Folic Acid Supplement Use in the Prevention of Neural Tube Defects in 2009

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Abstract
In 2008, planned folic acid fortification for the prevention of Neural Tube Defects (NTD) was postponed. Concurrently, the economic recession may have affected dietary folic acid intake, placing increased emphasis on supplement use. This study examined folic acid supplement use in 2009. A cross-sectional survey of 300 ante-natal women was undertaken to assess folic acid knowledge and use. Associations between demographic, obstetric variables and folic acid knowledge and use were examined. A majority, 284/297 (96%), had heard of folic acid, and 178/297 (60%) knew that it could prevent NTD. Most, 270/297 (91%) had taken it during their pregnancy, but only 107/297 (36%) had used it periconceptionally. Being older, married, planned pregnancy and better socio-economic status were associated with periconceptional use. Periconceptional folic acid use in 2009 was very low, little changed from earlier years. Continuous promotion efforts are necessary. Close monitoring of folic acid intake and NTD rates is essential, particularly in the absence of fortification.

Introduction
Until 2006, the mainstay of NTD prevention in Ireland was based on dietary intake of folic acid, including daily 400 microgram supplements, promoted through media campaigns aimed at women of child-bearing age. However, a number of studies of folic acid supplement intake in the late 1990s and earlier in this decade showed that at most only 25-27% of pregnant women were actually taking folic acid during the crucial periconceptional period. As a consequence of this low uptake, and a rate of NTD in Ireland that was still higher than many other European countries, a joint report from the Dept of Health & Children (DoHC) and the Food Safety Authority of Ireland (FSAI) in 2006 recommended that Ireland should fortify staple foodstuffs with folic acid 1, a step already taken some years earlier in the United States and Canada. The FSAI was given the responsibility of implementing fortification. However, by 2007, baseline studies undertaken by the FSAI in preparation for fortification showed that serum folic acid in women of child-bearing age was higher than in earlier years, possibly through the availability of an increased range of foods voluntarily fortified with folic acid by food producers.

The FSAI also observed in a study of 2005 and 2006 births, that the rate of NTD had declined a little further from earlier in the decade. These findings, although welcome, were in contrast to findings in other countries 2. In addition, safety concerns were raised regarding the levels and effect of unmetabolised blood folate and cancer risk 3-5. It was therefore concluded in a report from the FSAI in 2008 that mandatory folic acid fortification of foodstuffs should be postponed for an unspecified period 6, thereby leaving the original policy of promoting dietary intake and supplementation in place. However, with the onset of the most severe economic downturn in decades, affecting a large proportion of the population in many aspects of their lives, it is unclear if dietary behaviour, including the consumption of folic acid containing foods has changed. If there has been a reduction in the consumption of such foods, then, in the absence of mandatory fortification, more emphasis will need to be placed on the continued promotion of folic acid supplements during the periconceptional period. This study examined the use of folic acid supplements in a cross-section of women attending maternity hospitals in Dublin during the autumn of 2009.

Methods
During the period July to September 2009, a cross-sectional survey was conducted at the three maternity hospitals in Dublin which provide public antenatal services for women in the east of Ireland (counties Dublin, Wicklow and Kildare), with a catchment population of approximately 1.3 million people. Three hundred consecutive women (100 in each hospital) attending their first antenatal booking appointment were interviewed. Only women who have lived in the region for at least two years were eligible for the survey; women who were recent immigrants or whose knowledge of English was poor were excluded for reasons of communication, or because they would not have had the same exposure to folic acid promotional campaigns as other women resident in the region.
An interviewer-administered questionnaire was adapted from that used in a number of previously published studies of folic acid intake in the same setting in Dublin during the previous 15 years, with no change in the core questions from previously. These included questions on the respondents' knowledge and sources of advice on folic acid, as well as their consumption of folic acid supplements before and during pregnancy. Demographic and obstetric variables obtained included age, marital status, planning of pregnancy, and gravidity. Respondents were also asked if they were General Medical Services (GMS) patients; in general, GMS patients are entitled to all medical care free of charge, including prescription drugs. Approximately one third of the Irish population are GMS patients, eligibility for which is based primarily on low income. We used GMS status as a proxy measure of poorer socio-economic status. A univariate analysis using chi-squared tests was undertaken. The statistical software package Epi Info 6.04 was used in analysing the data.

