Original Research Paper

Volume-10 | Issue-2 | February - 2020 | PRINT ISSN No. 2249 - 555X | DOI : 10.36106/ijar

Gynecology

ROLE OF VITAMIN B12 IN FIRST TRIMESTER OF PREGNANCY

Dr. Prerak Modi — Assistant Professor Department of Obstetrics and Gynecology, B. J. Medical College, Civil Hospital, Ahmedabad

Dr. Shafika Mansuri* — Former Resident Doctor Department of Obstetrics and Gynecology, B. J. Medical College, Civil Hospital, Ahmedabad *Corresponding Author

ABSTRACT

Objective: To study outcome of pregnancy in patients with low Vitamin B12 levels in 1st trimester of pregnancy.

Methods: A Prospective observational study was conducted over 2 year period between July 2016-2018 in Dept of OBGY, Civil Hospital, Ahmedabad.Total 100 antenatal patients (1st trimester) were randomly selected from routine OPD & IPD and were prospectively studied throughout pregnancy.

Results: Out of 100 cases,57% patients had normal B12 levels while 43% patients were B12 deficient.Out of 56 patients with veg diet, 62.5% patients were B12 deficient, while amongst 44 nonveg patients, only 18.2% patients were B12 deficient. Out of 43 patients with decreased B12 Levels, 83.72% were Hindus, 10.87% were Muslims and 4.65% were Christians. Out of 43 patients with B12 Deficiency, 30 had live birth, 6 had preterm labour, 5 had history of recurrent abortion and 2 patients had delivery after 20 weeks but before viability. Out of 43 patients, 6 had PTL, 17 had LBW newborn babies, 15 had IUGR fetuses and 10 patients had fetuses with NTDs.

Conclusion: Vitamin B12 is an essential nutrient required for normal erythropoiesis, nucleoprotein and myelin synthesis, fattyacid degradation, cell reproduction and normal growth. Majority B12 deficient patients are vegeterians and Hindu.B12 Deficiency is associated with complications such as RPL,ERA,VERA,IUGR, LBW and NTDs. So B12 rich diet, B12 Fortified Foods and B12 Supplementation should be provided in ANC period(1st trimester), to avoid such untoward fetal complications.

KEYWORDS : Vitamin B12,Cyanocobalamin,erythropoiesis,embryogenesis and fetal development,NTDs.

INTRODUCTION:

Vitamin B12(cyanocobalamin), is a water-soluble vitamin involved in the metabolism of every cell of the human body: it is a cofactor in DNA synthesis, and in both fatty acid and AA metabolism.It is particularly important in the normal functioning of the nervous system via its role b12 levels with recurrent abortion in the synthesis of myelin, and in the maturation of developing red blood cells in the bone marrow.

There are no naturally-occurring notable vegetable dietary sources of the vitamin, so vegans and vegetarians are advised to take a supplement or fortified foods. Most omnivorous people obtain enough vitamin B12 from consuming animal products including meat, milk, eggs, and fish. Vitamin B12 supplements are available in single agent or multivitamin tablets; and pharmaceutical preparations may be given by intramuscular injection. Vitamin B12 is produced industrially via bacterial fermentation. Vitamin B12 was discovered as a result of its relationship to pernicious anaemia.

RDA for pregnancy equals 2.6 µg/day. RDA for lactation equals 2.8 µg/day Natural Food Sources of Vitamin B12 are Wild Salmon, Soy Milk, Shrimp, Yogurt, Red Meat, Milk,Cottage Cheese.

B12 improves energy, mood and stress levels by aiding the metabolization of fats, carbohydrates, and proteins. It helps to maintain the normal CNS and neurological functions by regulating the synthesis of myelin and fatty acids.

B12 and first trimester growth:The embryonic growth rate was positively associated with vitamin B12 and negatively associated with plasma total homocysteine.

B12 levels with preterm birth and LBW:Vitamin B12 deficiency (<148 pmol/L) was associated with higher risk of LBW(<2500 kg) in newborns.

