Determinants Of Anemia in Pregnancy: An Ecological Study In All States of India

Introduction/Background:

In underdeveloped countries, deficiency of iron affects more than two billion people globally. Almost half of persons with iron deficiency have or will develop anemia. Anemia occurs when there is a low Hb content or hematocrit (HCT) in the blood. In majority of the cases, anemia occurs when there is a lack of bioavailable iron. There are other common factors which include infections like malarial infection, dietary deficiencies of some nutrients, malabsorption, loss of blood, AIDS and genetic diseases like sickle cell disease, metabolic disorders, and repeated pregnancy can all cause or contribute to the condition. (Public Health Nutrition, 2000)

Anaemia during pregnancy is a global health issue. And it must be taken seriously as it is one of the causes of mortality in the country. There are various factors which act as the major causes of anaemia and they include food intake along with its nutritional status, environmental factors, social-economic factors and educational status and these all are definitely significant. According to the WHO report on anaemia, total of 40% of women during pregnancy get affected by anaemia. National Family Health Survey statistics report shows that every second women of India is anaemic and one in five maternal deaths are because of anaemia which means it affects almost a half of billions of women belonging to reproductive age globally.

Thus, it is really critical to distinguish iron deficiency anaemia from physiologic anaemia, as well as to mostly identify actually other generally less sort of common causes of anaemia that may basically require treatment.

More than half of women in India are anaemic which makes it a serious issue. Anaemia can leads to various problems including both health and work problems like fatigue, no productivity in work, more risk of pre-term delivery, and maternal mortality. The government of India has promoted and make availability of the use of iron-folic acid supplements (IFA) which helps in the prevention and treatment of anaemia from past five decades, but uptake of these supplements remains very low and thus the prevalence of anaemia is quite high

in a certain way. There are so many programs running which are mainly targeting all the barriers among women during their pregnancies and also women belonging to reproductive age but more comprehensive approach is required with main motive of increasing the uptake of IFA and food rich in iron which could help in decreasing anaemia.

Anaemia mainly occurs due to the deficiency of iron in diet, deficiency of B12 , excessive intake of coffee or tea and menstrual los of blood every month is also one of the major cause of iron deficiency anaemia among women..

During pregnancy, there occur a lot of changes within the body to support the growth of the foetus and production of more blood is one of them. So that time the body needs more iron and other nutrients and if the body does not get these nutrients and iron, it leads to the deficiency of required blood and causes anaemia. In maximum cases having mild anaemia is sometimes normal but severe anaemia leads to various complications. Mild anaemia causes fatigue and tiredness as its main symptoms but severe anaemia leads to severe complications like preterm delivery and in some cases also lead to mortality.

Specific Types of Anaemia

Iron-Deficiency Anaemia:

Iron is required by the body to form haemoglobin which is an important protein of RBCs that carries oxygen. The main source of iron is outside the body in the form of food. During certain conditions like haemorrhage, growth spurts or during pregnancy, our body required more level of iron compared to normal conditions and if this iron level is not maintained within the body or its deficiency leads to a more common type of anaemia known as iron deficiency anaemia. The main Groups at risk are the infants, children, women belonging to reproductive age, diet lacking iron, internal bleeding etc.

Treatment: supplements with iron in it and dietary changes like eating iron rich food.

Pernicious Anaemia:

Vitamin B12 and folate (another B vitamin) are required for the formation of healthy RBCs. We get these nutrients from outsource like food. Pernicious anaemia occurs body van not form required RBCs due to the deficiency of vitamin B12 and folate.

Groups at risk:

- People who are deficient of folate in their body
- Diet lacking vitamin B12.

Treatment: Vitamin B12 supplements and dietary changes like eating vitamin B12 rich food

Aplastic Anaemia:

Most type of anaemia are mainly associated with the deficiency of red blood cells but there are some types of anaemia which occurs due to the smaller number of other blood cells like white blood cells, platelets too. Aplastic anaemia occurs when there is deficiency of any types of blood cells within the body and the main cause of aplastic anaemia is the disorder in bone marrow. As bone marrow is responsible for the formation of the blood cella but if there occurs any destruction in bone marrow it leads to the deficiency of blood cells and cause aplastic anaemia.

