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ORIGINAL ARTICLE

Prevalence Rate and Different Methods of Treatment of Iron Deficiency Anemia Among Pregnant Women Attending Diarb Negm Central Hospital

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ABSTRCT

Background: Anemic pregnant women, especially those with severe anemia, will be at risk of low physical activity, increased maternal morbidity and mortality. Furthermore, both pregnant women and their neonates have negative effects including fetal anemia, low birth weight, premature delivery, restriction of intrauterine development, and perinatal mortality. Anemia can be effectively avoided and easily detected in a timely manner. The aim of this work was early detection and treatment of iron deficiency anemia among pregnant women attending Diarb Negm centeral hospital.

Methods: Cross-sectional study was conducted in Obstetrics and Gynecology and clinical pathology department Diarb Negm Central Hospital from January 2018 till June 2018 at on 269 pregnant women C.B.C was done for them non iron deficiency anemia was 164 pregnant women (61%) Iron deficiency anemia was 105 pregnant women (39%) mild cases 62 maderate cases 41 and sever cases 2 oral treatment was given for mild cases IV & Im Iron was given for moderate cases and Blood transfusion for sevener cases.

Results: In our study, prevalence of IDA in study participants was 18.6%. Nearly half of anemic patients had moderate anemia, which is higher than the World Health Organization (WHO) median prevalence rate of 32.6 percent.

Conclusions: The majority of cases of anemia are this research, socioeconomic determinants. Therefore, in women attending for delivery at term, they should be considered as major risk factors of anemia. These women should be encouraged to start antenatal care early after conception in order to allow enough time to restore iron stores.

Key words: Anemia in pregnancy, iron deficiency anemia**,** Treatment of Iron Deficiency Anemia.

INTRODUCTION

Anemia in pregnancy, especially in developing countries, is a major public health problem. It affects 41.8% of pregnant women worldwide, with the highest prevalence in Africa (57.1%) being 17.2 million. Different studies showed different rates of anemia during pregnancy between 16.6 and 95.0%. Anemia in pregnant women has serious medical, social and economic implications **[1], [2]**. Anemic pregnant women, particularly those with severe anemia, will be at risk of low physical activity, increased maternal morbidity and mortality **[3]**. Therefore, all pregnant women and their neonates have negative effects including fetal anemia, low birth weight (LBW), premature delivery, restriction of intrauterine development and perinatal mortality **[2]**. Anemia can be largely prevented and, if detected in time, easily treated. Effective anemia management includes treatment of the underlying causes, restoring the concentration of hemoglobin to normal levels and preventing and treating complications. Anemia appears to be a common cause of mortality and morbidity among pregnant women, and there are limited data on relative contributions of related factors that make it difficult to address the issue effectively. In addition, different studies suggest major differences in anemia prevalence both within and between countries, suggesting a need for local data to support the preventive programme. In

addition, information on prevalence and associated anemia factors, especially in pregnant women, are restricted in the study area. This research was therefore intended to determine the prevalence and related anemia risk factors among pregnant women**[4]**.Anemia refers to a disorder in which the blood's hemoglobin content is lower than normal for the age, gender and environment of an individual, resulting in a decrease in the blood's oxygen carrying capacity **[5]**.

WHO recommendations find the average minimum acceptable level of hemoglobin during pregnancy to be 11g/dL. WHO further distinguishes pregnancy anemia into: mild anemia (10-10.9g/dL hemoglobin), moderate anemia (7.0-9.9g/dL hemoglobin) and severe anemia (7g/dL hemoglobin). It is a global health issue with significant negative effects on human health as well as social and economic growth in both developing and developed countries**[6]**.