Vitamin B12 plays a pivotal role in recurrent pregnancy loss. The implicated mechanisms are faulty and sporadic ovulation producing a faulty oocyte, homocysteinemia leading thrombosis, incomplete trophoblastic invasion of spiral arteries leading to defective placentation.

B12 deficiency and neural tube defects

Research strongly implicates low B12 levels as a factor in NTDs*, since folic acid and B12 work hand in hand.* Neural tube defects are group of birth defects that include spina bifida, which can cause partial paralysis, and anencephaly, a fatal condition in which the brain and skull are severely underdeveloped.

METHODS

A prospective observational study was conducted between July 2016-2018 in Department of Obgy, Civil Hospital, Ahmedabad. Medical ethics committee approved this study.A total of 100 patients participated in this study. Choice of the patients were totally on randomization, to avoid bias. Detailed history, preoperative examination and investigations along with S. Vit B12 were recorded on predesigned proforma.

After woman has signed the informed consent about the study, they were studied based for the outcome of pregnancy(maternal and fetal complications).This data was analysed in Microsoft Excel Worksheet. Meticulous assessment and careful individualization of each case proved that Vitamin B12 supplementation is highly recommended in first trimester of pregnancy as it reduces various adverse effects on the mother and foetuses including NTDs and recurrent pregnancy loss.

RESULTS

The present study has been carried out amongst **100 pregnant women** selected randomly, both from inpatients and outpatients. This study assesses the role of Vitamin B12 in first trimester of pregnancy and collaborates the fetomaternal outcome due to its deficiency.It excludes antenatal patients with history of malabsorption, Crohn's Disease, intrinsic factor deficiency and other causes of intestinal obstruction.

Table 1 Patients with Vitamin B12 Deficiency

B12 Levels	No. of Patients (N=100)	Percentage
Patients with Normal B12 Levels	57	57%
Patients with Decreased B12 Levels	43	43%
Total	100	100%

Among 100 cases, 57% patients had Vitamin B12 levels in normal range while 43% patients had Vitamin B12 levels below the recommended level.

Table 2 Differences in Vitamin B12 level depending on diet

Veg/Nonveg Diet	B12 Levels		Percentage
Patients on Vegetarian Diet	Normal	21	37.5%
	B12 Deficiency	35	62.5%

Total Patients on Vegetarian Diet		56	100%
Patients on Nonvegetarian Diet	Normal	36	81.8%
	B12 Deficiency	8	18.2%
Total patients on NonVegetarian Diet		44	100%

Out of randomly selected 100 patients, total 56 patients were on vegetarian diet and 44 patients were on nonvegetarian diet. Out of 56 patients with vegetarian diet, 62.5% patients were having Vitamin B12 Deficiency. And out of 44 patients with nonvegetarian diet, only 18.2% patients had Vitamin B12 deficiency. This implies that majority of patients with vegetarian diet are likely to have Vitamin B12 deficiency than those with nonvegetarian diet.

Table 3 Relation of B12 Levels with Religion

Religion	Patients with Decreased B12 Levels (n=43)	Percentage (%)
Hindu	36	83.72%
Muslim	5	10.87%
Others (Christianity)	2	4.65%
Total	43	100%

This table shows that 83.72% Hindus i.e 36 out of 43 patients have decreased B12 levels as compared to 10.87% Muslims (5 out of 43 patients) and 4.65% patients having Christianity as religion.

Table 4 Fate of Pregnancy

Outcome of Pregnancy	No. of Patients	Percentage
Live Birth	30	69.77%
Recurrent Abortion	5	11.63%
>12 Weeks(2nd trimester loss)	2	4.65%
>28 weeks	6	13.95%

Out of 43 patients with Vitamin B12 Deficiency, 30 patients(69.77%) had live birth, 6 patients (13.95%) had preterm labour, 5 patients (11.63%) had history of recurrent abortion and 2 patients (13.95%) had delivery after 20 weeks but before viability.

