Content available at: https://www.ipinnovative.com/open-access-journals

Indian Journal of Obstetrics and Gynecology Research

Journal homepage: www.ijogr.org

Original Research Article

A self-study on identification of etiology of Anemia in pregnancy

Archana Dhawan Bajaj [1,*]

[1] *Dept. of Obstetrics and Gynecology, Nurture IVF Centre, Unit of Nurture Pvt. Clinic, India*

ARTICLE INFO

Article history:
Received 21-09-2022
Accepted 10-10-2022
Available online 08-11-2022

Keywords:
Iron deficiency anemia
Folate deficiency
Anencephaly
Spina bifida

ABSTRACT

Introduction: Anemia in medical literature could be defined as when levels of hemoglobin are below two standard derivation of the mean for age and gender of patients. During pregnancy many women lacks the sufficient amount of iron which is needed for 2^{nd} & 3^{rd} trimesters due to significant changes in increase in volume of blood to support the growth of baby, person could suffer from anemia. Based on several researches conducted it have been stated that anemia is one of the most common complications which could occur in pregnancy.

Materials and Methods: A systemic self-study was planned to determine and review the possible cause of Anemia during pregnancy. With the application of electronic databases we searched PubMed, Google Scholar, Web of Science, Clinical Trial Gov, Medline Plus, health line, John Hopkins Medicine which were published in English language. This systemic self-study have reviewed the facts which were published earlier to determine the cause of anemia during pregnancy. Vast analysis was made to determine the cause of anemia during pregnancy.

Observation and Discussion: We observed and concluded the fact that anemia during pregnancy occurs due to iron and folate deficiency. In more than 50 percent of studies conducted in pregnant women, we observed that one who have less adequate diet and did not received any prenatal iron and folate supplement have the chances to suffer from iron deficiency and folate deficiency anemia.

Conclusion: We conclude by delivery of very important message that adequate iron and folate intake is very crucial for both mother and child during pregnancy. Healthcare professionals must provide proper nutritional advice and essential supplementation which is required at their first consultation with mother's which lowers and minimalizes the risk of anemia related complications in future.

1. Introduction

When one becomes pregnant, our body goes through significant changes. One of the most common characteristic changes includes the increase in volume of blood by 20 to 30%. This in turn increases the demand and supply of vitamin and iron which our body needs to make hemoglobin.[1] Hemoglobin is that protein which is present in red blood cells that carries oxygen to other cells in our body. So in simpler terms anemia is type of chronic conditions in which body lacks the level of healthy red blood cells to carry adequate oxygen to other cells and tissues of our body. During pregnancy many women lacks the sufficient amount of iron which is needed for 2^{nd} & 3^{rd} trimesters due to significant changes in increase in volume of blood to support the growth of baby, person could suffer from anemia. When one becomes pregnant, due to body's heavy demand in increase in volume of blood, it's normal to have mild anemia. Based on several researches conducted it have been stated that anemia is one of the most common complications which could occur in pregnancy.

* *Corresponding author*.
E-mail address: dhawanarchana@rediffmail.com (A. D. Bajaj).

https://doi.org/10.18231/j.ijogr.2022.102

2. Materials and Methods

A systemic self-study was planned to determine and review the possible cause of anemia during pregnancy. With the application of electronic databases we searched PubMed, Google Scholar, Web of Science, Clinical Trial Gov, Medline Plus, health line, John Hopkins Medicine which were published in English language. This systemic self study have reviewed the facts which were published in English language. This systemic self-study have reviewed the facts which were published earlier to determine the cause of anemia during pregnancy. Vast analysis was made to determine the cause of anemia during pregnancy.

3. Observation & Discussion

Based on our systemic self study, we observed and derived the facts that several types of anemia can develop during pregnancy which commonly includes:-

1. Iron deficiency anemia
2. Folate deficiency anemia

Studies have shown the fact that anemia could occur up to 1/3 of women during their third trimester. In large observational studies it has been stated that women who have less adequate diet and did not received any prenatal iron and folate supplement have the chances to suffer from iron deficiency and folate deficiency anemia.

Studies have also shown that anemia during pregnancy occurs due to two predominating factors[2]-

1. Iron deficiency
2. Folate deficiency

Iron deficiency and folate deficiency anemia are the true most common anemias that occurs during pregnancy.[3]

3.1. What is the etiology of Iron deficiency anemia?

According to many studies conducted worldwide it have been observed that the most common cause of anemia globally is due to deficiency of iron. Iron deficiency anemia in general patients can be caused by several factors. The most common factors of iron deficiency anemia in general patients are mostly due to the followings:[4]

1. Loss of blood
2. Abnormalities of gastrointestinal tract
3. Diet low in Iron

Sometimes due to blood loss from menstrual bleeding gastrointestinal bleeding or any form of injuries can cause iron deficiency anemia. Loss of blood can cause decrease in the level of iron in our body and hence result in iron deficiency anemia.