WHO ranked anemia in the developing world as the 8th leading cause of disease for girls and women. World Health Organization reports that in developing countries 35% to 75% of pregnant women and 18% in developed countries are anemic. The largest burden of anemia is born in Asia and Africa, where it is estimated that 60% and 52% of pregnant women are anemic, respectively, and between 1% and 5% are seriously anemic (hemoglobin <7g/dl) and are associated with women under 20 years of age, third trimester pregnancy, rural residents, and multiparous women**[7]**.During childbirth, the cause of anemia is multi-factorial. Steel, folate, vitamin B12 and vitamin A deficiency, intestinal parasite infections, malaria and chronic disease have all been shown to be the main causes of anemia in pregnant women. **[8]**.The relative contribution to anemia during childbirth of each of these variables varies greatly by geographic location, season and dietary practice. Iron and folate deficiencies in pregnant women are the most common causes of anemia **[9]**. Vitamin B12 deficiency in this region of the world may be an unrecognized contributor to anemia due to population dependence on grains as dietary staples and low consumption of foods of animal origin, which are the primary source of dietary vitamin B12 **[10],[2]**.The lack of dietary diversity contributes to a scarcity of minerals and vitamins, which means that much of the iron's bio-availability in the typical Ethiopian diet is limited and this restriction may have affected iron status **[6]**. Anemia in the study area is considered to be a mild public health issue. Variables causing anemia in pregnant women were the number of births, meal duration, dietary variety and regular meat consumption. In order to prevent anemia in pregnant women, information on contraceptive use, dietary advice on consumption of iron-rich foods and iron/foliate supplementation is recommended **[2]**. The aim of this work was early detection and treatment of iron deficiency anemia among pregnant women attending Diarb Negm centeral hospital.

METHODS

After obtaining approval of the ethics committee, a prospective cross-sectional study was conducted in Obstetrics and Gynecology, in clinical pathology department at Diarb Negm Central Hospital from January 2018 till June 2018 on 269 pregnant women C.B.C was done for them non iron deficiency anemia was 164 pregnant women (61%) Iron deficiency anemia was 105 pregnant women (39%) mild cases 62 maderate cases 41 and sever cases 2 oral treatment was given for mild cases IV & Im Iron was given for moderate cases and Blood transfusion for sevener cases

The work was carried out for studies involving humans in accordance with the World Medical Association's Code of Ethics (Helsinki Declaration).

Inclusion criteria: All pregnant women. Included were pregnant mothers who had not recently transfused, had no chronic medical conditions, had no reported haemoglobinopathies and had no premature bleeding or ante partum hemorrhage. Included in the study were pregnant women residing for more than six months who came to ANC during the study period.

Exclusion criteria: Pregnant women who were not long-term residents of the city (less than 6 months) were excluded. Seriously ill patients due to chronic diseases leading to anemia such as renal, cardiac, and lung diseases and hemoglobinopathy were excluded.Patients unable to respond, mentally ill

pregnant women and pregnant women with repeated visits were excluded during study time.

Methods: All patients underwent the following: Consent taken from all patients.Complete history taking. Complete clinical examination. Collection of 4ml blood: 1ml on edeta for C.B.C, 3ml were left for agglutination 20 minutes at room tempoture then center fuged for 10 minutes at aspeed of 3000 RPM, Serum stored at -20oc to be tested for iron, ferretin, transferrin, TIBC, Assesment was done by automated auto analyzer C.O.B.A.S 6000.

Serum Iron: The reference interval is 50-160 µg/dl (9-29µmol/1) in adults**[11]**. Serum Iron-Binding capacity: The reference interval for adults in 250-400 µg/dl (45-72 µmol/1) **[12]** .

TIBC: The ratio of serum iron to TIBC is the percent saturation of the TIBC. Normally this is 20-55%. Serum Ferritin: The equivalence of 1 µg/dl of serum ferritin with 8-10mg storage iron has been suggested. All women are surveyed using a questionnaire to collect their socio-economic and demographic data. In addition, the following information was obtained: hemoglobin value within 24 hours of delivery, maternal age, parity and abortion number, body mass index before pregnancy, weight gain during pregnancy, educational level, occupational status, monthly household income per person, smoking habits, alcohol consumption, number of antenatal care visits, Number of tests performed during pregnancy, pregnancy at first entry, gestational age at delivery and period of iron and folic acid supplementation. Adverse perinatal outcomes were recorded as dichotomous variables, including antenatal bleeding, pre-placenta, gestational diabetes, restriction of intrauterine growth, and congenital anomalies. Until anemic pregnant women were treated with an oral dose of 60-120 mg/day.