Table 5 Fetal Complications in relation to Vitamin B12 Levels

Fetal Complications	No. of patients	Percentage
IUGR	15	34.88%
NTDs(detected at <20 weeks)	8	18.60%
NTDs(detected at >20 weeks)	2	4.65%
Preterm labour	6	13.95%
LBW Newborn	17	39.53%

Out of 43 patients, 6 patients(13.95%) had preterm labour ,17 patients had newborn babies with LBW (39.53%), 15 patients(34.88%) had IUGR foetuses and 10 patients(23.25%) had neural tube defects.

DISCUSSION

- In this study, 100 cases of antenatal patients were studied during the period of July 2016 to July 2018 in Civil Hospital, Ahmedabad.
- Among 100 cases, 57% patients had Vitamin B12 levels in normal range while 43% patients had Vitamin B12 levels below the recommended level.
- Out of randomly selected 100 patients, total 56 patients were on vegetarian diet and 44 patients were on nonvegetarian diet. Out of 56 patients with vegetarian diet, 62.5% patients were having Vitamin B12 Deficiency. And out of 44 patients with nonvegetarian diet, only 18.2% patients had Vitamin B12 deficiency. This implies that majority of patients with vegetarian diet are likely to have Vitamin B12 deficiency than those with nonvegetarian diet.This is because the major source of Vitamin B12 is from nonvegetarian foods and dairy products.
- Out of 43 patients who had decreased B12 Levels, 83.72% patients were Hindus i.e 36 out of 43 total patients, 10.87% patients were Muslims (5 out of 43 patients) and 4.65% patients were having Christianity as religion. This is because majority of Hindus are vegeterians owing to their low Vitamin B12 reserve.
- Out of total 100 patients, 59 patients were Hindus and 39 were Muslims. Out of 59 Hindus, 54 were Vegetarian, out of which 35 patients had Vitamin B12 deficiency and rest 21 had normal B12 levels. Other 3 Hindus were Nonvegetarian. All muslim patients(39) were nonvegetarian, out of which only 5 patients had Vitamin B12 deficiency.
- Out of 43 patients with Vitamin B12 Deficiency, 30 patients(69.77%) had live birth, 6 patients (13.95%) had preterm labour, 5 patients (11.63%) had history of recurrent abortion and 2 patients (13.95%) had delivery after 20 weeks but before viability.
- Out of 43 patients with Vitamin B12 deficiency in first trimester, 26 patients(60.47%) had uncomplicated deliveries, 9 patients(20.93%)had pregnancy induced hypertension, 6 patients (13.95%) had preterm labour and 2 patients (4.65%) had suffered from gestational diabetes mellitus. This is implies the association of Vitamin B12 with MMA and Homocysteine levels.
- Out of 43 patients, 6 patients(13.95%) had preterm labour ,17 patients(39.53%) had newborn babies with LBW , 15 patients(34.88%) had IUGR foetuses and 10 patients(23.25%) had neural tube defects. This is implies that Vitamin B12 has major role in myelination,DNA synthesis and normal cellular functioning.

CONCLUSION

- Vitamin B12 (Cyanocobalamin), a **water-soluble vitamin** is an essential nutrient required for maintenance of normal erythropoiesis, nucleoprotein and myelin synthesis, fatty acid degradation, cell reproduction and normal growth.
- Majority of the patients with decreased Vitamin B12 level are **vegeterians** and belonging to **Hindu** religion (owing to the vegeterian diet).
- B12 Deficiency is associated with maternal complications such as **maternal anemia, PIH, GDM, RPL, ERA, VERA and preterm labour** and fetal complications such as **IUGR, LBW** and more Vitamin importantly, **Neural Tube Defects**.
- Hence, this study implies that Vitamin B12 plays a very vital role in embryogenesis and fetal development as well as maintaining the health of mother. So, Vitamin B12 supplementation in terms of B12 rich diet, B12 Fortified Foods and B12 medications should be provided in antenatal period, especially in the first trimester so as to avoid such untoward maternal and fetal complications.