

Original Research Article

Low dosage iron supplementation: the impact of hemoglobin levels and the side effect of non-anemic pregnant women in Denpasar city, Bali, Indonesia, 2016

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Received: 08 September 2016

Revised: 15 October 2016

Accepted: 25 October 2016

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ABSTRACT

Background: Nearly 95% of anemia in pregnancy is caused by iron deficiency. Iron tablet is recommended in pregnant women, but only 18% who consume iron tablet. One of the factors that influence compliance is the side effects such as constipation, nausea and vomiting. Pregnant women need additional iron supplementation of 30 mg / day, along with folic acid and vitamin C. Based on the above it is necessary to create Iron tablet formulations with low doses but can be optimally absorbed by the body.

Methods: Randomized pre and posttest control group design. The inclusion criteria pregnant women 20-35 years, a distance of children ≥ 2 years, live in Denpasar city and the number of single fetus. Simple random sampling technique to determine the treatment group and the control group. The statistical test used in analyzing is the normality test, homogeneity, Chi-Square test and test the T-group.

Results: During research of 44 respondents obtained the results of 44 (100%) are in a healthy reproductive age and no respondents were vegetarian. The analysis data with statistical test T-test, obtained no difference between low-dose iron supplementation and conventional doses of the hemoglobin of non-anemic pregnant women. Also showed that the low-dose iron supplementation can significantly lower incidence of side effects of iron supplementation in non-anemic pregnant women.

Conclusions: The proper used of iron in the appropriate dose, will affect the effectiveness of absorption in the body and helps in reducing the side effects that arise from taking iron tablets during pregnancy.

Keywords: Anemia, Indonesia, Iron tablet, Low dosage, Pregnant women

INTRODUCTION

During pregnancy, there is 15% increase of woman's nutrient requirements.¹⁻³ These nutrient requirements included macronutrients and micronutrients. The supply of micronutrients is often neglected even though it is highly needed during pregnancy.⁴ The substances which are needed during pregnancy included protein, carbohydrate, fat and mineral.⁵ One of important minerals

for pregnant women is iron.⁶⁻⁹ In order to fulfil the need during pregnancy, the amount of nutrients supply needed is bigger than the amount for common adult female. Noting recent economic condition, the nutrients requirement during pregnancy is difficult to be fulfilled by merely dietary nutrients intake, therefore additional intake is needed in the form of micronutrients in particular iron tablet which could suffice the needs during pregnancy.⁴

Since 1970s, our government has planned iron supplementation program for pregnant women. The dosage of iron supplementation contains 60 milligrams iron and 400 mcg acid. This iron supplementation is given with the amount of 90 tablets which will be consumed daily in the third trimester of pregnancy.⁶ Basic health research in Indonesia on 2010 shows that 19.3% of pregnant women do not consume iron tablet while only 18% consuming 90 tablets.¹¹ One of the factors that affects the obedience level of pregnant women in consuming iron tablet is the side effects of the supplementation such as constipation, nausea and vomiting.⁸

Pregnant women need additional iron from the supplementation with the amount of 30mg/day. The result which was published on *The American Journal of Clinical Nutrition* stated that iron supplementation with the dosage of 30 mg/day along with folic acid and vitamin C could increase the haemoglobin level of pregnant women.⁷ Besides the iron supplementation with lower dosage shows positive effect on the decreasing number of the supplementation side effects incidents, so that vitamin C is highly needed in assisting the iron absorbing process to work better.⁷

Iron is one of nutrients which could not be acquired in adequate amounts from food consumed during pregnancy, therefore additional iron in the form of *ferrosus* with the dosage of 30 mg/day. The use of sulphate iron could cause stool colour black and some pregnant women experienced nausea, vomiting, diarrhoea, even constipation, thus to decrease those symptoms the additional iron has to be consumed between mealtime or before sleep along with vitamin C consumption to increase absorption.² Iron supplementation is highly needed for pregnant women because iron during pregnancy would not be sufficient if it is only obtained from food resources. Nothing the daily need of iron is only 30 mg, iron should not be given with high dosage. Therefore, if the body need toward iron is still low, then the intake of iron nutrients will be thrown out. Iron store within body and personal haemoglobin status determine the percentage of iron absorption. The big store of iron will decrease the amount of iron absorbed. It occurs to protect body from excessive iron load.³ Based on the explanation above, iron tablet formulation with low dosage but could be absorbed effectively by body with additional vitamin C is needed to be created. The low dosage iron supplementation is expected to give positive effect toward non-anaemic pregnant women without decreasing the effectiveness of iron supplementation haemoglobin level and lowering its side effect incidents so that the obedience level of pregnant women could be increased.

