

Prospective Deficiency Symptoms of Iron-Folate in Expecting Women, A Clinical Study

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ABSTRACT

Aim: To find out importance of folic acid and iron uncovered in pregnant women and physiological complications.

Period of study: The Study was conducted from January 2022 to May 2022 in different medical institutes.

Methods: For current study 400 women with 29-38 weeks pregnancy (third trimester) were selected and divided them into three different groups. In group-A 100 women were those how were taking regularly folic acid and iron from their pregnancy preparation till to day and in group-2, 150 pregnant women were those how started folic acid and iron in third trimester. Whereas in group-3 150 pregnant women were not taking folic acid and iron regularly. The raw data of all medical complications of individuals were presented Bio-statistically with the application of SPSS.

Results: Folic acid levels, hemoglobin levels, weakness, headache, fatigue, pale skin color, shortness of breath, mouth ulcer, disturbed vision, memory lost were measured in mothers of three groups. Whereas Diarrhea, Decreased appetite, short of breath and neural tube defects were observed in delivered new born babies by these women. It was concluded by comparing results of each group that study was significant, and a remarkable significant changes ($p < 0.05$) were seen in the individuals of three groups.

Conclusion: Folic acid and iron have a key role for the better health of both mother and new born baby. Folic acid deficiency anemia and decreased biosynthesis of hemoglobin because of iron deficiency caused serious medical complications in mother as well as in fetus.

Keywords: Diarrhea, Folic acid, Appetite, Headache, Fatigue

INTRODUCTION

Folic acid or folate is belong to vitamin B-complex. Anemia can be caused by a lack of folate. Anemia occurs because of decreased red blood cells in body³. It is proved that red blood cells deliver oxygen in different parts of biological system. Citrus juices and dark green vegetables are two foods and drinks that are particularly high in folate². An illness or genetic mutation that stops human body from absorbing or converting folate into its useable form may also cause deficiency. Therefore genetic mutation that prevents biological system from converting dietary or supplementary folate into its useable form i.e. methyl folate, in a timely and effective manner¹. During pregnancy, folic acid is very important and helpful for neural tube development of fetus. In case of neural tube defects the spinal cord or brain showed medical complications⁴.

Spina Bifida is a medical defect in new born baby because of this baby's spinal cord or brain do not grow properly, due to such syndrome paralysis or many physical disabilities may occur. Another complication i.e. anencephaly syndrome in which the brain and skull of a baby do not fully develop in the womb [5]. The most severe type of neural tube abnormality is anencephaly. In this syndrome the brain tissue fails to grow and it is always fatal. In majority of cases neural tube defects developed in first trimester and the significant cause is deficiency of folic acid. Anemia is hemoglobin deficiency syndrome caused by iron deficiency⁹. Hemoglobin is an iron containing carrier globulin protein which transported oxygen from lungs to all parts of the body¹⁰.

The most frequent type of anemia is iron deficiency anemia. It occurs when human body is deficient in iron, which is required for the production of hemoglobin [6]. Without required amount of iron the biosynthesis of hemoglobin become reduced by which concentration of oxygenated hemoglobin decreased and caused hypoxia [8]. The storage level of iron depends upon the levels of ferritin in blood, low levels of ferritin means iron shortage in the body. This is an ethical right of a pregnant woman to pick her companion for support throughout pregnancy and childbirth, as well as to accompany her to the antenatal care clinic and during labor [9]. Similarly pregnant woman has right to be treated with

dignity, respect, and confidentiality and she may ask inquiries and receive answers regarding her.

MATERIALS AND METHODS

In present study the importance of folic acid and iron was uncovered in pregnant women and physiological complications because of their deficiency. The Study was conducted from January 2022 to May 2022 in different medical institutes.

Selected individuals: For current study 400 women with 29-38 weeks pregnancy (third trimester) were selected and divided them into three different groups.

Sample size: In group-A 100 women were those how were taking regularly folic acid and iron from their pregnancy preparation till to day and in group-2, 150 pregnant women were those how started folic acid and iron in third trimester. Whereas in group-3 150 pregnant women were not taking folic acid and iron regularly.

Collection of Raw Data: Raw data was collected with the help of a questioner Performa.

Bio-statistical presentation of raw data: The raw data of all medical complications of individuals were presented Bio-statistically with the application of SPSS.