Results
The response rate was 99% (297/300). The demographic and obstetric profile of the respondents is shown in Table 1. Approximately half had planned their pregnancy and a similar proportion were married. The mean and median age was 29 years. Table 2 shows respondents' folic acid knowledge and use. Virtually all respondents had heard of folic acid, with 60% knowing that its use is for the prevention of NTD. More than half of respondents reported being advised to take periconceptional folic acid. A little over a third (36%) of all women in the sample had taken folic acid during the periconceptional period.

Table 3 shows the results of a univariate analysis. Planning of pregnancy and being married showed the strongest association with taking periconceptional folic acid. Alternatively, women under 30 years of age were significantly less likely to have taken periconceptional folic acid, as were those who were GMS medical card holders. The main sources of information and advice about folic acid were the general practitioner (35%), the media (23%), and the internet (23%). Other sources included doctors in hospitals, chemists, public health nurses, midwives, leaflets, books on pregnancy, women’s clinics, school or college.

Discussion
This study was undertaken to assess folic acid supplement use by women of childbearing age following the postponement of planned mandatory fortification of staple foodstuffs with folic acid in Ireland. The demographic and obstetric profile of the women interviewed is similar to those of studies earlier in the decade, although with a higher proportion of respondents over the age of 30 years reflecting the increase in mean maternal age observed across many countries in northern Europe over the past few years.

Although virtually all women attending the ante-natal clinics had heard of folic acid, we found that only 36% had taken periconceptional folic acid in late 2009. This finding is disappointing considering it is nearly eighteen years since it was first recommended in Ireland. It represents a small increase compared with the last of these studies in 2002, which showed a 27% uptake of folic acid. Our findings are comparable with another recent study of pregnant women in one Dublin maternity hospital which showed a periconceptional uptake of 28% earlier study in 2003/2004 in another Dublin maternity hospital showed an uptake considerably less at 14%. Although the methods of these studies were somewhat different, the one consistent finding in all of them is a low periconceptional uptake. Nationally, a study of dietary habits of pregnant women in Ireland from 2001-2003 also showed a low uptake of 45% in the three months prior to pregnancy, with determinants of uptake (planned pregnancy, marital status, GMS status and age) similar to those in our study.

We found that planned pregnancies still represent only 50% of all pregnancies and has changed little over the past decade. Considering that planning of pregnancy is the most significant factor associated with periconceptional folic acid use in Ireland, it is difficult to see
how folic acid uptake during this crucial period can be improved, notwithstanding targeted promotional measures. At best, the likelihood is that considerably less than half of those women who become pregnant will have taken periconceptual folic acid. This implies that policies reliant on taking folic acid supplements as the primary means of reducing the risk of NTD in Ireland may not succeed. Apart from supplements, the other source of folic acid is through dietary intake of foods voluntarily fortified with folic acid. It is unclear how the economic recession has impacted behaviour on the part of both food producers and consumers. Even if food producers who voluntarily fortify particular foods with folic acid continue to do so at their own expense, there is no guarantee that consumers will continue to purchase these fortified foods to the same extent as in the past, especially if they are at additional cost. No clear information is available on consumers purchasing of folic acid fortified foods since the onset of the economic downturn, although there is ample evidence in the media that consumers have sharply cut-back and tightened their purchasing habits.

In the absence of fortification, with reliance on a low uptake of supplements and uncertain dietary intake during these years of economic stringency, it is possible that that the decline in NTD numbers observed during the past decade may reverse. Unfortunately, monitoring the numbers of NTD affected pregnancies at present is problematic. While the survey of the numbers of NTD affected pregnancies in Ireland to estimate baseline data in preparation for fortification was conducted as a special study for the years 2005 / 2006, no national data on NTD are available for subsequent years. Three HSE regional congenital anomaly registries gather data on birth defects including NTD, but only 62% of births nationally are included. In addition, the registries are hindered in their gathering of some types of data due to current data protection limitations, particularly data on prenatally diagnosed major anomalies (e.g. NTD, chromosomal anomalies) that do not go to term, either as a result spontaneous abortion or termination abortion. Notwithstanding this, the largest HSE registry in the East of the country, covering 37% of national births, has noted an increase in the number and rate of NTD affected births both in 2007 and 2008 compared with the previous two years (personal communication), and may signal a reversal of the low rates observed in 2005 / 2006.

For European countries, the European Surveillance of Congenital Anomalies (EUROCAT) network recommends a multifaceted approach in folic acid promotion. If Ireland is to maintain a lower rate of NTD than in earlier decades, then co-ordinated measures are necessary to gather up-to-date information on both rates of NTD and folic acid use through supplements and dietary intake. Further surveys and measurement of other parameters such as blood folate levels must be implemented to guide further policy adjustment on folic acid in the most timely way.

References

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Comments: