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Original article

Iron supplement use in pregnancy – Are the right women taking the right amount?

Rahul Chatterjee [a], Antonia Shand [a, b], Natasha Nassar [a], Mariyam Walls [b], Amina Z. Khambalia [a, *]

[a] Clinical and Population Perinatal Research, Kolling Institute, University of Sydney, NSW, Australia
[b] Department of Obstetrics and Gynecology, Royal Hospital for Women, Randwick, NSW, Australia

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SUMMARY

Objectives: To examine the prevalence and determinants of iron supplement use and the amount of iron consumed from iron-containing supplements.
Methods: A cross-sectional survey was performed in antenatal clinics in two tertiary hospitals in Sydney, Australia between January and March 2014.
Results: Of 612 (91% response rate) pregnant women, 589 with complete data were analysed. Overall iron-containing supplement use was 88.0%, of which 70.1% was multivitamin (MV) only, 7.2% was iron-only and 22.2% was both. Use of iron-containing supplements was associated with increased gestational age, a diagnosis of anaemia or iron deficiency (ID) in the current pregnancy and pre-pregnancy use of an iron-containing supplement. Several risk factors for ID or anaemia such as non-red meat eating and previous miscarriage were not associated with current iron supplement use. About 65% of women diagnosed with ID, and 62.3% of women diagnosed with anaemia were taking an iron-only supplement, with or without a MV. The proportion of women consuming low (<30), preventative (30–99) and treatment (≥100) mg/day doses were 36.8%, 45.4%, and 17.8%, respectively. Only 46.7% of women diagnosed with ID were taking ≥100 mg/day iron from supplements, while 23.3% were taking <30 mg/day.
Conclusion: Women are consuming varying doses of iron and some high-risk women are taking inadequate doses of iron to prevent or treat ID or iron deficiency anaemia. Healthcare professionals are best positioned to advise women on iron supplement use in pregnancy and should educate women individually about the type and dose of supplement best suited to their needs.

1. Introduction

It is well established that women are at increased risk of iron deficiency (ID) and iron deficiency anaemia (IDA) during pregnancy and are often unable to meet the increased iron requirements of pregnancy from dietary sources alone [1]. Dietary reference values for iron intake during pregnancy vary by geographical region. In Australia, the recommended daily intake for iron in pregnancy is 27 mg/day [2], which is similar to other developed countries [3]. However, like in other developed countries (USA/Canada, United Kingdom, Europe, New Zealand, and Japan), data from Australian pregnant women indicate that dietary iron intakes are below national nutrient recommendations [3].

There is strong evidence that iron supplementation in pregnancy improves maternal iron status and reduces the risk of IDA [4]. In fact, the provision of iron supplements to pregnant women is one of the most widely practiced public health measures [5]. However, there is no consensus worldwide regarding the optimum iron dose for supplementation during pregnancy, with recommendations varying between 30 and 200 mg/day [6]. Recommendations not only vary by iron dose, but also by whether iron supplementation is routine (treatment of all pregnant women regardless of their iron status) or selective (only women with or at risk of developing ID or IDA), and whether iron supplementation is for prevention or treatment of IDA and or ID. To date, it is still not clear if health

* Corresponding author. Kolling Institute, Building 52, University of Sydney, Royal North Shore Hospital, St Leonards, NSW 2065, Australia. Tel.: +61 2 9462 9810; fax: +61 2 9906 6742.
E-mail address: amina.khambalia@sydney.edu.au (A.Z. Khambalia).

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professionals should recommend routine or selective supplementation.

The International Nutritional Anemia Consultative Group (INACG) and the World Health Organization (WHO) both recommend universal supplementation in pregnancy with 60 mg of elemental iron daily for the prevention of ID, and if anaemia is detected, treatment with 120 mg of iron daily for three months [7,8].

Among developed countries, the United States and Canada recommend routine iron supplementation in pregnancy with 30–60 mg of elemental iron daily [9–12]. Other developed countries, such as the United Kingdom, Germany, Norway, New Zealand, and Australia recommend selective iron supplementation; however few of these countries provide guidance on the dose of supplemental iron [13]. In the UK 65 mg of elemental iron daily is recommended for non-anaemic women at increased risk of iron depletion (i.e. women with previous anaemia, multiple pregnancy, consecutive pregnancies with less than a year's interval between, and vegetarians) [14]. The recommended dosage of daily elemental iron to treat ID or IDA is 60–120 mg in the US [10,11], 100–200 mg in the UK [14] and 100 mg in Norway [15,16].