RESULTS

Table-1

Variables	Units	G-1 (Mean \pm SD)	G-2 (Mean \pm SD)	G-3 (Mean \pm SD)
Folic acid levels	mcg	600.2 \pm 0.02	500.5 \pm 0.01	300.6 \pm 0.04
Hemoglobin levels	g/dl	15.4 \pm 0.01	12.4 \pm 0.02	9.4 \pm 0.03

($p < 0.05$)

Table-2: Group-1, Pregnant women how were taking folic acid and iron from beginning of pregnancy (n=150).

Variables	Mean \pm SD (%age)	($p < 0.05$)
Weakness	2.10 \pm 0.01	0.00
Headache	3.01 \pm 0.01	0.00
Fatigue	1.01 \pm 0.04	0.00
Pale skin color	2.11 \pm 0.03	0.00
Shortness of breath	1.01 \pm 0.01	0.00
Mouth ulcer	1.10 \pm 0.04	0.00

Disturbed vision	1.01± 0.01	0.00
Memory lost	2.01± 0.01	0.00

Table-3: New born kids of group-1

Variables	Mean ±SD (percentage)	(p<0.05)
Diarrhea	2.12± 0.01	0.00
Decreased appetite	0.10± 0.03	0.00
Short of breath	0.01± 0.01	0.00
Neural tube defects	0.01± 0.02	0.00

Table-4: Group-2, pregnant women how were stated folic acid and iron in third trimester (n=150),

Variables	Mean ±SD (%age)	(p<0.05)
Weakness	5.10± 0.04	0.00
Headache	7.01± 0.02	0.00
Fatigue	5.01± 0.01	0.00
Pale skin color	7.10± 0.03	0.00
Shortness of breath	2.03± 0.02	0.00
Mouth ulcer	4.10± 0.02	0.00
Disturbed vision	4.01± 0.01	0.00
Memory lost	3.01± 0.01	0.00

Table-5: New born kids of group-2

Variables	Mean ±SD (%age)	(p<0.05)
Diarrhea	4.12± 0.01	0.00
Decreased appetite	1.12± 0.04	0.00
Short of breath	1.01± 0.02	0.00
Neural tube defects	3.01± 0.04	0.00

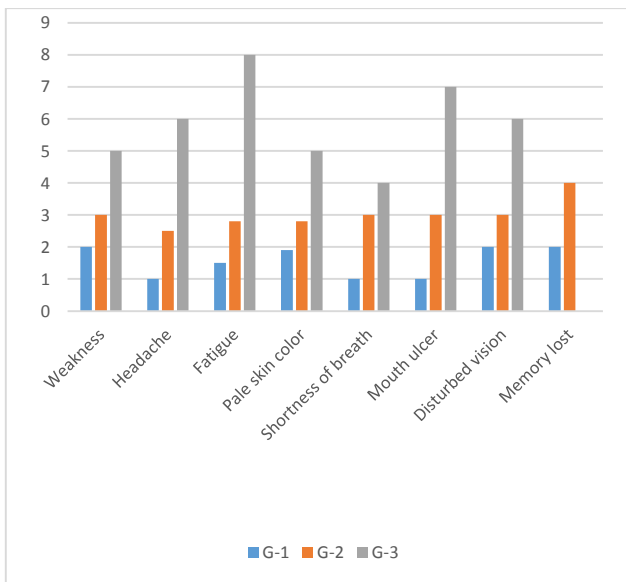


Figure-1: Folic acid and Iron deficiency symptoms in pregnant women

Table-6: Group-3, pregnant women how were not taking folic acid and iron regularly (n=150),

Variables	Mean ±SD (%age)	(p<0.05)
Weakness	7.10± 0.01	0.00
Headache	10.01± 0.02	0.00
Fatigue	11.01± 0.04	0.00
Pale skin color	15.12± 0.02	0.00
Shortness of breath	6.03± 0.01	0.00
Mouth ulcer	10.01± 0.01	0.00
Disturbed vision	16.01± 0.01	0.00
Memory lost	5.01± 0.02	0.00

Table-7: New born kids of group-3

Variables	Mean ±SD (%age)	(p<0.05)
Diarrhea	7.02± 0.04	0.00
Decreased appetite	4.10± 0.02	0.00
Short of breath	3.01± 0.01	0.00
Neural tube defects	6.01± 0.01	0.00

