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Predicting Factors in Iron Supplement Intake among Pregnant Women in Urban Care Setting

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Abstract

Background: The world health organization estimates that 58% of pregnant women in developing countries are anemic. In spite of the fact that most ministries of health in developing countries have policies to provide pregnant women with iron supplementation, prevalence of maternal anemia has not declined significantly. The aim of this study was to assess adherence to the current recommendation in the local population and to describe factors associated with taking iron supplementation during pregnancy.

Methods: A questionnaire assessing the use of prenatal iron supplementation was distributed among women recently having delivered in Urmia, west Azerbaijan Province, northwest Iran. The questionnaire consisted of two sections. The first included demographic information and the second part covered questions regarding duration of iron supplementation, awareness of per partum anemia and management including benefits and side effects of iron supplementation. SPSS version 10 was used for statistical analysis; data were analyzed by Chi-Square and logistic regression.

Results: Eighty seven percent of participants took iron supplements for at least 4 months. Training during pregnancy was associated with longer duration of iron use. In logistic regression analysis nuliparity was the only variable, which remained in the model .Knowledge of participants on anemia, was obviously poor. Health care stuffs were the main source of information.

Conclusion: The compliance was rather high but knowledge of subjects was low. Therefore, increasing effort is required to mobilize health workers to distribute information on anemia prevention and using iron supplements properly.

Keywords: *Pregnancy, Iron supplement, Compliance, Iran*

Introduction

Iron deficiency anemia (IDA) is one of the most frequently observed nutritional deficiencies among pregnant women in developing countries (1). The World Health Organization estimates that the worldwide prevalence of IDA among pregnant women is almost 55.8% (2). IDA is also an important risk factor in maternal morbidity and results in decreased work capacity (1).

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In the Eastern Mediterranean Region (EMR) collected data indicates 149 million people are iron-deficient or anemic according to the WHO criteria, with 83 million of this population suffering from resulting anemia (3). To reduce IDA, at least 49 countries have implemented iron supplementation programs (4). Majority of health ministries in developing countries have policies to provide pregnant women either iron by itself, combined with folate or in prenatal vitamins (5). However, only a few

countries have reported significant improvement in anemia rates at the national level (1-10). This could be due to several constraints such as poor infrastructure of the health care system (4), lack of motivation of health care workers, limited information on the effectiveness of supplementation interventions in health stuff (11), incomplete compliance due to side effects (12) and lack of awareness of IDA among pregnant women (1, 13).

Accordingly, IDA is a serious public health issue among pregnant women in the Islamic Republic of Iran, with a prevalence of 2.4 to 27.8% in various parts of the country (6-9) despite national Public Health Center recommendations regarding regular iron supplementation during pregnancy. The aim of this study was to assess adherence to the current recommendations and to describe factors associated with taking iron supplement during pregnancy.

Materials and Methods

This study was conducted in Urmia, northwest of Iran in 2005. Our sample was chosen according to Public Health Center (PHC) divisions. Eight PHC were selected randomly among the 28 centers in Urmia. Twenty-five post-partum women with a child between ages 3 to 6 months were recruited from each center.

All subjects were healthy including no medical illnesses or compilations during their pregnancy. They all received standard prenatal care by health care staff. All subjects were informed their confidentiality would be maintained and their participation would be voluntary. All women provided consent to take part in the survey.

The ministry of health policy in Iran is to provide 30 mg ferrous sulfate daily from 20 week of gestational age until 3 months after delivery. A questionnaire addressing the use of prenatal iron supplementation was utilized. Two interviewer gathered information by face-to-face interviews and based on women's self-report. The questionnaire contained two sections: The first included demographic information including age, parity educational levels. The second part of the survey inquired about duration of iron intake (How long did you take iron supplement during pregnancy?), associated side effects (Did you experience any side effects of iron supplement? Which one), awareness of anemia and benefits of iron use (which one is correct: -Increased requirement is cause of anemia during pregnancy. -Meat is one of the iron rich foods. -Taking iron tablet is to prevent anemia. -Difficulty pregnancy is consequence of anemia. -Unhealthy child and mother is consequence of anemia), management of side effects (what did you do when you experienced side effects), and reasons for discontinuation of iron intake (Did you consult with anyone when you decided discontinuing iron supplement). Subjects were also questioned regarding their primary source of information (Advice on iron intake being told by: 1- health worker 2- women's union 3-Radio /Tv 4- physician).