Groups at risk:

The main groups at risk are the people getting radiation therapy, chemotherapy or various medicines also cause its deficiency. The people with the disorders of bone marrow also comes under it

Haemolytic Anaemia:

Red blood cells have a normal lifespan of 120 days and after that these red blood cells died and replaced by new ones and this process continues but in some cases the red blood cells get destroyed before their normal lifespan. If the body is not able to form required red blood cells to replace the damaged ones it leads to a condition known as Haemolytic Anaemia. Haemolytic anaemia is of two types: inherited and acquired. Acquired haemolytic anaemia occurs when there occurs something wrong in the body and body start destroying RBCs before their lifespan get completed and there are various factors responsible for this. Inherited Anaemia occurs due to the fault in the genes or due to genetic disorders.

Treatment: Treatments may include blood transfusions, medicines, surgery and procedures, and lifestyle changes.

Types of Anaemia During Pregnancy:

There are various types of anaemia develop during pregnancy. These include:

- Iron-deficiency anaemia
- Folate-deficiency anaemia
- Vitamin B12 deficiency

Iron-deficiency anaemia:

Iron is required by the body to form haemoglobin which is an important protein of RBCs. The main source of iron is outside the body in the form of food. During pregnancy, the body required more level of iron compared to normal conditions and if this iron level is not maintained within the body or its deficiency leads to a more common type of anaemia known as iron deficiency anaemia. This is the most common type of anaemia during pregnancy.

Folate-deficiency anaemia:

Folate is required to produce blood cells mainly the RBCs and the main source of folate is outsource like diet rich in folate which includes green leafy vegetables. As during pregnancy, more blood is required for the growth and support of the foetus, so diet rich in folate is essential. Deficiency of folate during pregnancy leads to anaemia known as folate deficiency anaemia and this leads to various birth defects.

Vitamin B12 deficiency:

Like iron and folate, Vitamin b12 is also required for the formation of blood cells mainly the RBCs and deficiency of this vitamin leads to Vitamin B12 deficiency. The main source of Vitamin B12 is outside the body through vit B12 rich foods and if the pregnant women do not get good diet rich in Vitamin B12 it leads to its deficiency.

During mild stages of anaemia, a person may not feel any signs and symptoms except for little fatigue but in severe conditions it leads to serious complications and sometimes, non anaemic women also develop anaemia during pregnancy due to more demand of blood at that time. Routine blood tests are very important to be done for anaemia at the prenatal appointments.

Risks of Anaemia in Pregnancy:

- Anaemia cause risk to both mother and baby during pregnancy period. Severe form of iron deficiency anaemia leads to low birthweight, a baby with anaemia and the child in which there occurs the delay in its development
- Untreated folate deficiency also causes risk during pregnancy which includes low birthweight of the baby, birth defects

Review of Literature:

Mary Kamau et al. (2020) conducted a study on pregnant women to know about their knowledge on the availability of IFAS and IFAS counselling practices among these women. It was a cross-sectional study involving pregnant women aged 15-49 years. They have chosen a cluster sampling with two stages which included one country and 5 health facilities centres. In their study, less people were found to have knowledge about IFAS and there was scarcity of IFAS documents in these health facilities. Regarding IFAS counselling, it was also limited in different health facilities. In their study, they have concluded that the pregnant women in these health facilities were having less knowledge about IFAS uses, and also there was limited counselling sessions, so steps should be taken to improve women knowledge about IFAS and counselling should be increased so that there would be more usage of IFAS among pregnant women and less incidence of Anaemia would take place.

