

Impact of Anemia and Iron Supplementation in Pregnancy, Bgs Global Hospitals, Bangalore, India

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Abstract

The main objective of the study was to conduct study on impact of anemia in pregnancy. It was a prospective observational study conducted in: gynecology ward, BGS Global hospitals, Bangalore, conducted for a period of 6 months from October 2017- march 2018. All inpatients women who are pregnant and anemic. The patient data collection was used to collect all the details like inpatient number, age, sex, social history, past history, laboratory data, diagnosis, therapeutic management. All inpatients diagnosed anemia in pregnancy and pregnant women without anemia. Fulfilling the inclusion criteria will be enrolled into the study and their prescriptions will be analyzed on daily basis. The prescription guidelines, Micromedex, interaction checker, drug interaction database and stockley's drug interaction book 8 edition. The drug interaction in prescription was collected and then compare with guidelines. When the analysis of prescription was completed then all data entered to the appropriate software and the results were gained. Presence study showed from total of 110 patients were included in this study, anemia was confirmed in 50 patients. From these 28 (25.4%) of them diagnosed as mild anemic, 20 (18.1%) Of them with Moderate and 2 (1.8%) of them as sever anemic patients. Factors associated with anemia in pregnancy were Caste, dietary – habit, Education, Occupation, Socio-economic status, ANC Visit, Iron and folic acid supplementation whereas Residence Religion Number of Children Type of family Inter-Pregnancy Interval (Months) were not associated. These should be improved through providing proper ANC services. More low-birth weight (LBW) babies were born to anemic mothers. Anemia in pregnancy may be reduce by proper Iron and folic acid supplementation which can be improved through providing proper ANC services. Has also recognizable association with fetal outcome.

Keywords: anemia, iron supplementation, pregnancy, ANC services.

Introduction

Anemia is a common medical problem in pregnancy. The extent up to which maternal anemia affects maternal and neonatal health is still uncertain. Iron deficiency anemia is a health problem that often goes untreated especially in pregnant women living in developing countries where it can be most dangerous. The world health organization estimates that averages of 56% of pregnant women in developing countries are anemic. Iron deficiency during pregnancy is thought to be caused by combination of factors such as previously decreased iron supply, the iron requirements of growing fetus and expansion of maternal plasma volume (Goswami et al., 2014).

During pregnancy, increase in plasma volume exceeds the increase in red cell volume, which causes a physiological hem dilution, resulting in reduced Hb concentration. In normal pregnancy without iron supplementation, Hb concentration decreases from an average of 12.5–13.0 g/dL to an average of 11.0–11.5 g/dL. Anemia in pregnancy is a significant cause of direct and indirect morbidity and mortality, both for pregnant mother and her fetus (Alizadeh et al., 2014).

A high proportion of women in both industrialized and developing countries become anemic during pregnancy. Estimates from the World Health Organization report that from 35% to 75%

(56% on average) of pregnant women in developing countries, and 18% of women from industrialized countries are anemic. However, many of these women were already anemic at the time of conception, with an estimated prevalence of anemia of 43% in no pregnant women in developing countries and of 12% in women in wealthier regions. The prevalence of iron deficiency is far greater than the prevalence of anemia and iron deficiency (low serum ferritin and sparse or absent stainable iron in bone marrow) often develops during the later stages of Pregnancy even in women who enter pregnancy with relatively adequate iron stores. For this reason, and because of

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doubts concerning the benefits of iron supplementation on pregnancy outcome, there is uncertainty about whether routine iron supplementation of pregnant women is necessary. World Health Organization's (WHO) definition of anemia is based on a hemoglobin level of less than 13 g/dl in men and 12 g/dl in women. Anemia in COPD can have various causes. Anemia of chronic disease (ACD) is probably thought to be the predominant mechanism of anemia related to chronic systemic inflammation of COPD. Prevalence of anemia in the general population increases with age and COPD is a disease that affects the aging population (Biswas and Baruah, 2014).

In India, anemia contributes directly to 20% maternal death and indirectly to further 20%.^{2,3} The main causes of Anemia in the developing countries in Antenatal women includes low dietary intake of iron and folic acid, poor bioavailability of iron and fiber rich Indian diet, poor Absorption of iron due to hook worms infestation and blood loss during delivery and heavy menstrual blood loss.⁴⁻⁶ Iron deficiency & Anemia during antenatal period are associated with low birth weight babies, premature birth, and increase perinatal and neonatal mortality. Anemia increases the risk of maternal morbidity & mortality and adverse maternal outcome such as ante partum hemorrhage, post-partum hemorrhage & puerperal sepsis (Bekele, Tilahun and Mekuria, 2016).

Iron deficiency is responsible for about 95% anemia during pregnancy, reflecting the increased demand of iron. During the first half of pregnancy, iron requirement may not increase significantly and iron intake of 10–15 mg/day from food is sufficient to cover the basal loss of 1 mg/day. However, in the second half of pregnancy, iron requirements increase owing to an expansion of red blood cell mass and rapid growth of the fetus. Increased number of red blood Cells and a higher hemoglobin mass require about 500 mg iron. The iron requirement of the fetus on average is 300 mg. Thus, the total amount of iron necessary over the course of a normal pregnancy is approximately 800 mg. This cannot be supplied in the diet, and iron supplementation is a must (Bekele, Tilahun and Mekuria, 2016).

Therefore, the relationship between hemoglobin concentrations and birth weight is still not clear. The purpose of this study was to investigate the prevalence of anemia in geographically different locations in pregnant women, and describe the associations of hemoglobin concentrations with birth weights (Lone, Qureshi and Emanuel, 2004).

Materials and Methods

Presence study showed from total of 110 patients were included in this study, anemia was confirmed in 50 patients. From these 28 (25.4%) of them diagnosed as mild anemic, 20 (18.1%) Of them with Moderate and 2 (1.8%) of them as sever anemic patients. it was a prospective observational study conducted in: gynecology ward, BGS Global hospitals, Bangalore, conducted for a period of 6 months from October 2017_march 2018. All inpatient women who are pregnant and anemic. The patient data collection was used to collect all the details like inpatient number, age, sex, social history, past history, laboratory data, diagnosis, therapeutic management. All inpatients diagnosed anemia in pregnancy and pregnant women without anemia. Fulfilling the inclusion criteria will be enrolled into the study and their prescriptions will be analyzed on daily basis. The prescription guidelines, Micromedex, interaction checker, drug interaction database and stockley's drug interaction book 8 edition. The drug interaction in prescription was collected and then compare with guidelines. When the analysis of prescription was completed then all data entered to the appropriate software and the results were gained.

Result and Discussion

Anemia is one of the most commonly encountered medical disorders during pregnancy. In developing countries, it is a cause of serious concern as, besides many other adverse effects on the mother and the fetus it contributes significantly high maternal mortality (Bardisi, 2015).

According to world Health Organization estimates, up to 56% of all women living in developing countries are anemic, hemoglobin level below 11gm/dl in pregnant women constitutes anemia and hemoglobin below 7gm/dl is severe anemia (Bardisi, 2015).

The present study was focused to find out the presence of anemia in 110 pregnant women who were admitted in gynecology and OBG wards of BGS Global hospital. to know about any correlation between adverse effects on the mother or fetus and serum hemoglobin/iron deficiency. We selected randomly 110 cases during 6 month and analysis various parameters of case sheet like as laboratory data, demographic information, drug interaction, medical history, medical outcomes and number of hospitalization.

Demographic Data

Out of 110 patients 50 of them are anemic (5 of them are between years <20yrs, 30 of them are between 20-30 year and 15 of them are >30 years), also 60 of them are non-anemic (7 of them are between <20 years, 35 of them are between 20-30 yrs. and 18 of them is >30 yrs. old). Through this study majority numbers of patients were listed in 20-30 years' age group. Also in this study has been found that

the percentage of anemic patients were more in 20-30 years' age group (n=30), (27.2%) compared to the <20 years' age and >30 years age group.

This study has been supported by H.K. Cheema *et al* who in their study number of patient were listed more in 20-30 years' age group (n=170), (56.6%). male patients exceeded female, with (n=119, 59.5%). Also in their study anemic patients were listed more in 20-30 years' age group. (Cheema et al., 2016) Also in this study we find out non-educated women were having maximum prevalence of anemia (n=32), (309%) as compared to educated. almost similar finding was observed by Bedi, R et al, in their result showed presence of anemia were more in non-educated patients (62.7%). observation of present study could be explained by the fact that less educated women have lack of knowledge about nutritious food, inadequate use of health services, lack of awareness regarding anemia and its effect on pregnancy and its outcomes (Bedi et al., 2015).

presence of anemia

Presence study showed from total of 110 patients were included in this study, anemia was Confirmed in 50 patients. From these 28 (25.4%) of them diagnosed as mild anemic, 20 (18.1%) Of them with Moderate and 2 (1.8%) of them as sever anemic patients. table 1

Table 1: severity of anemia according to mothers age. (normal range >10.9g/dl)

AGE	MILD(10-10.9G/DL)		MODERAT(7-<10G/DL)		SEVER(<7G/DL)	
	NO	(%)	NO	(%)	NO	(%)
<20YRS	3	2.7%	2	1.8%	0	0%
20-30YRS	15	13.6%	13	11.8%	2	1.8%
>30YRS	10	9.09%	5	4.5%	0	0%
TOTAL	28	25.4%	20	18.1%	2	1.8%

This result was same as result that found with Dereje Lelissa *et al*, in their result also out of 125 patients, 70 of them were anemic and among these cases 41(53.2%) of them diagnosed as mild anemia and 36(46.7%) of them as moderate anemic (Lelissa et al., 2015).

Table 2: presence of anemia among mothers as per dietary pattern

DIET	NON-ANAEMIC		ANAEMIC		TOTAL	
	NO	(%)	NO	(%)	NO	(%)
VEG	38	34.5%	30	27.2%	68	61.8%
NON-VEG	6	5.4%	12	10.9%	18	16.3%
MIXED	16	14.5%	8	7.2%	24	21.8%

Out of 110 patients according to dietary pattern 68 of them are veg, 18 of them are non-veg and 24 of them are with mixed diet. table 2

association of ANC variable with anemia

Likewise, mother who had <3 antenatal visits were significantly more anemic (n=19), (17.3%) in this study. This may be due to lack of proper ante-natal care during pregnancy.as regular check-up during pregnancy can detect anemia during pregnancy and other associated diseases.

This result was compare with Reno Bedi *et al*, in their study also pregnant women who has <3 ANS visits were more anemic than who had >3 ANS visits. (Bedi et al., 2015) table 3

Table 3: association of ANC variable with anemia

ANC VARIABLE		ANAEMIC		NONANAMIC		TOTAL	
		N	%	N	%	N	%
AGE OF MOTHERS	<20YRS	5	4.5%	7	6.3%	12	10.8%
	20-30YRS	30	27.2%	35	31.8%	68	59%
	>30YRS	15	13.6%	18	16.3%	33	29.9%
ANC VISIT	<3	19	17.2%	17	15.4%	36	32.6%

	>3	31	28.1%	43	39.09%	74	67.3%
MEDICAL ILLNESS	DESEASED	18	16.3%	17	15.4%	35	31.7%
	UNDISEASED	32	29.09%	43	39.09%	75	68.3%
IRON AND FOLIC ACID SUPPLEMENTATION	ADEQUATE	18	16.3%	30	27.2%	48	43.5%
	INADEQUATE	15	13.6%	21	19.09%	36	32.6%
	NOT TAKEN	17	15.4%	9	8.1%	26	23.5%

association B.W folic acid and iron supplementation with anemia

In this study, prevalence was significantly higher among women who did not take iron and folic

Acid supplementation during pregnancy (30.1% VS 9.3%). Similar finding was found in a study conducted by Bedi, R et al in their study also anemic patient were not taken properly iron supplementation compare to non-anemic patients (27.4% VS 13.6%). Effect of iron and folic acid supplementation is explained by fact that iron supplementation increase hemoglobin, serum ferritin, mean cell volume, serum iron, and transferring saturation. Supplementation can reduce the extent of iron depletion in third trimester. (Bedi et al., 2015) table 4

Table 4: association of fetal and newborn outcomes with anemia

FATAL OUTCOME		ANAEMIA STATUS					
		ANEMIC		NON ANAMEIC		TOTAL	
W.T OF FATAL	>2.5	31	17.1%	43	35.7%	74	52.9%
	<2.5	19	25.7%	17	21.4%	36	47.1%
GENDER	MALE	29	26.3%	37	33.6%	66	59.9%
	FEMALE	21	19.09%	23	20.9%	44	40.1%
GRADE NUMBER	<1	27	24.5%	23	20.9%	50	45.4%
	>2	23	20.9%	37	33.6%	60	54.6%

Association of fetal and newborn outcomes with anemia

The result of this study showed that LBW is higher in anemic women (n=19, 25%) compared to non-anemic (n=17, 21%). Also the majority number of male newborn (n=66, 59.9%) were listed more.

This study has been supported by Wali Lone et al, who in their study the number of LBW was higher in anemic women compare to non-anemic, and the male newborn were listed more (n=42,24%) than female. (Lone, Qureshi and Emanuel, 2004) table 5

Table 5: clinical outcomes (high risk, bleeding)

OUT COME	ANAEMIC	NONANAEMIC	TOTAL
BLEEDING	5	6	11
LEAKING	20	23	43
DEATH CHILD	5	6	11
ABORTION	7	9	16
HIGH RISK	13	16	29

Out of the drugs used after delivery, the most drugs used was PPI drugs, then antibiotics, analgesic and supplements. table 6