Among compliant patients, duration of iron supplementation was classified into two groups of iron intake for 1 to 4 months or "shorter duration" in comparison to 5 to 9 months or "longer duration".

This division of timing is based on the literature report that 12 wk of iron supplementation is sufficient to produce a maximal hemoglobin response (14, 15) where the compliance was 100%. However, because in the real world compliance is never 100%, four months of iron supplementation was set as the criteria for success. In a comprehensive review of randomized control trials on the prenatal iron supplementation, the optimal duration of taking iron tablets remains unclear (16).

All data from questionnaires were coded and entered into SPSS software for analysis. Initially descriptive statistics were obtained and

t-test was used to compare mean of taking iron according to some variables including parity (nuliparous), age (less than 25), and educational levels.

The association between longer duration with independent variables was assessed with Chi –Square. Then odds ratios were calculated by using binary logistic regression analysis to evaluate the association between duration of taking iron and relevant predictor factors including demographic characteristic, knowledge on anemia and experiencing of side effects.

Results

The socio-demographic characteristics of sample are detailed in Table 1. In this study, the mean duration of taking iron tablets was 5.9+-1.7 (min: 1, max: 8 months).

In summary, 30.3% of subjects experienced side effects of iron with vomiting reported as the most prevalent problem. Only 54.9% of participants reported training regarding iron benefits and side effects during pregnancy. Although the mean duration of iron use was higher significantly in subjects who received training and nuliparous women (6.2 vs. 5.6 and 6.6 vs5.7 respectively), other variables such as demographic factors and experiencing side effects did not show any differences (Table 1)

Four months of iron supplementation use was set as criteria of success (14-16). According to this categorization, 13% of women took iron tablets for 1-4 months (shorter duration) and 87% used supplements for 5-9 month (longer duration) during their last pregnancy.

We also assessed high compliance of iron tablets (longer duration: taking 5-9 Months) with some independent variables. Training and nuliparous subjects showed a significant association with longer duration of iron use (P<0.05). Factors that may influence of taking iron tablets were compared between shorter and longer duration groups in Table 2.

The odds ratio for longer period of taking iron tablets (5-9 months) was significantly associated with multiparty after entering variables with a forward stepwise procedure (odds ratio= 1.58 95%CI: 1.15-4.89, P< 0.05), (Table 3).

The main informational source of anemia and benefits of iron supplementation were health workers (67%) versus other sources like private centers and media. Knowledge was obviously insufficient regardless to duration of taking iron tablets. For example, only 3% of participants had been advised on management of side effects.

The participants with low compliance (less than 4 months had been interviewed for some reasons encourage them to discontinue iron use, 87% of them believe iron tablets are not necessary for maternal-fetal health and that it can be provided by food, and 13% did not mention any significant attitude regarding iron use and stopped using just because of their relatives recommendation.

Table 1: The mean ±SD duration of taking iron according to independent variables

Variables		Mean±SD	*P*
Age	Age ≤24	6.3±1.6	0.539
	Age ≥25	5.9±1.8	
Education	Illiterate	5.6±1.7	
	Did not complete high school	5.8±1.6	0.228
	High school and above	6.1±1.7	
training	Yes	6.2±1.5	
	No	5.6±1.6	0.021
Parity	Nuliparous	6.6±1.6	0.01
	Multiparous	5.7±1.7	
Experience side effect	Yes	6.03±1.7	0.671
	No	5.8±1.6	

Table 2: Comparison of variables that affect duration of taking iron tables

Variables	Shorter Duration (%) (n=24)	Longer Duration (%) n (160)	*P* (X^2)
Training	37.5	58.8	0.005
Illiterate	24.2	22.7	0.899
Experience side effects	33.3	29.4	0.509
Age>25	48.1	54.2	0.359
Nuliparous	29.2	49.9	0.002

Table 3: Remaining variables in Logistic regression analysis with forward stepwise procedure

Variables	B	Sig	exp(B)
Training	0.061	0.614	1.063
Illiterate	0.23	0.414	1.23
Experience side effects	1.32	0.09	3.76
Age>25	0.32	0.559	1.366
Nuliparous	0.181	0.049	1.58

Discussion

Iron deficiency anemia is a problem of serious public health; it is the most common nutritional disorder in the world, as it is in the eastern Mediterranean region (3). In the developing world, 47% of pregnant women in Africa, 39% in Latin America, 80% in Southeast Asia, 65% in the Eastern Mediterranean, and 40% of pregnant women in the West Pacific are believed to be anemic (17). The prevalence of anemia among pregnant women is different in different parts of Iran with a range between 2.8% in Hamadan to 27.5% in Jahrom indicating the significance of socio-economic status, culture, including nutritional beliefs and life style in overall prevalence of anemia (6-9, 13).