After gastrointestinal surgeries malabsorption of iron is very common. This occurs because when iron taken in by foods is absorbed in upper part of small intestine. Any abnormalities in gastrointestinal tract could alter the absorption of iron and hence could result in iron deficiency anemia. Various surgeries and certain medications can stop stomach acid production which will also decrease the absorption of iron.

In our diet iron is obtained from foods. But according to research it have been observed that only 1mg of iron is absorbed for every 10 to 20 mg of Iron ingested. Any person who are unable to have balanced iron rich diet may suffer from some degree of iron deficiency anemia.[4]

3.2. What happens to women suffering from iron deficiency anemia during pregnancy?

Iron deficiency when occurs during pregnancy have been observed that it is one of the major leading cause of anemia in infants and young children's.

The following hemoglobin (Hb) and Hct levels are classified as anemic.[2,5]

1. 1^{st} trimester: Hb < 11 g/dL; Hct < 33%
2. 2^{nd} trimester: Hb < 10.5 g/dL; Hct <32%
3. 3^{rd} trimester: Hb < 11 g/dL; Hct < 33%

If Hb is < 11.5 g/dL at the onset of pregnancy, women may be treated prophylactically because subsequent hemodilution usually reduces Hb to < 10 g/dL. Despite hemodilution, oxygen-carrying capacity remains normal throughout pregnancy. Hct normally increases immediately after birth.

Table 1:

Causes	Examples
Physiological	Prematurity, growth spurt, pregnancy
Poor intake	Malnutrition, pseudo-bulbar palsy, vegans, chronic illness, poor socio-economic state
Malabsorption	Celiac disease, atrophic gastritis
Blood loss	Esophageal varices, hiatus hernia, gastritis, peptic ulcer, inflammatory bowel disease, hook worm, hemorrhoids, menorrhagia

Pregnancy is mostly associated with increased demand of iron in our body, and therefore, increase the risk of iron deficiency anemia. Up to 50% of pregnant women in the developing world are affected. Prematurity and early weaning off breastfeeding increases the risk further, because of reduced iron stores.[6]

Throughout pregnancy, iron deficiency anemia have adversely affected the maternal and fetal well-being which in turn linked to increase morbidity and fetal death. Affected mothers frequently experience breathing, fainting, tiredness, palpitations and sleep difficulties.[7]

They also have an increased risk of developing perinatal infection, pre-eclampsia, and bleeding. Post-partum cognitive impairment and behavioral difficulties were also reported.

With our analysis on iron deficiency anemia we would state that adequate iron intake is very crucial for healthy pregnancy. Mother should always receive appropriate nutritional advice and supplementation at their first consultation with health care professionals. There is a growing need for public health strategies to educate the mass population about the importance of a healthy diet and iron supplementations add the beginning of pregnancy.

3.3. What is the etiology of folate deficiency anemia?

Folate is a B vitamin which assists our body to make red blood cells. It is also known as folic acid. Due to lack of this folate, body cannot produce RBCs which causes folate deficiency anemia.

In folate deficiency anemia the red blood cells are larger in size than normal. Such cells are also termed as macrocytes. This are also known as megaloblasts. They are fewer of this cells. They are also Oval shaped, not round. This type of anemia is called as megaloblastic anemia.

In general studies it has been observed that folate deficiency anemia is caused by lack of folic acid in the diet.

3.4. Diet

Vegetables, beans, citrus fruits and whole grains are the natural source of folic acid. Any diet which is low in fresh fruits, vegetables and fortified cereals are the main cause of folate deficiency anemia sometimes due to overcooking also can destroy this essential vitamins. [8]

3.5. Medications

There are certain medications which have the potential to cause folate deficiency.

This mainly includes :-

1. Phenytoin (Dilantin)
2. Trimethoprim-sulfamethoxazole
3. Methotrexate
4. Sulfasalazine
5. Pyrimethamine

3.6. Alcohol

Research studies have shown the fact that long term alcoholism interferes with the absorption of folate. It have also increases the folate excretion through urine.

3.7. Disease

The chronic conditions which affect absorption in the gastrointestinal tract can cause folate deficiencies which include mainly. [9]

1. Crohn's disease
2. Celiac disease
3. Cancer
4. Severe kidney problems

3.8. What happens to women suffering from folate deficiency anemia during pregnancy?

During pregnancy body becomes very slower to absorb folic acid because fetus consumes body is folic acid as it grows, which in turn causes folate deficiency anemia.

