor level of understanding of the importance and timing of FA recommendations indicating awareness of the peri conceptual use is also still inadequate. This is analogous to the two Australian studies^{14,16} which showed that despite a high level of awareness of the importance of FA, far fewer women (1 in 3) knew the correct peri-conceptual timing.

Socio-demographic characteristics in this study that predict lack of FA awareness were age <25years and lack of private health insurance. Both of these associations have previously been reported

in Australian^{14,17} and internationally.^{13,18,19} Like us one of these²⁰ noted that although overall 77.6% of women surveyed were aware of the benefits of taking FA before pregnancy, this was 32.3% in the 15-19 years age group compared to 87% of those aged 30-34 and 93% in the 45-49 years age groups.

As we have clearly demonstrated that women of reproductive age or women planning to conceive are mostly unaware of the preventive role of FA, public health promotion initiatives are required. Dissemination needs to occur by government, mass media and medical societies. They also need to be designed to target younger women and women of lower socio-economic grouping, women prior to their childbearing years.¹⁹ Information strategies for female students as a part of health education or sex education components of school curricula would seem to be quite rational and effective.²¹ They need to be informed about the importance of folic acid as well as the peri conceptual timing of PFS to facilitate the health-related behaviour change. The programs also need to be ongoing, so that each cohort of women is made aware of and takes advantage of the benefits of peri conceptual folic acid supplementation. Too often public health campaigns are only temporary in nature and therefore have no lasting impact. In the Netherlands with over ten years of folic acid health promotion initiatives, the highest rate of its correct use in the world has been demonstrated.⁷

Acknowledgments

None.

Conflicts of interest

The authors have no conflict of interest to declare.

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