Iron supplementation is probably the best available option to effectively address iron deficiency in pregnant women and young children (3).

Available literature from several countries suggest that the most important reason for the failure of supplementation programs is a lack of supply (18), but noncompliance on the part of pregnant women can also be a significant factor. Low compliance is the result of an aversion to the side effects of taking iron supplements and the failure of many primary health care systems to adequately motivate both health cares providers and

pregnant women regarding significance of iron intake (18).

This study found that the compliance was rather high but knowledge of subjects was low. Results from various studies show consumer knowledge about anemia is low. However, when consumers are informed, the compliance rate for taking iron tablets increases (11).In the present study the average duration of taking iron was significantly higher among subjects who received training (6.3+-1.5 vs. 5.6+-1.6).

Information, education and communication (IEC) programs are the best approach to improve the effectiveness of iron intervention (1, 11).

It is reported that anemia prevalence decreased in Thailand when village health volunteers made more effort to encourage pregnant women to attend antenatal care services (10).

One of the difficulties in program management for anemia reduction was the low level of awareness among the target population and perhaps the negative perception towards iron supplementation among general population (1). In the present study we found most women received information on anemia and iron supplement from health workers rather than other informational sources such as media, but their knowledge was still low regardless of the training.

Unfortunately, consumer ignorance is caused in part by health providers' limitations, including lack of knowledge about anemia and iron tablets and insufficient communication and counseling skills (11). Therefore improving health providers' knowledge and communicational skills has been effective in promoting program content and counseling strategies (11).

Nordeng et al. has reported demographic factors as associated with non-compliance to guideline on iron supplementation during pregnancy (19).

In this study, no impact was identified by any socio – demographic characteristics on taking iron tablets for longer period except parity. Nulliparous women took iron longer time, perhaps because of focused training or their reception to accept health workers recommendation as reported by Aikawa et al. (1).

In the present survey, compliance with supplementation was relatively high (87%), and few self-reported side effects were reported (30.3%). The study in Jakarta concluded compliance of supplementation program was low and the supplementation strategies need reliable monitoring and evaluation system (20). Galloway et Al. showed a high compliance (88%) and low side effects (4%) in their study. Another study revealed only one – third of women reported that they experienced negative side effects (5).

In Sweden, side effects of supplements, perceived need and advice from midwives influenced on their use (21).

Contrary to the belief that women stop taking iron tablets mainly due to negative side effects (5), in our study experiencing side effect did not influence duration of iron intake. During iron supplementation trials in five countries, only about one – tenth of the women stopped taking the tablets due to side effects (5). Another study revealed that gastrointestinal side effects were not significantly associated with compliance (22).

There is no doubt that supplementation is required for pregnant women, however the challenge remains to improve the effectiveness of supplementation strategies in many developing countries (23). Limitation of our study findings include the use of self-report data, another point is that it is the population-based survey in a representative primary care settings not in a general population. We also suggest preparing a study to confirm self-report data with laboratory finding such as serum iron level.

Conclusively, in Iran, iron supplementation programs have been a major strategy to reduce IDA in Pregnancy and the dynamic nature of nutrition problems confirm strategies require regular review to maintain and improve their effectiveness.

