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ORIGINAL ARTICLE

Factors Associated with Iron and Folic Acid Deficiency Among Pregnant Women a Cross-Sectional Hospital-Based Study

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ABSTRACT

Current study is a cross-sectional hospital-based study and its comparative results were highly significant (<0.005). When 200 pregnant women after dividing into two different groups compared with each other regarding their folic acid and iron intake during three trimesters of their pregnancies results were significant (<0.005). In the multiple regression analysis three variables iron, folic acid and hemoglobin levels were analyzed. In Group X, and Group Y the levels of iron (167.2± 3.12, 165.12±4.11, 164.33±2.13), (67.1± 4.12, 15.12±6.11, 14.33±2.13) folic acid (16.4±2.4, 16.4±1.5, 17.1±2.3), (6.4±1.4, 10.4±1.8, 5.1±1.3) and hemoglobin (15.2±3.6, 15.5±2.11, 15.5±3.12) (10.2±3.6, 7.5±32.10, 8.5±11.12) were calculated respectively. The percentage mean standard deviation of Spinal bifida, Anencephaly and Premature birth in Group X and Group Y was (1.21±1.01, 1.11±1.11, 1.22±2.2), (7.41±5.3, 3.17±2.14, 17.12±12.22).

Keywords: Spinal bifida, Anencephaly, anemia, folic acid, iron

INTRODUCTION

In both developed and developing countries Iron deficiency anemia and neural tube complications in new born babies are very common [1]. These problems developed because of iron and folic acid deficiency during pregnancy [3]. Different researchers were stated through their studies that 42% pregnant women all over the world are anemic, which is an indication of preterm birth, risk of low birth weight, neonatal mortality and perinatal mortality [5]. Folate and iron are two important micronutrients required for proper and normal functioning of biological system, growth, regular development and immunity [2].

Pakistan is a developing country where people have socio economic problems and malnutrition in very common all over the community [4]. In Pakistan medical health services strictly fallow the recommendations for iron and folic acid in pregnancy by World Health Organization (WHO) [4]. The World Health Organization recommendations are 60 milligrams (mg) of iron in addition to folic acid daily for all pregnant women. In a hospital study which was conducted in India, when delivery card and medical record of visits during pregnancy were observed of women admitted for delivery the situation was so critical because they do not take proper iron and folic acid because of their economic crisis [6].

Iron deficiency anemia is a major nutritional problem in pregnant women and the consequences of this deficiency creates very dangerous effects in our society [3, 5, and 6]. The health and mental development of new generation depends upon the healthy mother. Folic acid is an important constituent of planning for a healthy pregnancy. The World Health Organization recommendation is 400 mcg of folic acid daily for all pregnant women [5]. The recommended dose of folic acid prevents, by birth defects in brain and spine of new babies. Researchers from different studies concluded that Low maternal folate status during pregnancy and lactation is a major cause of maternal morbidity in both developed and developing countries. Malnourished folate pregnancy caused low infant birth weight and long term complications [7]. Meanwhile folate-related anemia during childhood and adolescence also creates much complications and infections [8].

Two important neural tube defects in new born babies are anencephaly and spina bifida. Anencephaly is that syndrome in which brain and skull of new baby do not form properly [9]. Mostly all babies born with anencephaly die after some time of birth will die shortly after birth. Spina bifida is a very serious birth defect in which spine of new born babies do not develop normally and caused many physical disabilities. It has seen in different studies that all women can conceive pregnancy if they used 60 mg iron and 400 mcg folic acid regularly before pregnancy preparation [15].

MATERIALS AND METHODS

In this study 200 pregnant women were selected from different hospitals and divided them in to two different group i.e. Group X and Group Y. 100 pregnant women were in each group. Blood samples were taken of all women in each trimester for iron and folic acid test. In Group X was those women how take proper recommended doses of both iron and folic acids throughout their three trimesters of pregnancy while in Group Y was those women they do not take proper iron and folic acid in their pregnancy period. After delivery the health of each new born baby was monitor deeply and noted the indicated complication in each baby clinically. In the multiple regression analysis with all considered biomarkers were calculated bio- statistically with the help of SPSS. Model 2000

RESULTS

In the multiple regression analysis three variables iron, folic acid and hemoglobin levels were analyzed. In Group X, and Group Y the levels of iron (167.2± 3.12, 165.12±4.11, 164.33±2.13), (67.1± 4.12, 15.12±6.11, 14.33±2.13) folic acid (16.4±2.4, 16.4±1.5, 17.1±2.3), (6.4±1.4, 10.4±1.8, 5.1±1.3) and hemoglobin (15.2±3.6,

15.5±2.11, 15.5±3.12) (10.2±3.6, 7.5±32.10, 8.5±11.12) were calculated respectively. The graphical presentation of each group was shown in fig. (1, 2 and 3) comparatively. The results are highly significant (<0.005).