A study was conducted by **Jithin Sam Varghese et al. (2019)** . To estimate the prevalence of anaemia among pregnant women of India and found that there was a decline in the anaemia rates according to the NFHS-4 report in which the incidence of Anaemia was less than the NFHS-3 report. They have done a in-depth study to find out the loopholes whether they are on demand side or on supply side. In their study, they have found that the demand side was associated with anaemia because of the knowledge of IFAS, less consumption due to the lack of registration during pregnancy, lack of antenatal visits, not receiving IFA tablets from the health centres and they found the same association from the supply side. They found that there are so many villages which did not have access to OFA tablets. They concluded that there is insignificance in both ends. Proper counselling of pregnant women should be done and proper registration, antenatal checkups should be done on time to improve the uptake of IFA supplementation which will leads to the reduction in iron deficiency anaemia in pregnant women and a constant supply of IFA should be there so that there should be no delay from the supply side.

A study was conducted by Phuong **Hong Nguyen et al. (2019) to** find out the various factors which are associated with maternal nutrition in the state of Uttar Pradesh. Cross sectional study was done and Data was collected through household survey of pregnant women or those women who had delivered recently. They have found that during pregnancy many women have taken IFA and calcium tablets and maximum of the women were having the knowledge

about the consumption of diet during pregnancy or post delivery. they have found a lot of improvement in maternal nutrition from previous years but it is not sufficient to meet the WHO recommended levels and hence further improvement is required to achieve the desirable goals, Hence, strengthening of maternal health programs is required along with the proper counselling of the women to have knowledge about the diet and increase the intake of these supplements among pregnant women.

A study was conducted by **Pamela A Williams et al. (2020)** to find out the factors like social or cultural in the provision of iron and folic acid intake and to identify the strategies which help in the improvement in the behaviour regarding intake of iron and folic acid supplements to prevent and treat anaemia among pregnant women and lactating women. They collected data with the help of in-depth interviews and focus group discussions with pregnant and lactating women and also took interviews with healthcare professionals. They found that most women have knowledge about anaemia but they were not aware about its consequences. They also found that women received iron and folic acid supplements mostly those which were available for free but they were not adherent to its because of their some side effects. They lack knowledge about these supplements uses and their seriousness due to low social support. Based on their findings they recommended various interventions which included proper training of healthcare workers, awareness camps for pregnant women and proper counselling of these women. (Public Health Nutrition, 2020)

Mishu Mangla et al. (2016) conducted a cross-sectional study to find out the Haemoglobin levels among pregnant women during antenatal care and delivery time in general hospitals across India. They studied about the incidence of anaemia and the associated risk factors. They found more prevalence of anaemia among pregnant women living in rural population and majority of the pregnant women had mild anaemia followed by moderate and very less women were having severe form of anaemia

Diamond-Smith et al. (2016) done a study to find out the determinants of persistent anaemia. Interviews were taken with the help of questionnaire including questions about their nutrition knowledge and practices. A follow-up survey in health clinics were also done. They have found that majority of women i.e., were anaemic. Very less respondents were getting free IFA and again very less women were getting nutritious diets. They concluded that there was lack of knowledge among women regarding nutritious diet and IFA.

Siddiqui et al. (2017) They study to find out the prevalence anaemia among pregnant and lactating versus non-pregnant non-lactating. They had used National Family Health Survey (NFHS3) data for the analyses of this study. They found high prevalence of anaemia among lactating women than NP-NL women. They found various factors responsible for that like socioeconomic factors, and demographic factors and these factors together leaded to the high burden of anaemia (SAGE Open,2017)

Rai N et al. (2016) conducted a cross sectional study **at** the urban health training centre MP, India from A total 150 pregnant women were studied. They found that most of the pregnant women had mild anaemia followed by moderate and very less women were having severe form of anaemia Religion, caste, educational status, socioeconomic factors, and parity come out to be important predictors of anaemia in pregnancy. So, they concluded that there is a need to intensify awareness campus.

Viveki RG et al. (2012) conducted a study to estimate the prevalence of anaemia in pregnant women and to find out the epidemiological determinants of anaemia in pregnancy. They have done a descriptive case series with the help of by questionnaire. They have done the estimation of Haemoglobin and then done grading of anaemia accordingly by using WHO criteria. They have found high prevalence of anaemia among pregnant women. This high prevalence of anaemia needs to be taken seriously and proper awareness among women regarding IFA and iron rich food should be done.

