Assessment of the Prevalence of Anemia and its Complications among Term Pregnant Women at Ain-Shams University Maternity Hospital

Original Article

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ABSTRACT

Background: Anemia is a public health problem in both developed and developing countries. It affects 1.62 billion people globally, which corresponds to 24.8% of the world population. Global prevalence of anemia in pregnant women is 41.8%, approximately 50% of cases of anemia are considered to be due to iron deficiency.

Aim: This study aimed to assess the prevalence of anemia and its complications among term pregnant women at Ain Shams University Maternity Hospital.

Patients and Methods: This retrospective study was conducted on hospital records of 1552 pregnant women at Ain Shams University Maternity hospital for period from January 2018 to July 2018 and files with incomplete registration were excluded as required data weren't sufficiently registered.

Results: Hb was 11.3±1.4 gm/dL, 59.1% of patients were normal and 40.9% had anemia in form of Mild in 28.3%, Moderate in 11.3% and Severe in 1.3%. -4.0% of the included women had complications in form of PPH, 0.3% in ICU and 2.0% had blood transfusion 48.4% of them had 1-2 units, 38.7% of them had 3-4 units and 12.9% of them had >4 units. As regard neonatal outcome we found that mean gestational age was 38.8±0.9 weeks, birth weight 3.13±0.56 kg, Apgar 1st was 8.4±1.2, 5th was 8.5±1.1. As regard neonatal complications 9.35 of them had LBW, 9.2% had NICU, 3.7% had APGAR1<7,death rate was in 2.6% of them and was either neonatal death in 2.2%, Inrapartum fetal death in 0.1% and Intrauterine fetal death in 0.3%. Parity was significantly different among anemia grades; were highest in severe followed by moderate then mild and lowest in normal. PPH, ICU and transfusion were significantly different among anemia grades; were highest in severe followed by moderate then mild and lowest in normal. Birth weight was significantly different among anemia grades; were lowest in severe followed by moderate then mild and highest in normal. Low APGAR, NICU and death were significantly different among anemia grades; were highest in severe followed by moderate then mild and lowest in normal. There were significant weak positive correlations between hemoglobin and birth weight and APGAR scores.

Conclusion: Anemia in pregnancy continues to be a health problem in Egypt, and economic factors may contribute to the situation as its prevalence was 40.9% among our cases which were low socioeconomic populations.

Key Words: Anemia, hemoglobin, term pregnancy

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INTRODUCTION

Anemia is a condition in which red blood cells or their oxygen carrying capacity is insufficient to meet physiologic needs, which may vary according to age, sex, and pregnancy status. In pregnancy, if hemoglobin level is less than 11 gm/dl in the first and third trimester, or less than 10.5 gm/dl in second trimester, the pregnant women considered anemic[1].

World Health Organization reported that 18% of the women from industrialized countries, and 35% to 75% (56% on average) of pregnant women in developing countries, are anemic. Anemia is one of the most common medical disorders during pregnancy. It can cause serious adverse effects on the mother and the fetus with high risk for maternal mortality.

The association of maternal anemia with pre-eclampsia and eclampsia as well as intrauterine growth restriction (IUGR), low birth weight, and increased risk of postpartum hemorrhage (PPH), has been proposed[2].

Prematurity, low Apgar score and intrauterine fetal death are more common in anemic pregnant women compared to non-anemic. Mild anemia usually has no effect

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on pregnancy except that the mother may become anemic in subsequent pregnancies due to low iron stores; on the other hand severe anemia is associated with poor outcome as tachycardia, dyspnea and high cardiac output failure which may be fatal. During pregnancy, iron requirements increases thus exacerbating the prevalence of anemia, also there is a disproportionate increase in plasma volume more than red cell mass resulting in a physiological drop in hemoglobin level (Hb) in the mid trimester[3].

Anemia in pregnancy could be due to malnutrition, blood loss, infections, chronic diseases, parasites and chronic hemolysis, and several risk factors have been recognized as unhealthy lifestyle, multiple pregnancies, alcohol, smoking, and menstrual disorders[4].

Iron and folic acid deficiency are the two most prevalent causes of anemia in pregnancy[5], with subsequent fetal complications as IUGR, low birth weight, and prematurity, while vitamin B12 deficiency is rare during pregnancy as it usually causes infertility[6].

AIM OF THE WORK

This work aims to assess the prevalence of anemia and its complications among term pregnant women at Ain Shams University Maternity Hospital

PATIENTS AND METHODS

This Retrospective study was conducted on hospital records of 1552 pregnant women at Ain Shams University Maternity hospital for period from January 2018 to July 2018 and files with incomplete registration were excluded as required data weren't sufficiently registered.

Sample size justification: Depending on (Tsegaye Ababiya, Tesfaye Gabriel) who found the prevelance of anemia 56.0%, and assuming the confidence interval width = 0.95 and $\alpha = 0.05$, and by using PASS 11th release the minimal sample size to detect the prevelance is 1552 cases (Fleiss *et al*., 2003).