Table 1: Group X: n= 100 Women take recommended dose of iron and folic acid

Trimesters	Iron levels (Mean ± SD) mcg/dL	Folic acids levels (Mean ± SD) (ng/mL)	Hemoglobin levels (Mean ± SD) mcg /dL	P value
First trimester	167.2± 3.12	16.4±2.4	15.2±3.6	0.000
Second trimester	165.12±4.11	16.4±1.5	15.5±2.11	0.000
Third trimester	164.33±2.13	17.1±2.3	15.5±3.12	0.000

<0.005

Table 2: Group Y: n= 100 Women without recommended dose of iron and folic acid

Trimesters	Iron levels (Mean ± SD) mcg/dL	Folic acids levels (Mean ± SD) (ng/mL)	Hemoglobin levels (Mean ± SD) mcg /dL	P value
First trimester	67.1± 4.12	6.4±1.4	10.2±3.6	0.000
Second trimester	15.12±6.11	10.4±1.8	7.5±32.10	0.000
Third trimester	14.33±2.13	5.1±1.3	8.5±11.12	0.000

<0.005

Table 3: Low dose intake of iron and folic acid in both groups

Groups	Spinal bifida Percentage Mean ± SD	Anencephaly Percentage Mean ± SD	Premature birth Percentage Mean ± SD
Group X	1.21±1.01	1.11±1.11	1.22±2.2
Group Y	7.41±5.3	3.17±2.14	17.12±12.22

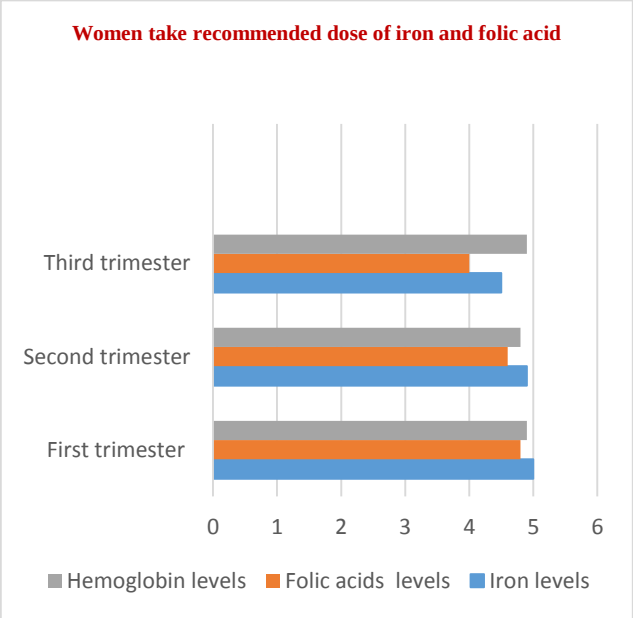

Figure 1:

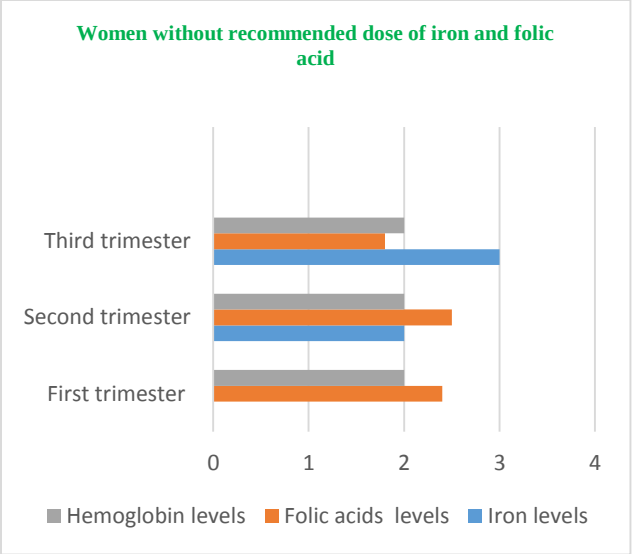

Figure 2:

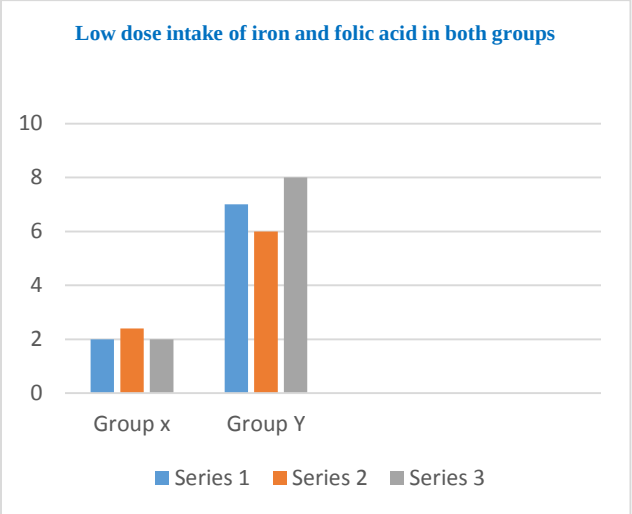

Figure 3:

DISCUSSION

Folate and Folic Acid are two different form of Vitamin B 9 [11]. These both form are highly water soluble and the only difference is that folate is constituent of our daily food while folic acid is manufactured synthetically [12]. Green leafy vegetable, fruits, beans, peas, poultry, meat, dairy products, sea food, grains, etc. are the natural sources of folate. . Folic acid is available in the form of supplements. In different research it has proved that folic acid plays a basic role in the development of neural tube and spine and prevent new born baby from number of complications [14]. Many researchers found through their studies that recommended dose of folic acid and iron during pregnancy in three trimesters enhance the metabolic pathways and give protection against complications of brain or spine disorders in new born babies. A study which was conducted in USA stated that recommended dose of folic acid may reduce the chances of neural tube defects i.e. Spina bifida, and Anencephaly will reduced [13].