Aim:

To Analyse the determinants of anaemia in pregnancy in all states of India.

Objective:

General Objective:

To analyse the Determinants of anaemia in pregnant women in India.

Specific Objective:

To study the Correlation between MPI, Literacy and tobacco consumption with anaemia in all women and anaemia in pregnant women.

Methodology:

Study Design:

Study design is secondary data. The data collected from various sources like NFHS,National Multidimensional Poverty Index Baseline Report(NITI Ayog), published articles, books, newspaper and magazines.

Study Area:

All States & UTs of India

Duration Of Study:

3 Months

Study Population:

All women & Pregnant women/Reproductive age group (15-49 years) who are anemic, and using tobacco in India.

Data Collection Method:

- Data Regarding pregnant women age 15-19 years who were anaemic was obtained from NFHS-5.
- Data regarding headcount ratio of MPI was obtained from NITI Ayog, National Multidimensional Poverty Index Baseline Report 2016-17.
- Data regarding Percentage of women currently using tobacco in any form were obtained from Global Adult Tobacco Survey (Second Round, India Report 2016-17)

Data Analysis:

MS Excel-2010 was used to plot scatted diagrams of correlation between variables and correlation coefficient was calculated.

Results:

Figure-1 shows that the states with high ratio of MPI (Multidimensional Poverty Index) and have higher percentage of anaemia among pregnant women. There is strong correlation between pregnant women who were anaemic and headcount ratio.

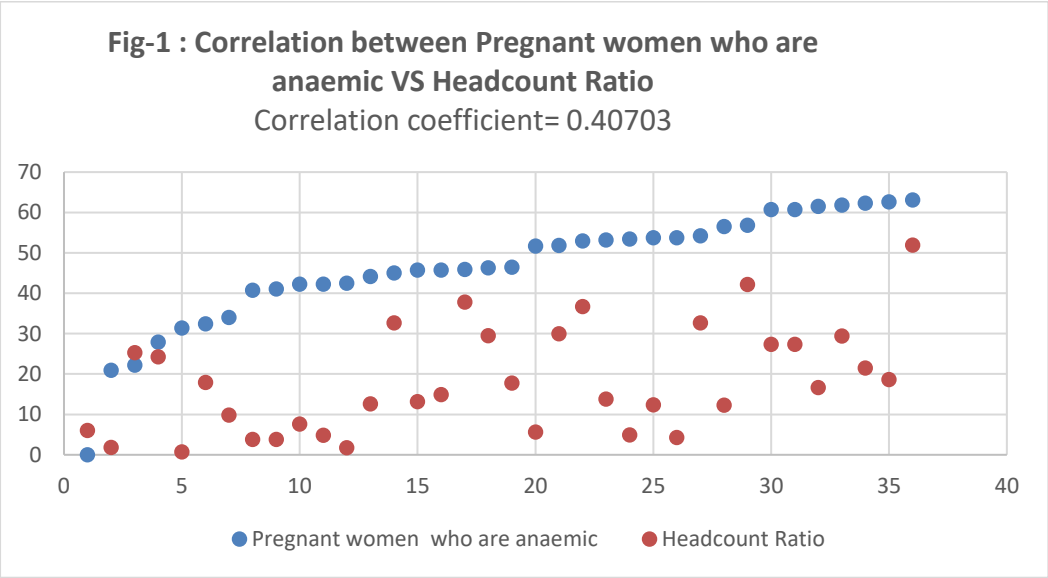
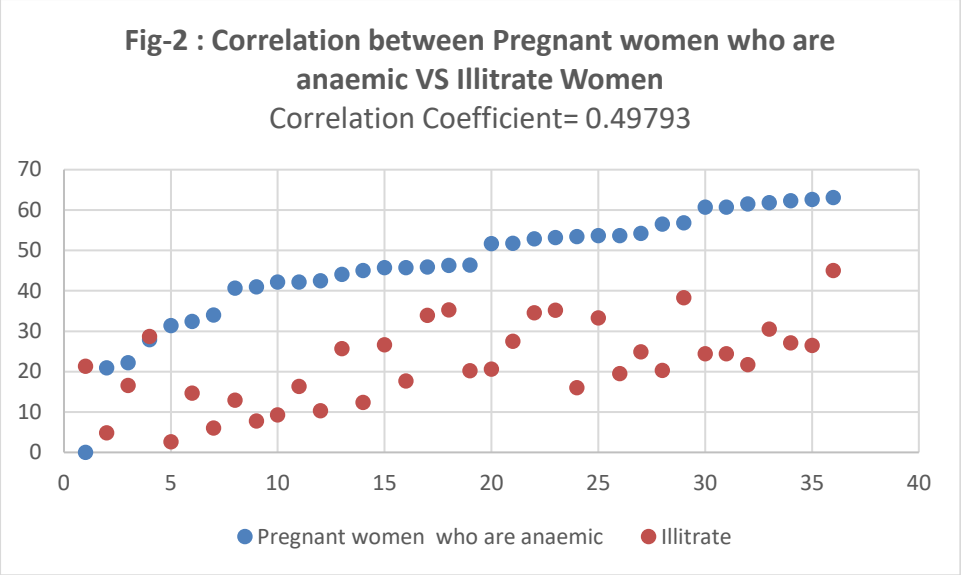