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References

1. Aikawa R, Jimba M, Nguen KC, Zhao Y, Binns CW, Lee MK. Why do adult women in Vietnam take iron tablets? *BMC Public Health.* 2006; **6(1):**144-52.
2. Guilbert JJ. The world health report 2002- reducing risks, promoting healthy life. *Educ Health (Abingdon).* 2003; **16(2):**230-33.
3. Anna Verster, Jolieke C. van der Pols. Anaemia in the Eastern Mediterranean Region. *East Mediterr Health J.* 1995; **1(1):** 64-79.
4. Wahidinia A,Shamsswalla S.A study on iron as well as iron- deficiency anemia in pregnant women of Hamedan. *Scentific Journal of Ilam Medical University*.2003; **11(38,39):**36-7.
5. Aziz zadeh Frozi M, Mohammadalizadeh S, ghazanfari Z, Afsharadeh P. Prevalence of iron deficiency on pregnancy women in Kerman health centers, Iran. *Journal of Research in Health Sciences.* 2002; **2(1):**11-15.
6. Amam Ghoreishi F, Iranmahboob A, Rezaei M. Evaluation of iron status in mothers and their newborns. *Hormozgan Medical Journal*.2003; **7(3):**145-50.
7. Khademi Z, Shahi A, Zare SH, Farshidfar GR. Prevalence of iron deficiency anemia in pregnant women referred to Shariati hospital in Bandar Abass, Iran. *Hormozgan Medical Journal*. 2004; **8(1):**27-33.
8. Galloway R, Dusch E, Elder L, Achadi E, Grajeda R, Hurtado E, Favin M, Kanani S, Marsaban J, Meda N, Moore KM, Morison L, Raina N, Rajaratnam J, Rodriquez J, Stephen C. Women's perceptions of iron deficiency and anemia prevention and control in eight developing countries. *Soc Sci Med.* 2002; **55(4):**529-44.
9. Winichagoon P: Prevention and control of anemia. *J Nutr*. 2002; **132(4):**862S-6S.
10. Mora JO. Iron supplementation: overcoming technical and practical barriers. *J Nutr.* 2002 ;**132(4 Suppl):**853S-5S.
11. Emamghorashi F, Heidari T. Iron status of babies born to iron-deficient anaemic mothers in an Iranian hospital. *East Mediterr Health J.* 2004; **10(6):**808-14.
12. Ekstrom EC,Hyder SM, Chowdhury AM, Chowdhury SA, Lonnerdal B,Habicht JP, Persson LA. Efficacy and trial effectiveness of weekly and daily iron supplementation among pregnant women in rural Bangladesh: disentangling the issues. *Am J Clin Nutr.* 2002; **76(6):**1392-400.
13. Sloan NL, Jordan E, Winikoff B. Effects of iron supplementation on maternal hematologic status in pregnancy. *Am J Public Health.* 2002; **92(2):**288-93.
14. Suharno D, West CE,Muhilal, Karyadi D, Hautvast JG. Supplementation with vitamin A and iron for nutritional anaemia in pregnant women in West Java, Indonesia. *Lancet.* 1993; **342(8883):** 1325-8.
15. Beard JL. Effectiveness and strategies of iron supplementation during pregnancy. *Am J Clin Nutr.* 2000; **71(5 Suppl):** 1288S-94S.

16. Bothwell TH. Iron requirements in pregnancy and strategies to meet them. *Am J Clin Nutr*. 2000; **72(1 Suppl):**257S-264S.
17. Nordeng H, Eskild A, Nesheim BI, Aursnes I, Jacobsen G. Guidelines for iron supplementation in pregnancy: compliance among 431 parous Scandinavian women. *Eur J Clin Pharmacol*. 2003; **59(2):**163-8.
18. Schultink W, van der Ree M, Matulessi P, Gross R. Low compliance with an iron-supplementation program: a study among pregnant women in Jakarta, Indonesia. *Am J Clin Nutr*. 1993; **57(2):**135-9.
19. Wulff M, Ekstrom EC. Iron supplementation during pregnancy in Sweden: to what extent is the national recommendation followed? *Acta Obstet Gynecol Scand*. 2003; **82(7):**628-35.
20. Hyder SM, Persson LA, Chowdhury AM, Ekstrom EC. Do side-effects reduce compliance to iron supplementation? A study of daily- and weekly-dose regimens in pregnancy. *J Health Popul Nutr*. 2002; **20(2):**175-79.
21. Yip R, Ramakrishnan U. Experiences and challenges in developing countries. *J Nutr*. 2002; 132(4 Suppl):827S-30S.
22. Winichagoon P. Prevention and control of anemia: Thailand experiences. *J Nutr*. 2002; **132(4 Suppl):**862S-6S.
23. Aguayo VM, Koné D, Bamba SI et al. Acceptability of multiple micronutrient supplements by pregnant and lactating women in Mali. *Public Health Nutr*. 2005; **8(1):**33-7.