In Australia, there are no national guidelines that provide recommendations on dosage of iron supplementation during pregnancy. The Royal Australian and New Zealand College of Obstetricians and Gynaecologists (RANZCOG) recommend investigation and treatment of anaemia using haemoglobin levels at the first antenatal visit and again at approximately 28 weeks' gestation, as well as iron supplementation for pregnant women at particular risk of ID, including vegetarians and women with multiple pregnancies [17]. A wide range of pregnancy supplements with iron alone or in combination with other minerals and vitamins (multivitamins, MV) are commercially available on the market in Australia and each preparation varies in the amount of contained elemental iron from 5 to 105 mg.

Information on iron supplement use among Australian pregnant women is limited to prevalence data from older studies in single hospital settings [18,19]. Contemporary data on the prevalence and determinants of iron supplement use as well as the number of iron-containing supplements, frequency, and dose of iron consumed by pregnant women is needed to understand whether women requiring treatment or at particular risk of ID and/or IDA are consuming iron supplements, and whether these dosages from iron supplements are adequate.

Therefore, the aims of the present study were to examine the prevalence and determinants of iron supplement use in pregnancy and to compare maternal and pregnancy characteristics by the amount of elemental iron consumed from iron-containing supplements.

2. Methods

2.1. Design and study population

A survey on iron and dietary supplement use in pregnancy was administered to women of all gestational ages attending antenatal clinics of two large teaching hospitals in Sydney, Australia between January and March 2014. Both hospitals, the Royal North Shore Hospital and the Royal Hospital for Women, have tertiary obstetric and neonatal facilities. To be eligible, women had to be pregnant, able to complete the questionnaire in English, and completing the questionnaire for the first time. Women were approached by the recruiter while waiting for their appointment and provided verbal and written information about the study. Those who consented returned the survey to the recruiter or into a marked box.

The self-administered and anonymous survey was developed based on a review of the literature, existing surveys, and discussion with perinatal researchers and midwives, and took around 10 min to complete. Following a pilot study of 20 women, minor modifications in the order of questions were made to improve clarity and ease of completion. The survey consisted of 22 items in three sections; '*About you and your pregnancy*', '*About your last pregnancy*', and '*Dietary supplements*'. The primary aim of the survey was to collect information on iron supplement use; however general information on the use of other select dietary and herbal supplements 3 months before and during the current pregnancy was also collected and is reported elsewhere. Ethics approval was obtained from Northern Sydney Health District (HREC# LNR/13/HAWKE/340), with site-specific approval received from both hospital sites.

2.2. Iron supplements

Prevalence, frequency and dose of iron consumed from iron-containing supplements, including multivitamin (MV) and/or iron-only, in the current pregnancy was assessed from information collected in a table within the survey that elicited detailed information including the brand name, the number of weeks the supplement was consumed, and the number of tablets consumed per week. Women were asked to report every iron-only or MV and mineral preparations consumed during the current pregnancy. Common iron-only and MV and mineral preparations were listed in the table and blank rows were provided for women to specify other brands. Information collected in the table was used to determine the dose of elemental iron in each of the iron-containing supplements mentioned.

2.3. Other maternal and pregnancy factors

The survey also collected information on maternal and pregnancy characteristics; factors related to the previous pregnancy that were regarded as potential determinants of current iron status and/or iron supplement use, the average amount of money spent per month, and main sources of information for dietary supplement use in pregnancy. Potential determinants (explanatory variables) of iron supplement use included those related to maternal characteristics (maternal age, multiple pregnancy, no previous children, body mass index (BMI), cigarette smoking, educational attainment, and red meat consumption), the previous pregnancy (miscarriage, heavy bleeding, and ID), the current pregnancy (gestational age, gestational diabetes, gestational hypertension, anaemia, or ID) and iron supplement use (iron-only or MV supplement use 3 months prior to pregnancy, or MV supplement use in the current pregnancy).

2.4. Definitions

The total number of iron-containing supplements consumed in the current pregnancy was calculated as the sum of brands reported by each woman. Based on reporting of brand names of MV and iron-only supplements, woman were categorised as consuming MV only, iron only, both or neither. Frequency is reported as the maximum number of weeks that any iron-containing supplement was used because women often reported multiple brands for varying number of weeks. The dose of elemental iron (in mg) consumed per week from an iron-containing supplement was calculated by adding the dosage from each iron-only or MV and mineral preparation that women reported using during the current pregnancy. To compare the amount of elemental iron consumed from iron-containing supplements with recommended doses from other developed countries [9–11,14], the average daily dose of