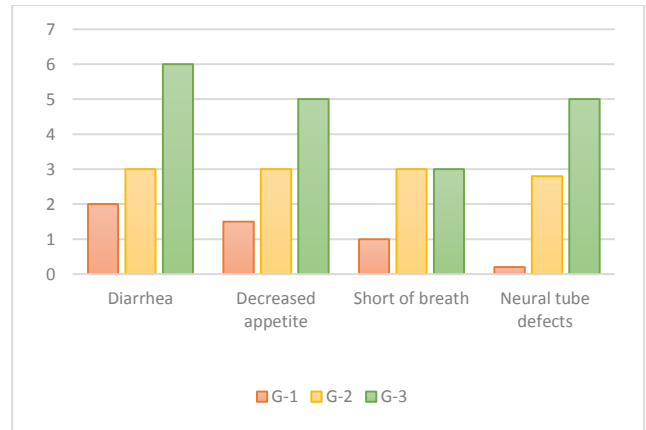


Fig. 2: Medical Complications in New born kids of group-1,group-2and group-3

The physiological variables measured in the pregnant women of group-1, group-2 and group-3 were weakness, headache, fatigue, pale skin color, shortness of breath, mouth ulcer, disturbed vision and memory lost their percentage mean standard deviation was (2.10± 0.01, 3.01± 0.01, 1.01± 0.04, 2.11± 0.03, 1.01± 0.01, 1.10± 0.04, 1.01± 0.01, 2.01± 0.01), (5.10± 0.04, 7.01± 0.02, 5.01± 0.01, 7.10± 0.03, 2.03± 0.02, 4.10± 0.02, 4.01± 0.01, 3.01± 0.01) and (7.10± 0.01, 10.01± 0.02, 11.01± 0.04, 15.12± 0.02, 6.03± 0.01, 10.01± 0.01, 16.01± 0.01, 5.01± 0.02). Similarly folic acid and iron deficiency symptoms in new born kids of group-1, group-2 and group-3 women were Diarrhea, Decreased appetite, short of breath and neural tube defects and their percentage mean standard deviation levels were (2.12± 0.01, 0.10± 0.03, 0.01± 0.01, 0.01± 0.02), (4.12± 0.01, 1.12± 0.04, 1.01± 0.02, 3.01± 0.04) and (7.02± 0.04, 4.10± 0.02, 3.01± 0.01, 6.01± 0.01) respectively. In this study a significant (p<0.05) variations were seen in the results of group-1, group-2 and group-3 pregnant women and similarly significant physiological complications caused by deficiency of folic acid and iron in new born kids were marked which have shown graphically in figure-2.

DISCUSSION

The deficiency of folic acid or vitamin B12 caused anemia in pregnant women, such medical complication developed gradually and become so serious because it is untreated²⁰. Folic acid deficiency anemia caused weakness, headache, fatigue, pale skin color, shortness of breath, mouth ulcer, disturbed vision and memory lost in pregnant women¹⁹. Anemia can be caused by a lack of folic acid in other words anemia is a condition in which the red blood cells count become decreased. Leafy greens, citrus fruits, almonds, beans, peas, shellfish, eggs, dairy, meat, poultry, and grains are foods which contain folic acids and without such food deficiency of folate will be developed¹⁶. Folic acid play a key role in the development of brain and spinal cord of new born kids. Neural tube defects are serious birth malformations caused by a lack of folate¹⁵. Spina bifida and anencephaly are syndromes of neural tube abnormalities. Folate insufficiency can also lead to placental abruption, which occurs when the placenta separates from the uterus¹⁴.

A study claimed that Low folate levels during pregnancy have also been linked to the development of autism in children. Every day requirement of folic acid directly proportional to the age of people, it has concluded through different studies that 400 mcg is the daily demand of an adult but it increases in the case of pregnancy in women¹². The fertility rate and placental abruption in women is correlated with folic acid levels. Folate deficiency anemia usually improves after 3 to 6 months of treatment. When the underlying source of the insufficiency is addressed, it will most

likely improve. Nutritional anemia affects over two-thirds of pregnant women in developing nations, according to estimates¹³.

Iron deficiency anemia is exceedingly frequent, especially in developing countries, and has reached pandemic proportions. One of the primary causes of anemia in babies and young children is iron deficiency during pregnancy¹¹. Many women go the entire pregnancy without getting the minimum amount of iron they need. Iron deficiency can be predicted by a lack of appropriate weight gain during pregnancy. Iron is required for the metabolic activities that result in tissue oxygenation. A typical diet can provide up to 15 milligrams of iron per day¹². Co-administration of acidic nutrients, such as ascorbic acid, helps to increase iron absorption in the biological system. Protein-bound iron is carried into the bone marrow after absorption, where it is incorporated into the formation of red blood cells [6]. Iron status tends to fall as pregnancy progresses, which can be attributed to iron mobilization or haemodilution, which peaks at 24–26 weeks².