Table 6: drugs used after delivery

DRUG CLASS	DRUG NAME	NUMBER	TOTAL
ANTI BIOTICS	PIPERACILLIN	5	69
	METRONIDAZOLE	17	
	AUGMENTIN	5	

	CEFALEXINE	23	
	CEFAZOLINE	19	
PPI	RANITIDINE	41	74
	PANTAPRAZOLE	33	
SUPPLIMENT	CALCIUM	25	54
	IRON	29	
ANALGESIC	PARACETAMOL	21	63
	DICLOFENAC	42	
ANTIEMETIC	ONDANSETRON	24	24
HORMON/THYROID	THYRONORM	17	17
OTHERS	NIFEDIPINE/LEVETRIACETAM	19	19

Drug-Drug Interaction:

In this study we were found that these are some drug-drug interaction between drugs with each other. We find out 33 drug-drug interaction, from these 12 of them were major and 21 of them were moderate, also number of interactions was more in anemic patients compare to non-anemic. interaction between METRONIDAZOLE AND ONDANSETRON was the most major drug-drug interaction, which caused increased risk of Q-T interval prolongation, so ECG monitoring is recommended.

This result was same with the result which founded by STOCKLY'S drug interaction edited by KAREN BAXTER, in their study also the concomitant use of METRONIDAZOLE and ONDANSETRON may increase risk of Q-T interval prolongation and arrhythmia so if coadministration is required, monitoring of ECG may be warranted. (Baxter and Preston, 2010) table 7

Tablet 7: drug-drug interaction

DRUGS NAME	SEVERITY	EFFECT	ANEMIC	NON ANEMIC
METRONIDAZOLE/ ONDANSETRON	MAJOR	INCREASED Q-T INTERVAL PROLONGATION, ARRHYTHMIA	7	5
THYRONORM/ CALCIUM	MODERATE	REDUCED CALCIUM ABSORPTION	8	4
ONDANSETRON /TRAMADOL	MODERATE	DECREASED TRAMADOL EFFICACY	3	6

Conclusion

Through this study majority numbers of patients were listed in 20-30 years' age group (n=65), (59%). also in this study has been found that the percentage of anemic patients were more in 20-30 years' age group (n=30), (27.2%). Presence study showed from total of 110 patients were included in this study, anemia was confirmed in 50 patients. From these 28 (25.4%) of them diagnosed as mild anemic, 20 (18.1%) Of them with Moderate and 2 (1.8%) of them as sever anemic patients.

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References

Alizadeh, L., Raoofi, A., Salehi, L., & Ramzi, M. (2014). Impact of maternal hemoglobin concentration on fetal outcomes in adolescent pregnant women. Iranian Red Crescent Medical Journal, 16(8).

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- Bardisi, S. M. (2015). Evaluation of anemia during pregnancy at Rusaifah primary health care center in Makkah Al Mukarramah, Saudi Arabia. *International Journal of Medical Science and Public Health*, 4(5), 694-700.
- Baxter, K., & Preston, C. L. (Eds.). (2010). *Stockley's drug interactions* (Vol. 495). London: Pharmaceutical Press.
- Bedi, R., Acharya, R., Gupta, R., Pawar, S., & Sharma, R. (2015). Maternal factors of anemia in 3rd trimester of Pregnancy and its association with fetal outcome. *International Multispecialty Journal of Health*, 1(7), 9
- Bekele, A., Tilahun, M., & Mekuria, A. (2016). Prevalence of anemia and Its associated factors among pregnant women attending antenatal care in health institutions of Arba Minch town, Gamo Gofa Zone, Ethiopia: A Cross-sectional study. *Anemia*, 2016.
- Biswas, M., & Baruah, R. (2014). Maternal anaemia associated with socio-demographic factors among pregnant women of Boko-Bongaon Block Kamrup, Assam. *Indian Journal of Basic and Applied Medical Research*, 3(2), 712-721.
- Cheema, H. K., Bajwa, B. S., Kaur, K., & Joshi, H. (2016). Prevalence and possible risk factors of anaemia in different trimesters of pregnancy. *Int J Contemporary Med Res*, 3(4), 1194-7.
- Goswami, T. M., Patel, V. N., Pandya, N. H., Mevada, A. K., Desai, K. S., & Solanki, K. B. (2014). Maternal anaemia during pregnancy and its impact on perinatal outcome. *Int J Biomed Adv Res*, 5(2), 99-102.
- Lelissa, D., Yilma, M., Shewalem, W., Abraha, A., Worku, M., Ambachew, H., & Birhaneselassie, M. (2015). Prevalence of Anemia among women receiving antenatal Care at Beditii Health Center, southern Ethiopia. *Age*, 15(19), 25.
- Lone, F. W., Qureshi, R. N., & Emanuel, F. (2004). Maternal anaemia and its impact on perinatal outcome. *Tropical Medicine & International Health*, 9(4), 486-490.