STATISTICAL ANALYSIS

Microsoft Excel technology has entered and analyzed data collected throughout time, basic medical review, and ultrasound detection. Data were then imported into the Social Sciences Statistical Package (SPSS version 20.0) (Social Sciences Statistical Package) for analysis software. Depending on the type of qualitative data represented as number and percentage, quantitative continuous group represented by mean ± SD, the following tests were used to test for meaning differences; Chi Square Test Differences and Association of Qualitative Variable (X^2). Differences between quantitative independent groups by t test, paired by paired t. P value was set at <0.05 for significant results and <0.001 for high significant result.

RESULTS

This study showed that, mean age of study participants was 26.3 years old, mean gestational age was 31.0 months, 65.1% were urban residents, 67.7% were middle socio-economic level, 59.9% were receiving iron supplementation and 68.8% were multigravida. Almost half of multigravida were primipara and 56.2% had no previous abortion **Table (1)**. This study showed that, mean blood hemoglobin level was 11.6 gm/dl, mean serum iron level was 78.8 µg/dl, mean TIBC level was 378.0µg/dl, mean transferrin saturation was 28.5%, mean serum ferritin level was 71.0ng/ml **Table (2)**. This study showed that prevalence of IDA in study participants was 39.0%. Almost half of anemic patients had mild anemia **Table (3)**.

This table shows that there were no statistical significant associations between IDA and gravidity, parity and history of abortion in study participants **Table (4)**. This study showed that oral iron was prescribed to mild IDA patients; iron injection was prescribed to moderate IDA patients while severe IDA patients had received blood transfusion. Mild anemia: Hb level 10-10.9 g/dl. Moderate anemia: Hb level 7-9.9 g/dl. Sever anemia: Hb less than 7 g/dl **Table (5)**. This study showed that there was a statistical significant association between IDA and serum iron level, TIBC in study participants. Patients with moderate and severe IDA had significantly lower serum iron level. Women with no IDA had significantly lower serum TIBC level than IDA patients **Table (6)**.This study showed that there was high statistical significant association between IDA and transferrin saturation, serum ferritin in study participants. Women with no IDA had significantly higher transferrin saturation, serum ferritin than IDA patients **Table (7).**

Table (1): Baseline characteristics of study participants:

Variables	Study participants (n=269)
Age (years): ***Mean ± SD*** ***Range***	 26.3 ± 5.4 19.0 – 41.5
Gestational age (weeks): ***Mean ± SD*** ***Range***	 31.0 ± 6.1 18.0 – 40.0
Geographic distribution: • ***Urban*** • ***Rural***	 175 (65.1%) 94 (34.9%)
Socio-economic level: • ***Low*** • ***Middle*** • ***High***	 26 (9.6%) 182 (67.7%) 61 (22.7%)
Iron supplement intake: • ***Yes*** • ***No***	 161 (59.9%) 108 (40.1%)
Gravidity: • ***Primigravida*** • ***Multigravida***	 84 (31.2%) 185 (68.8%)
For Multigravida only (n=185)	
Parity: • ***Nullipara (G1 P0)*** • ***Primipara (P1 + 0)*** • ***Multipara* (> P2)**	 15 (8.1%) 86 (46.5%) 84 (45.4%)
Previous abortion: • ***Yes*** ***Abortion one*** ***Abortion > one*** • ***No***	 60 (30%) 21 (13.8%) 104 (56.2%)

Table (2): Laboratory characteristics of study participants:

Variables	Study participants (n=269)
Blood Hemoglobin (gm/dl): ***Mean ± SD*** ***Range***	 11.6 ± 1.1 7.2 – 14.3
Serum iron(µg/dl): ***Mean ± SD*** ***Range***	 78.8 ± 19.3 34.0 – 144.0
Serum TIBC (µg/dl): ***Mean ± SD*** ***Range***	 378.0 ± 78.1 201.0 – 604.0
Transferrin saturation (%): ***Mean ± SD*** ***Range***	 28.5 ± 7.1 7.8 – 38.2
Serum ferritin (ng/ml): ***Median*** ***IQ-Range***	 71.0 48.0 – 94.0

Table (3): Prevalence and severity of iron deficiency anemia in study participants:

Variables	Study participants (n=269)
Non-IDA	**164 (61.0%)**
IDA:	**105 (39.0%)**
• ***Mild***	62 (59.0%)
• ***Moderate***	41 (39.0%)
• ***Severe***	2 (2.0%)

Table (4): Association between iron deficiency anemia with gravidity, parity and history of abortion in study participants:

	Non-IDA		Mild IDA		Moderate & severe IDA		χ^2	P
	No.	%	No.	%	No.	%		
Gravidity								
Primigravida (n=84)	35	41.7	33	39.3	16	19.0	0.8	0.4
Multigravida (n=185)	129	69.7	29	15.7	27	14.6		
Parity								
Nullipara (n=15)	8	53.3	6	40.0	1	6.7	1.9	0.2
Primipara (n=86)	53	61.7	16	18.7	17	19.8	1.5	0.2
Multipara (n=84)	68	81.0	7	8.3	9	10.7	0.01	0.9
Previous abortion								
Yes (n=81)	62	76.5	10	12.3	9	11.2	1.0	0.3
No (n=104)	67	64.4	19	18.3	18	17.3		

Table (5): Treatment prescribed to IDA patients.

Variables	IDA patients (n=105)
Mild IDA (n=62):	
• ***Oral iron***	62 (59.0%)
Moderate IDA (n=41):	
• ***IM iron injection***	30 (28.6)
• ***IV iron injection***	11 (10.5)
Severe IDA (n=2):	
• ***Blood transfusion***	2 (1.9%)

Table (6): Association between serum iron level, TIBC and iron deficiency anemia in study participants

	Non-IDA (n=164)	Mild IDA (n=62)	Moderate & severe IDA (n=43)	F	P
					Serum iron (µg/dl)
Mean ± SD	79.9 ± 19.0	75.3 ± 17.2	71.8 ± 16.0	3.3	**0.04**
Range	43.0 – 144.0	44.0 – 129.0	34.0 – 117.0		**S**
					Serum TIBC (µg/dl)
Mean ± SD	370.7 ± 77.8	413.4 ± 71.8	405.7 ± 73.6	5.3	**0.005**
Range	201.0 – 500.0	297.0– 604.0	303.0 – 573.0		**S**

Table (7): Association between transferrin saturation and iron deficiency anemia in study participants:

	Non-IDA (n=164)	Mild IDA (n=62)	Moderate & severe IDA (n=43)	F	P
Transferrin saturation (%)					
Mean ± SD	30.8 ± 4.9	18.7 ± 5.0	18.5 ± 7.8	111.3	**<0.001 HS**
Range	19.0 – 37.0	10.8 – 33.1	7.8 – 38.2		
Serum ferritin (ng/ml)	**Non-IDA (n=164)**	**Mild IDA (n=62)**	**Moderate & severe IDA (n=43)**	**KW**	**P**
Median	78.0	6.6	5.8	96.8	**<0.001 HS**
IQ-Range	61.0 – 98.0	4.4 – 22.2	3.4 – 25.2		

DISCUSSION

This study showed that mean age of study participants was 26.3 years old, mean gestational age was 31.0 months, 65.1% were urban residents, 67.7% were middle socio-economic level, 59.9% were receiving iron supplementation and 68.8% were multigravida. Almost half of multigravida were primipara and 56.2% had no previous abortion. Mean blood hemoglobin level was 11.6 gm/dl, mean serum iron level was 78.8 µg/dl, mean TIBC level was 378.0µg/dl, mean transferrin saturation was 28.5%, mean serum ferritin level was 71.0 ng/ml.

