Periconceptional Folic Acid Supplementation in a Nationally Representative Sample of Mothers

Abstract:
S McNally, A Bourke
School of Psychology, Trinity College, College Green, Dublin 2

This study reports recent trends in periconceptional folic acid use in Ireland using archived data from Growing Up in Ireland – the National Longitudinal Study of Children. Of a sample of 10,891 mothers, 6,936 (64%) reported taking folic acid before conception and 10,157 (93%) reported taking folic acid during the first trimester of pregnancy. Younger (OR=0.38, 95% CI=0.29-0.50), lower income (OR=0.59, 95% CI=0.51-0.68), lower educated (OR=0.77, 95% CI=0.66-0.89), and single mothers (OR=0.46, 95% CI=0.40-0.52) were less likely to have taken folic acid pre-conception. A similar pattern was found post-conception with younger (OR=0.58, 95% CI=0.40-0.84), lower income (OR=0.40, 95% CI=0.38-0.66), and single mothers (OR=0.46, 95% CI=0.40-0.52) less likely to have taken folic acid post-conception. The findings highlight an ongoing need for targeted promotional campaigns to increase supplementation rates among younger and socially disadvantaged mothers.

Introduction
Neural tube defects (NTDs) are a serious and common type of birth defect, encompassing a broad range of congenital spine and spinal cord defects. Up to 70% of neural tube defects can be prevented by taking folate in its synthetic form, folic acid, before conception and in the first 28 days of pregnancy. This study aimed to add to knowledge on folate use in pregnancy in Ireland using recent data on the prevalence of, and trends in, folic acid use in different age groups and locations. The sample was drawn from the Irish Child Benefit register held by Revenue. In five of the eight years covered by the register (2003-2010), 38% of the population had utilised the benefit. The sample sample was calibrated to the child population of Ireland for age, gender, and location. To ensure that the sample was representative of children and their families from different locations in Ireland and from different social and economic backgrounds, this study sought to capitalise on available sociodemographic data from this large primary sample to examine predictors of folate acid use, including maternal age, income, education, age, and relationship status.

Methods
The infant cohort sample of GUI consisted of 11,134 nine-month-olds and their families who were resident in Ireland between September 2008 and April 2009. The project was subject to ethical approval by a Research Ethics Committee convened by the Department of Health and Children. Using the Child Benefit register as a sampling frame, sample selection was determined by a systematic random sampling procedure, using a random start and a constant sampling fraction. The project was pre-stratified by marital status, county of residence, nationality, and number of children in the child benefit claim.

A team of trained interviewers carried out interviews with primary caregivers at home, nine months after the birth of the study child. Primary caregivers were asked to complete a main questionnaire and a sensitive questionnaire. Data from the main questionnaire were archived in an anonymised microdata file (AMF), and include information on folic acid use, maternal characteristics and socio-demographic variables. Sensitive data regarding pregnancy intention, and maternal smoking and drink behaviours were not included in the AMF and are therefore not included in this analysis. Primary caregivers completed a detailed questionnaire regarding several aspects of the infant’s development, including parental behaviours before, during, and after the birth of the child. 11,093 mothers completed the primary questionnaire. In the main questionnaire, mothers were asked by the interviewer to report: (1) whether or not they took folic acid or folate before becoming pregnant with the study child; and (2) whether or not they took folic acid or folate during the first trimester of pregnancy. Ninety-eight percent of mothers responded to both of these questions (n = 10,891) and the following analysis is based on this sample population.

Results
Data were re-weighted prior to analysis for any changes in the frequency of folic acid/folate use among the overall population. The data were then examined using binary logistic regression to determine the frequency of folic acid/folate use among mothers in Ireland. Data were then examined using binary logistic regression to determine in which mothers age, income, education, relationship status, and location (urban or rural) successfully predicted folic acid use. Binary logistic regression was used to calculate the adjusted odds ratios (ORs) with 95% confidence intervals (CIs) as estimates of effect. The analysis model was then fitted to the data: (1) to examine the maternal characteristics associated with pre-conceptional folic acid use and (2) to examine the maternal characteristics associated with folic acid use in the first trimester of pregnancy. The category which had the largest number of participants was chosen as the reference category for each variable in the regression model. Statistical analysis was performed using PASW statistics 18 for Windows Release 18.0 (SPSS Inc, Chicago, IL).

Results Pre-conceptional Folic Acid Use
Results indicated that 64% of mothers took folic acid prior to becoming pregnant. The largest disparity in terms of folate use occurred by maternal age. Seventy-four per cent of the women from the older age group (over 35) used folic acid prior to becoming pregnant, compared with 29% of the younger age group (under 20). Adolescent mothers were least likely to take folic acid prior to conception (OR=0.38, 95% CI=0.29-0.50). As shown in Table 1, analysis using a Binary Logistic Regression indicated that mothers with a higher income, education, and age, and those in a relationship were significantly more likely to take folic acid prior to becoming pregnant. Mothers living in rural locations were more likely than mothers living in urban locations to report taking folic acid before pregnancy but this difference was not significant in the fully adjusted model.

First Trimester Folic Acid Use
Results indicated that 93% of mothers reported taking folic acid in the first trimester of pregnancy. Table 2 presents the maternal use of folic acid use during this period. As with pre-conceptional use, mothers with a higher income, education, and age, and those in a relationship were significantly more likely to take folic acid during pregnancy. Mothers living in rural locations were more likely than mothers living in urban locations to report taking folic acid during pregnancy but this difference was attenuated in the fully adjusted model.

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Almost two thirds of mothers interviewed reported taking folic acid before pregnancy while the vast majority of mothers reported taking folic acid during the first trimester of pregnancy. The high percentage of mothers who reported folic acid use during pregnancy in the current study is similar to recent supplementation studies in Ireland of Irish mothers. Trends reported here regarding socio-demographic factors affecting folic acid use are in keeping with findings from other studies investigating health inequalities in folic acid supplementation. However, the current study found that women of lowest income, education, and age are most at risk for inadequate intake of folic acid prior to conception and during the first trimester of pregnancy, and that single supplement users are also significantly less likely to report having participated in these health behaviours. These findings highlight a group of mothers currently most at risk for non-compliance with folic acid health recommendations in Ireland, and provide significant support for previous calls for targeted awareness campaigns that can reach this group of disadvantaged mothers.

References