Figure-2 shows that the states with higher percentage of women illiteracy also have higher percentage of anaemia among pregnant women. There is strong correlation between women with anaemia and women who are illiterate.The result of figure two shows that the pregnant women who were less literate were more anaemic compared to women who were literate. (Correlation Coefficient is 0.49793) (Refer Figure 2)



Further illiteracy is correlated with anaemia in all women in general as shown in **figure-3**.when anaemia was linked with education of women , it was found that as schooling decreases, the percentage of women with anaemia increases. There is strong correlation between pregnant women who were anemic and women education. The result of figure three shows that the pregnant women who were less educated were more anaemic than educated women (Correlation Coefficient is 0.59489) (Figure 3).

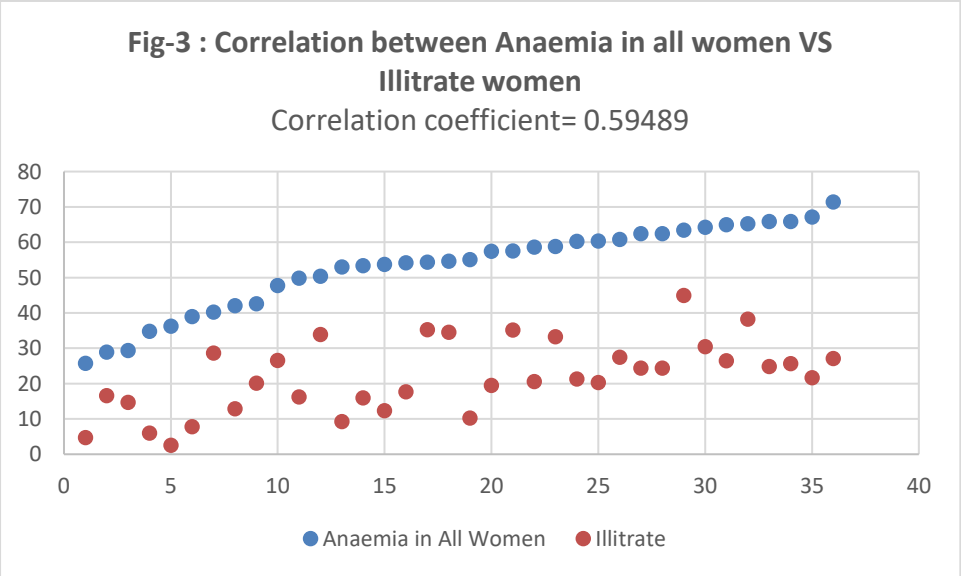
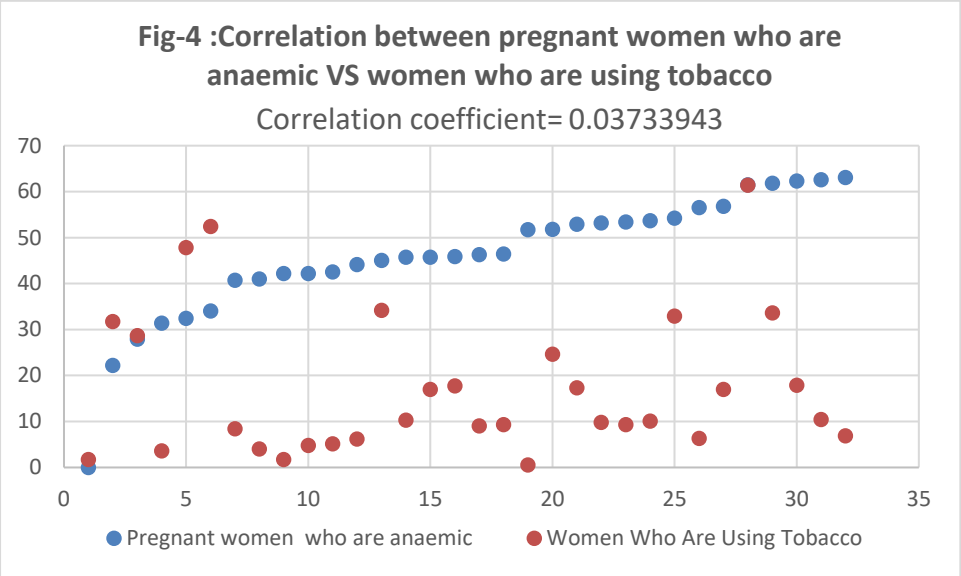