Folate deficiency anemia in pregnancy have high risk to cause neural tube defect. This is a condition when our brain and spinal cord doesn't develop normally. Neural tube defects are serious birth defects that affect the spine, spinal cord or brain which might even cause death.

This mainly includes two conditions:-

1. Spina bifida
2. Anencephaly

3.9. What is spina bifida?

Spina bifida the word mean split spine in Latin is a birth defect which is mostly occurs due to spine and spinal cord not formed properly.

If a baby has this condition during development it can cause physical and mental issues.

About 1500 to 2000 babies of the four million born in US every year have Spina bifida.

3.10. What is anencephaly?

Anencephaly is a very serious birth defect in which a baby is born without any parts of brain and also cranium. This condition occurs when the baby's cranium, skull or scalp which does not develop in the womb. According to many research studies it have been observed that infants who are born with this condition usually die within a few hours or days.

Researchers have estimated that about one in every 4600 babies is born with Anencephaly in United States.

So we are concluding based on our research facts on folate acid deficiency by stating that one must lower the risk of Anencephaly or Spina bifida by taking the recommended dosage of folic acid before and during pregnancy.

4. Conclusion

Based on our vast analysis on anemia in pregnancy we conclude this facts that two pre dominating factors are most commonly responsible for anemia during pregnancy which are folate deficiency and iron deficiency. In more than 50 percent of studies conducted in pregnant women, we observed that one who have less adequate diet and did not

received any prenatal iron and folate supplement have the chances to suffer from iron deficiency and folate deficiency anemia. We also observed that iron deficiency anemia is the most common cause of anemia worldwide which could result in microcytic and hypochromic red cells in peripheral smear. We have also reported that women suffering from folic acid deficiency during pregnancy have higher risk to cause neural tube defects which mainly includes spina bifida and Anencephaly. Anencephaly is known to such a serious birth defects in which baby is born without any cranium or brain, and they usually die within a few hours or days.

We would like to end our study by delivering a very crucial message to our readers that adequate iron and folate intake is very important for health of both mother and child during pregnancy. Healthcare professionals must provide appropriate nutritional advice and supplementation at their first consultation with mother's which lowers and minimalizes the risk of anemia related complications in the future.

5. Source of Funding

None.

6. Conflict of Interest

None.

References

1. Anemia and Pregnancy. American society of hematology . Available from: https://www.hematology.org/education/patients/anemia/pregnancy.
2. Friel LA. Anemia in Pregnancy. MSD Manual Professional. Available from: https://www.msdmanuals.com/en-in/professional/gynecology-and-obstetrics/pregnancy-complicated-by-disease/anemia-in-pregnancy.
3. Sifakis S, Pharmakides G. Anemia in pregnancy. *Ann N Y Acad Sci*. 2000;900:125–36.
4. Iron-Deficiency Anemia. John Hopkins Medicine. Available from: https://www.hopkinsmedicine.org/health/conditions-and-diseases/irondeficiency-anemia#amp_tf=From%20%251%24s&aoh=16636042153668&referrer=https%3A//www.google.com&ampshare=https%3A//www.hopkinsmedicine.org/health/conditions-and-diseases/irondeficiency-anemia.
5. Lee KA, Zaffke ME, Baratte-Beebe K. Restless legs syndrome and sleep disturbance during pregnancy: the role of folate and iron. *J Womens Health Gend Based Med*. 2001;10(4):335–41.
6. Folate-deficiency anemia. Medline Plus. Available from: https://medlineplus.gov/ency/article/000551.htm.
7. Varma A. Folate Deficiency. Available from: https://www.healthline.com/health/folate-deficiency#causes.
8. Pfeiffer C, Caudill SP, Gunter EW, Osterloh J, Sampson EJ. Biochemical indicators of B vitamin status in the US population after folic acid fortification: results from the National Health and Nutrition Examination Survey 1999-2000. *Am J Clin Nutr*. 2005;82(2):442–50.
9. Bailey RL, Dodd KW, Gahche JJ, Dwyer JT, McDowell MA. Total folate and folic acid intake from foods and dietary supplements in the United States. *Am J Clin Nutr*. 2010;91(1):231–7.

Author biography

Archana Dhawan Bajaj, Director and HOD https://orcid.org/0000-0002-8607-7791

Cite this article: Bajaj AD. A self-study on identification of etiology of Anemia in pregnancy. *Indian J Obstet Gynecol Res* 2022;9(4):537-540.