



Mental models of pregnancy may explain low adherence to folic acid supplementation guidelines: a cross-sectional international survey



Bethan Fulford^a, Nick Macklon^b, Jacky Boivin^{a,*}

^a School of Psychology, Cardiff University, Tower Building, Park Place, Cardiff, South Wales, CF10 3AT, United Kingdom

^b Division of Human Development and Health, Faculty of Medicine, University of Southampton, Southampton General Hospital, Mailpoint 815, Princess Anne Hospital, Coxford Road, Southampton SO16 5YA, United Kingdom

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ABSTRACT

Objective: Mental models of pregnancy refer to women's perceptions of whether their pregnancies are susceptible to poor health outcomes. Mental models influence health behaviour during pregnancy. In the present study we examined whether mental models of pregnancy are linked to compliance with folic acid supplementation guidelines.

Study design: Cross-sectional survey implemented in four countries (France, Germany, Belgium, and Poland) of women planning a pregnancy (pregnancy planners, $n = 325$) or within the first 18 weeks of pregnancy (currently pregnant, $n = 326$). Logistic regression was used to examine the association between mental models of pregnancy (i.e. whether women felt susceptible to the health consequences of not taking folic acid supplements), maternal background, and use of folic acid supplements.

Results: Most women (82.8%) had heard of folic acid but only 45.5% were taking folic acid supplements. Use of folic acid supplements did not differ between pregnancy planners and currently pregnant women. Women who believed that they had good general and obstetric health (e.g. no history of illness or miscarriage) and those living in adverse health environments (e.g. smoking, living in poverty) had mental models of being insusceptible to the health consequences of not taking folic acid supplements ($p < 0.001$) and were the lowest users of folic acid supplements ($p < 0.01$). Mediation analyses showed that perceived susceptibility was the common pathway through which the seemingly disparate predictors of folic acid supplementation (i.e. maternal background characteristics) operate.

Conclusions: Maternal background characteristics may shape women's mental models of pregnancy and its susceptibility to health complications. Mental models could therefore be the common factor explaining poor adherence to folic acid supplementation guidelines. Findings suggest that in the 'invulnerable mum' mental model, perceived susceptibility to health threats is reduced because the good health of the mother is believed to protect the pregnancy from threat, whereas in the 'invulnerable pregnancy' mental model, perceived susceptibility is reduced because pregnancy is viewed as naturally robust or immune to risk. The challenge for the practitioner wanting to increase adherence to periconceptional health advice is to elicit and correct patients' erroneous beliefs about pregnancy.

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1. Introduction

Neural tube defects (NTDs) affect around 0.086% of births [1]. Worldwide around 300,000 babies are born with NTDs every year [2]. Folic acid supplementation can prevent 72% of cases of NTD [3], but only 31–37% of women adhere to the recommended

400 microgram (μg) daily folic acid supplement from the point at which they begin trying to conceive until week 12 of pregnancy [4,5]. Finding effective ways to increase compliance with folic acid supplementation guidelines is a key priority for practitioners and policy makers, according to the National Institute for Health and Care Excellence (NICE) [6]. Research shows that non-compliance with folic acid supplementation is more common amongst women who see themselves as healthy, as indexed by not having any previous obstetric or general health problems and by having 'proven' fertility (i.e. having given birth before) [5,7–9].

* Corresponding author. Tel.: +44 02920 875289.
E-mail address: boivin@cardiff.ac.uk (J. Boivin).

Non-compliance is also more prevalent amongst women with adverse health environments, indicated by factors such as lower socio-economic status, having an unplanned pregnancy, and smoking and drinking during pregnancy [5,7–9]. Why these associations exist, however, and what should be done to optimise compliance, are unclear. The aim of the present investigation was to test a theoretically driven explanation for poor compliance with folic acid supplementation guidelines.

Campaigns to increase adherence to folic acid supplementation guidelines have largely focused on increasing knowledge and removing barriers (e.g. cost of supplements) [10–12] but such an approach results in compliance rates no higher than 40–50% [10–12]. Compliance with folic acid supplementation guidelines may be better understood using the Health Belief Model (HBM) [13–15], which is a psychological theory of health behaviour. The HBM argues that demographic and psychological factors predict an individual's beliefs or perceptions about a given health condition and preventive health action. These beliefs influence the likelihood that the individual will take action to improve their health. According to the HBM, to make progress on compliance with folic acid supplementation recommendations it may be necessary to investigate perceived susceptibility, which refers to how likely an individual believes it is that they could contract a given health condition [13–15]. Perceived susceptibility may be particularly relevant to compliance with folic acid supplementation guidelines, given the low base rate of NTDs. If women perceive themselves or their pregnancies to be unsusceptible to poor health outcomes then they are unlikely to fully comply with preconceptional health recommendations [13–15].