The results of present study have closed correlation with the previous studies conducted by different researchers. Different metabolic physiological changes in biological system of pregnant women were concluded as number of scientists claimed in different studies. On the other hand folic acid and iron deficiency symptoms in new born babies in three considered groups indicated that anemic mothers are cause of these medical complications. Further research is required for the importance and uses of folic acid and iron in pregnant women.

REFERENCES

1. Lee JO, Lee JH, Ahn S, Kim JW, Chang H, Kim YJ, et al. Prevalence and risk factors for iron deficiency anemia in the Korean population: Results of the Fifth Korea National Health and Nutrition Examination Survey. *J Korean Med Sci.* 2014;29:224–229.
2. Anzaku AS. Assessing folic acid awareness and its usage for the prevention of neural tube defects among pregnant women in Jos, Nigeria. *J Basic Clin Reprod Sci.* 2013;2(1):13–17.
3. Bothwell TH. Iron requirements in pregnancy and strategies to meet them. *Am J Clin Nutr.* 2000;72:257–264.
4. Burke RM, Leon JS, Suchdev PS. Identification, prevention and treatment of iron deficiency during the first 1000 Days. *Nutrients.* 2014;6:4093–4114.
5. Kassebaum NJ, Jasrasaria R, Naghavi M, Wulf SK, Johns N, Lozano R, et al. A systematic analysis of global anemia burden from 1990 to 2010. *Blood.* 2014;30(123):615–624.
6. Mashayekhi SO, Dilmaghanizadeh M, Sattari MR. A survey on the consumption, knowledge and attitude of pregnant women toward the effects of folic acid on pregnancy outcome in Tabriz. *Iran J Child Neurol.* 2011;5(1):35–42.
7. Nelson AL. Folates for reduction of risk of neural tube defects: using oral contraceptives as a source of Folate. *Open Access J Contracept.* 2011;2:137–150.
8. Nosrat SB, Sedehi M, Golalipour MJ. Knowledge and practice of urban Iranian pregnant women towards folic acid intake for neural tube defect prevention. *J Pak Med Assoc.* 2012;62(8):785–789.
9. Parveen R., Latifa S.A.S. Health Education needs for pregnancy: A study among woman attending primary health centers. *J. Fam. Community Med.* 2003;10:31–38.
10. Sato APS, Fujimori E, Szarfarc SC, Borges ALV, Tsunehiro MA. Food consumption and iron intake of pregnant and reproductive aged women. *Revista Latino-Americana de Enfermagem.* 2010;18:247–254.
11. Shill KB, Karmakar P, Kibria G, Das A, Rahman MA, Hossain MS, et al. Prevalence of iron-deficiency anaemia among university students in Noakhali region, Bangladesh. *J Health Popul Nutr.* 2014;32:103–110.
12. Sirdah MM, Yaghi A, Yaghi AR. Iron deficiency anemia among kindergarten children living in the marginalized areas of Gaza Strip, Palestine. *Rev Bras Hematol Hemoter.* 2014;36:132–138.
13. Tekkesin N, Taser F. Folic acid usage and awareness in pregnant women in Istanbul, Turkey. *J Hosp Adm.* 2012;1(1):9–14.
14. The Regulation of the Minister of Health of 16th August 2018 on the Organizational Standard of Perinatal Care (Dz.U. 2018 poz. 1756) [(accessed on 21 April 2020)];
15. Thompson M.W. Pregnant women's knowledge of obesity and ideal weight gain in pregnancy, and health behaviours of pregnant women and their partners. *Aust. N. Z. J. Obstet. Gynaecol.* 2020;51:460–463.
16. Trivedi T., Liu J., Probst J., Merchant A., Jhones S., Martin A.B. Obesity and obesity-related behaviors among rural and urban adults in the USA. *Rural Remote Health.* 2015;15:3267.]
17. Vitale K, Mujki A, Todorovi G, Tulchinsky TH. Is level of knowledge, attitude and use of folic acid among pregnant women in Croatia a call for public health action? *Period Biol.* 2009;111(3):329–335.
18. Wojtyła C., Ciebiera M., Wojtyła-Buciora P., Janaszczuk A., Brzecka P., Wojtyła A. Physical activity patterns in third trimester of pregnancy—Use of pregnancy physical activity questionnaire in Poland. *Ann. Agric. Environ. Med.* 2019.
19. Wojtyła C., Wojtyła-Buciora P. Polish Pregnancy-related Assessment Monitoring System (Pol-PrAMS): Research on lifestyle health behaviours of Polish women during gestation—Study design. *J. Health Inequal.* 2016;2:185–191. Zimmerman MB, Hurrell RF. Nutritional iron deficiency. *Lancet.* 2007;370:511–520.