Current study is a cross-sectional hospital-based study and its comparative results were highly significant (<0.005). When 200 pregnant women after dividing into two different groups compared with each other regarding their folic acid and iron intake during three trimesters of their pregnancies results were significant (<0.005). In the multiple regression analysis three variables iron, folic acid and hemoglobin levels were analyzed. In Group X, and Group Y the levels of iron (167.2± 3.12, 165.12±4.11, 164.33±2.13), (67.1± 4.12, 15.12±6.11, 14.33±2.13) folic acid (16.4±2.4, 16.4±1.5, 17.1±2.3), (6.4±1.4, 10.4±1.8, 5.1±1.3) and hemoglobin (15.2±3.6, 15.5±2.11, 15.5±3.12) (10.2±3.6, 7.5±32.10, 8.5±11.12) were calculated respectively. The graphical presentation of each group was shown in fig. (1, 2 and 3) comparatively.

When medical complications of low intake of iron and folic acid during pregnancy were clinically observed in new born babies the results were very alarming and critical. The percentage mean standard deviation of Spinal bifida, Anencephaly and Premature birth in Group X and Group Y was (1.21±1.01, 1.11±1.11, 1.22±2.2), (7.41±5.3, 3.17±2.14, 17.12±12.22).

REFERENCES

1 Berry RJ, Li Z, Erickson JD, Li S (1999): Prevention of neural-tube defects with folic acid in China. China-U.S. collaborative project for neural tube defect prevention. N Engl J Med 1, 341:1485–1490.

2 Rahman MM, Abe SK, Rahman MS (2016). Maternal anemia and risk of adverse birth and health outcomes in low- and middle-income countries: systematic review and meta-analysis. Am J Clin Nutr; 103(2):495–504.

3 Gebremedhin S, Samuel A, Mamo G, Moges T, Assefa T (2014) Coverage, compliance and factors associated with utilization of iron supplementation during pregnancy in eight rural districts of Ethiopia: a cross-sectional study. BMC Public Health; 14:1–8.

4 World Health Organization Department of Making Pregnancy Safer: Standards for Maternal and Neonatal Care 2019.

5 Stoltzfus RJ: Iron interventions for women and children in low-income countries. J Nutr 2011, 141:756–762.

6 Bhutta ZA, Darmstadt GL, Hasan BS (2015). Community-based interventions for improving perinatal and neonatal health outcomes in developing countries: a review of the evidence. Pediatrics, 115(2 Suppl):519–617.

7 Carmichael SL, Shaw GM, Yang W, (2016) National birth defects prevention study. Correlates of intake of folic acid-containing supplements among pregnant women. Am J Obstet Gynecol, 194:203–210.

8 Maina-Gathigi L, Omolo J, Wanzala P (2013). Utilization of folic acid and iron supplementation services by pregnant women attending an antenatal clinic at a regional referral hospital in Kenya. Matern Child Heal J. 2013; 17:1236–1242.

9 Cogswell ME, Parvanta I, Ickes L, (2019) Iron supplementation during pregnancy, anaemia, and birth weight: a randomized controlled trial. Am J Clin Nutr, 78:773–781.

10 Merchant AT, Msamanga G, Villamor E, (2015) Multivitamin supplementation of HIV-positive women during pregnancy reduces hypertension. J Nutr, 135:1776–1781.

11 Villamor E, Msamanga G, Saathoff E, (2017). Effects of maternal vitamin supplements on malaria in children born to HIV-infected women. Am J Trop Med Hyg, 76:1066–1071.

12 Jikamo BSM (2018). Non-adherence to iron/folate supplementation and associated factors among pregnant women who attending antenatal care visit in selected public Health Institutions at Hosanna Town, Southern Ethiopia. J Nutr Disord Ther ;8:2

13 Massawe SN, Urassa EN, Nyström L, Lindmark G (2020) Effectiveness of primary level antenatal care in decreasing anemia at term in Tanzania. Acta Obstet Gynecol Scand, 78:573–579.

14 Hinderaker SG, Olsen BE, Lie RT, Bergsjø PB, Gasheka P, Bondevik GT, Ulvik R, Kvåle G (2002)Anemia in pregnancy in rural Rajasthan : associations with micronutrients status and infections. Eur J Clin Nutr, 56:192–199.

15 Desta M, Kassie B, Chanie H, Mulugeta H, Yirga T, Temesgen H(2019) Adherence of iron and folic acid supplementation and determinants among pregnant women in Ethiopia: a systematic review and meta-analysis. Reprod Health;16(182):1–14.