METHODS

This was a randomized pre and posttest control group design. The object group will be given intervention in the

form of low dosage iron tablet daily supply with the dosage of 30 mg iron + 400 mcg folic acid + 70 mg vitamin C which is consumed since the gestational age of 12 until 24 weeks, while the control group will be given the conventional iron tablet daily with the dosage of 60 mg iron + 400 mcg folic acid + 70 mg vitamin C which is consumed since the gestation age of 12 until 24 weeks. The research place in primary health care is located in Denpasar city. Pregnant women who become the sample of this research are those who never have anaemia or haemoglobin level ≥ 11 gr/dl. From the calculation of the sample size, there are 22 samples on each category. The sampling of this research is conducted with simple random sampling technique. The haemoglobin examination using coulometer method which is the combination of cyanmethemoglobin and oxyhemoglobin. Sodium Lauryl Sulfate (SLS-Hb) hemichrome which is measured by using Hemometer.

RESULTS

Among 22 sample in control groups and 22 sample in intervention groups who met the inclusion criteria about the effects of low dosage supplementation of iron and the conventional dosage on the haemoglobin level each iron supplementation dosage shows significant impacts on the change of haemoglobin level for pregnant women who are not suffering of anaemia (Table 1).

Table 1: The impact of iron supplementation on haemoglobin level.

Group	Hb level average		P
	Before	After	
Intervention	11.9	11.4	0.000
Control	11.7	11.1	0.039

The Impact of low dosage iron supplementation compared to conventional dosage show that there is no difference between the low dosage iron supplementation and the one with conventional dosage on the haemoglobin level of non-anaemic pregnant women (Table 2).

Table 2: The impact of low dosage iron supplementation compared to conventional dosage.

	t-test for equality of means			
	Sig. (2-tailed)	Mean difference	95% CI	
			Lower	Upper
Equal variance assumed	0.84	0.05	0.45	0.55

For the side effect incidents of iron supplementation based on the data analysis using Chi-Square, obtained the p value with the amount of 0.004 which means that low dosage iron supplementation could significantly decrease the side-effect incidents on non-anaemic pregnant women

(Table 3). The form of side effect included 41.7% of respondent experienced nausea, 33.3% dizziness, 16.7% responded got black faeces and 8.3% experienced constipation.

Table 3: Side effect incidents of iron supplementation.

	Group	P		
		Control	Intervention	
Side	None	12 (54.5%)	20 (90.9%)	0,004
Effect	Occur	10 (45.5%)	2 (9.1%)	

DISCUSSION

Research in Asia about the effect of time of initiation and dose of prenatal iron and folic acid supplementation on iron and folate nutriture during pregnancy which was published on The American Journal of Clinical Nutrition and stated that iron supplementation with 30 mg/day with folic acid and vitamin C could increase haemoglobin of pregnant women.⁷

According to theory, show during pregnancy 30 mg iron element, 400-800 mcg folic acid and 70 mg vitamin C is needed for daily supply.¹⁰ Therefore, the low dosage iron supplementation could be given to non-anaemic pregnant women. It occurs because the iron store within our body and personal haemoglobin status will determine the percentage of iron absorption from food and from supplementation.

Since 1970s, government has planned iron supplementation program for pregnant women. The dosage of iron tablet which is given contains 60 mg iron and 400 mcg folic acid. This iron supplementation is given with the amount of 90 tablets which will be consumed daily in the third trimester of pregnancy.⁶ Basic health research in Indonesia in 2010 shows that 19.3% of pregnant women do not consume iron tablet while only 18% consuming 90 tablets.¹¹

One of the factors that affects the obedience level of pregnant women in consuming iron tablet is the side effects of the supplementation such as constipation, nausea and vomiting.⁸

The use of sulphate iron could cause faeces colour black and some pregnant women experienced nausea, vomiting, diarrhoea, even constipation, thus to decrease those symptoms the additional iron has to be consumed between mealtime or before sleep along with vitamin C consumption to increase absorption.² Besides, iron supplementation with lower dosage gives positive effect on the decreasing number of side effect incidents due to the supplementation itself, so that vitamin C is highly needed to create better absorption process.⁷

CONCLUSION

Present study identified there is no difference between non-anaemic pregnant women's haemoglobin level with lower dosage iron supplementation and the conventional amount. The iron supplementation with low dosage could significantly decrease the side effect incidents. For the next researchers are expected to be able to do research with bigger and more sample. Longer time and developing other variables that influence haemoglobin level of pregnant women, also for provision holder is expected to facilitate the availability of iron tablet with low dosage that could be given to the non-anaemic pregnant women.

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

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Cite this article as: Arini N, Adnyani S. Low dosage iron supplementation: the impact of hemoglobin levels and the side effect of non-anemic pregnant women in Denpasar city, Bali, Indonesia, 2016. Int J Res Med Sci 2016;4:5209-11.