Taner et al., **[14]** identified anemia prevalence and predisposing factors that lead to anemia in pregnant women before delivery. A total of 1221 women attended for delivery, of whom 508 (41.6%) had a level of hemoglobin < 11 gm / dl and 713 (58.4%) had a level of about 11gm/dl. Maternal age > 35, body mass index < 30, parity > 3, analphabet and secondary education, lack of occupation, weight gain during childbirth, amount of antenatal visits < 5 and 5-10, admission to pregnancy in the second and third trimesters of gestation, and period of iron supplementation < 3 months and < 3-6 months are significantly associated with anemia at birth.

This study, the prevalence of IDA was 18.6 percent in study participants. Nearly half of anemic patients had moderate anemia, which is higher than the World Health Organization (WHO) median prevalence rate of 32.6 percent **[15]**. This study research, this high prevalence of anemia among pregnant women can be explained by the distribution of population socioeconomic status. WHO's figure was derived from community-based surveys. The rate in our study, however, was derived from the population, which consisted mainly of women with lower socio-economic status. Another interesting factor at the time of measurement is the difference in gestational age. This study research, pre-delivery anemia was correlated with parity, level of education, number of hospital admissions, first admission gestational age, period of iron supplementation and pr-eeclampsia. This study, there were statistical significant associations between IDA and gestational age, iron supplement intake, serum iron level and serum TIBC in study participants. Patients with moderate and severe IDA had significantly higher gestational age and lower serum iron level. Women with no IDA had significantly lower serum TIBC level than IDA patients. It is already recognized that 10-20 percent of women with severe preeclampsia may progress to hemolysis, elevated liver enzymes, and low platelet syndrome, characterized by hemolytic microangiopathy. On the other hand, maternal anemia and iron deficiency during the first trimester of pregnancy have been shown to trigger subsequent preeclampsia by inducing cortisol releasing hormones and alterations in the exchange of placental villi peripheral blood. **[16]**.

Taner et al. [14] Increased risk of anemia was found to be associated with antenatal bleeding and preeclampsia. There were no significant differences in demographic or perinatal results between the groups. Number of antenatal visits < 5 and 5-10, admission to antenatal care in the second or third trimester of pregnancy, period of iron supplementation <3 months and 3-6 months, and frequency of preeclampsia are separately correlated with anemia.

This study oral iron was prescribed to mild IDA patients; iron injection was prescribed to moderate IDA patients, while severe IDA patients had received blood transfusion. There was a high statistical significant increase of blood hemoglobin level of IDA patients after treatment.

Jufar and Zewde **(8)** Assessed the prevalence and determinants of anemia in pregnant women in follow-up treatment. They found that the total prevalence of anemia with a cutoff rate of haemoglobin <11 gm / dl (< 33% hematocrit) was 21.3% and most of them were of a mild form (haemoglobin: 10-10.9 gm / dl). We found a statistically significant correlation between anemia and gender, gestational age, gravity, parity, antenatal care, period of conception, loss of blood, family size and educational status (illiterates).

Taner et al. [14] Concluded that socio-economic determinants are the majority of cases of anemia and should therefore be considered as major risk factors for anemia in women on term delivery.

CONCLUSIONS

This study revealed that the prevalence of anemia among pregnant women was relatively low compared to the findings of other reports. Rural residence, history of abortion, current blood loss and third trimester gestational age were statistical significant associated factors with anemia in this study. Therefore, further large scale longitudinal studies should be done in respect to the importance of regular visit to maternal care centers and health education promotion programs regarding the cause and prevention of anemia among pregnant women by assessing micronutrients and other causal related factors for anemia.

Limitation of the study

The study was institutional based study. Further study should be conducted based on community level to make this finding stronger. Besides, the study was restricted cross-sectional study design and didn't address every nutritional variable.

Declaration of interest no conflicts of interest.

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