Beliefs about susceptibility to a given illness come from many sources, but two from which people make inferences are their own health and the health of others in their environment (i.e. social norms) [16]. According to the HBM, women who perceive themselves as healthy may be less likely to comply with folic acid supplementation recommendations because they believe that they are 'invulnerable mums' whose health protects the pregnancy from risk. Indeed, mothers with good prior health express disbelief following a diagnosis of infant NTDs: "We thought we were pretty immune because we were not that old and we were both really healthy and we really looked after ourselves" [17, p. 154]. What constitutes a norm in our environment also contributes to beliefs about susceptibility to illnesses. Non-compliers with folic acid supplementation guidelines are more likely to live in adverse health environments, as indexed by demographic profiles (e.g. lower social class [8,9]) and unhealthy behaviours (e.g. smoking during pregnancy [5]). Women living in adverse health environments may routinely be exposed to seemingly healthy births occurring despite these suboptimal conditions and such norms may give rise to belief in the 'invulnerable pregnancy'. Women themselves have shown the impact of social norms on their beliefs about folic acid supplementation: "I would not berate yourself for not taking [folic acid] . . . Some women do everything right . . . and don't get a healthy baby – and others, like one of my . . . cousins, smoke, drink and take drugs through their pregnancies – and both her babies were fine" [18]. This suggests that perceived susceptibility may mediate the link between perceived maternal health/adversity and use of folic acid supplements.

The aim of the present study was to examine whether women with high perceived health or adverse health environments feel less susceptible to the health risks of folic acid deficiency. It was hypothesised that women with high perceived health and those with adverse health environments would feel less susceptible and be less likely to take folic acid supplements. In addition, it was expected that the link between perceived health/adversity and use of folic acid supplements would be mediated by perceived susceptibility.

2. Materials and methods

2.1. Participants

Recruitment for the study was done by a healthcare research company (Opinion Health) in four countries (France, Germany, Poland, and Belgium). Inclusion criteria were (1) female, (2) aged between 18 and 45 years, and (3) actively planning a pregnancy (i.e. not pregnant but planning a pregnancy) or being within the first 18 weeks of pregnancy (i.e. currently pregnant). Women actively planning a pregnancy (i.e. pregnancy planners) were eligible if they had been trying to conceive for 6 months or less, to ensure that the sample did not include people with fertility problems (who are likely to have a different approach to pregnancy preparation than fertile couples [19]). Of the 3762 women screened, 925 were eligible. Of those eligible, 169 exited the survey without completing, resulting in 756 completed responses. A total of 105 responses were excluded because they did not meet the quality index threshold automatically assigned by the market research company (based on factors such as the presence of response sets). The final sample size was therefore 651 women (326 currently pregnant, and 325 pregnancy planners).

2.2. Materials

2.2.1. Survey

The HBM and a literature review regarding the causes and correlates of non-compliance with folic acid supplementation recommendations informed the selection of survey items. Variables related to demographic, health, obstetric and lifestyle factors were measured as in previous research linking these variables to folic acid supplement use [5,7–9,20]. The final survey consisted of 41 questions for currently pregnant women and 37 questions for women planning a pregnancy. Only variables relevant to analyses presented in this paper are described.

2.2.2. Demographic characteristics

Demographic variables were age (calculated from year of birth), relationship status, education level, household income, employment status, and migrant status (whether participants were born in their country of residence). Whether the pregnancy was planned/unplanned amongst currently pregnant women was determined by an affirmative response to either 'just before I became pregnant with my current pregnancy I was sexually active, not using contraception, and trying to get pregnant' or to 'just before I became pregnant with my current pregnancy I did not plan to get pregnant' (adapted from [21]).

2.2.3. General health, obstetric characteristics, and lifestyle factors

General health was assessed by asking participants whether they currently or had ever had a serious medical illness or chronic disease. The obstetric characteristics were parity and ever having had a miscarriage. The lifestyle factors were whether participants currently smoked, number of units of alcohol consumed per week, and whether participants were more than 13 kg overweight before their pregnancy, which is an empirically established risk factor for infertility that discriminates between medically confirmed fertile and infertile women [22].

2.2.4. Perceived health and adversity

Composite variables were created for perceived health and adversity, based on indicators of non-compliance in previous research. First, variables were coded 0 or 1 for the absence or presence (respectively) of risk for poor folic acid supplement uptake based on associations observed in the literature [5,7–9,20]. Second, indicators were summed to create the composite variable.

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