Figure-4 shows the relationship between women consuming tobacco and anaemia. There is strong correlation between pregnant women who were anaemic and tobacco consumption. The result of figure four shows that the pregnant women who were using tobacco were more anaemic than women with non-tobacco consumption. (Correlation Coefficient is 0.03733943) (Refer Figure 4).



Discussion:

Although the anaemia in pregnant women has been decreasing from past few years, the prevalence of anaemia is still high in pregnant women in India. Every woman whether older or younger Women, belongs to low income families, were at high risk of anaemia. Anaemia in women of reproductive age cannot be neglected. Anaemia during pregnancy causes serious complications to both mother and foetus, so it should not be ignored.

The risk of anaemia in non-working women was significantly higher than working women. Anaemia is related to various factors which are responsible and may cause mild to serious complications. The increased risk of anaemia lead to various complications and can cause harm to both mother and foetus. There are various factors responsible for anaemia including lack of education, social and cultural factors, lack of proper diet, poverty, alcohol consumption, tobacco intake and some genetic factors. There are other factors also like lack of health care facilities, lack of counselling by health care professionals, missing ANC visits etc.

Back to back pregnancies or pregnancy at very young age are also some of the factors responsible for causing anaemia among women. Lack of knowledge about IFA supplements uses and their importance is also one of the major factors responsible for increased anaemia rates in the country.

Strengthening of health programs for women especially pregnant and lactating women is very essential which should include proper education, counselling, awareness among women about anaemia and iron folic acid supplements. Proper antenatal checkups should be done and haemoglobin levels should be check on time. The availability of IFA supplements should be made easily accessible.

Conclusion & Recommendations:

Our results shows that anaemia in pregnancy increases by increase in multidimensional poverty index(MPI), illiteracy in women & increasing in tobacco consumption amount women .So there is a need for inter sectorial coordination between different vertical programmes run by the government of India. so apart from this policy initiatives there is a need for inter sectorial coordination by the government like from poverty to poverty allegation programmes ,from illiteracy to literacy programmes & from tobacco consumption to tobacco control programmes by the government.

Therefore, the status of women related to nutrition before and during pregnancy should be taken into consideration which help in the reduction of the anaemia in women and resulted in the overall improvement of maternal and child health .So, we have to adopt the holistic approach to address & reduce the anaemia in pregnant women and those women who are anaemic in India.

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