The study included women with 20-35 years old pregnant women who are ≥ 37 week of gestation, with singleton pregnancy cephalic presentation and normal Vaginal delivery. While hypertension with pregnancy, Diabetes with pregnancy, < 20 years old and > 35 years old, instrumental vaginal delivery, multiple pregnancy, caesarean section or fetal congenital anomalies were excluded from the study.

Ethics : The approval of hospital access to the files was taken and the personal information of the patients was hidden.

Study procedures: The 1552 patients were classified to either normal group with no anemia or one of three groups according to maternal hemoglobin level (Which was done at the date of the delivery in Ain Shams university maternity hospital labs); group A: consisted of patients with mild anemia which hemoglobin level is 10-10.9g/dl at the date of the delivery. group B: included patients with moderate anemia which hemoglobin level is 7-9.9g/dl at the date of the delivery and group C consisted of patients with severe anemia which hemoglobin level is less than 7g/dl at the date of the delivery.

Data of all files with complete registration of patients fulfilling inclusion criteria without exclusion criteria were carefully recorded as following: age of the patients. Obstetric history and gestational age. Hematological parameters including: complete blood picture (hemoglobin, RBC'S count and hematocrit %). Data of vaginal delivery including: Estimated blood loss. Postpartum hemorrhage if present. Measures taken for management for e.g. ecbolics or interventions like examination under anesthesia, laparotomy with uterine artery ligation and B-lynch Blood transfusion whether it is before delivery or after it and numbers of units was taken. Need of ICU admission Neonatal assessment in the form of: Birth weight. APGAR score at 1 and 5 minutes after delivery. NICU admission (Table 1).

Table 1: Grades of anemia[7]

Severity of anaemia	Haemoglobin Level (gm/dl)
Mild anaemia	10-10.99
Moderate anaemia	7-9.9
Severe anaemia	<7

1ry outcome: Maternal: Postpartum hemorrhage, excessive bleeding following delivery which is sufficient to deteriorate the general condition according to assessment of the registered resident.

2ry outcome : Maternal: Need for blood transfusion and need for ICU admission.

Fetal : low birth weight (is defined by the World Health Organization as a birth weight of a live born infant of 2,499 g or less, regardless of gestational age). APGAR score at 1 and 5 minute after delivery. NICU admission. Intrauterine, Intrapartum fetal death and early neonatal death.

STATISTICAL ANALYSIS

Data were analyzed using SPSS software. Data were summarized in tables and figures. Continuous variables were presented as the mean ± standard deviations (SDs). The *P-value* was set at < 0.05 for statistical significance.

RESULTS

Table 2: Demographic characteristics of the studied cases

		Mean±SD	Range
Age (years)		27.0±2.4	20.0–35.0
Parity number		1.4±1.3	0.0–5.0
		N	percentage
Parity	Multiparous	1072	69.1
	primigravida	480	30.9

Table 3: Hemoglobin findings of the studied cases

		Mean±SD	Range
Hb (gm/dL)		11.3±1.4	6.4–14.7
		N	percentage
Anemia grades	Normal	917	59.1%
	Mild	439	28.3%
	Moderate	175	11.3%
	Severe	21	1.3%
Total anemia		635	40.9

Table 4: Maternal complications of the studied cases

		N	percentage
PPH		67	4.0
ICU		11	0.3
Transfusion		33	2.0
Tranfused units	1-2	17	48.4
	3-4	12	38.7
	>4	4	12.9

Table 5: Neonatal condition of the studied cases

	Mean±SD	Range
GA (weeks)	38.8±0.9	37.0–42.0
Birth weight (kg)	3.13±0.56	1.80–4.50
APGAR1	8.4±1.2	2.0–10.0
APGAR5	8.5±1.1	2.0–10.0
	N	Percentage
LBW	145	9.3
NICU	143	9.2
Death	41	2.6
Intrauterine fetal death	5	0.3
Intrapartum fetal death	2	0.1
Early Neonatal death	34	2.2

Table 6: Comparison between anemia grades regarding demographic characteristics

History	Normal (N=917)	Mild (N=439)	Moderate (N=175)	Severe (N=21)	*P*
Age (years)	27.0±2.4	27.0±2.4	27.2±2.6	26.6±2.8	^0.487
Parity number	1.2±1.2	1.6±1.3	1.7±1.2	2.7±1.9	^<0.001*
Multiparity	586 (63.9%)	329 (74.9%)	140 (80.0%)	17 (81.0%)	#<0.001*

^ANOVA test, #Chi square test, *Significant

Table 6 showed that parity was significantly different among anemia grades; were highest in severe followed by moderate then mild and lowest in normal.

Table 7: Comparison between anemia grades regarding maternal complications

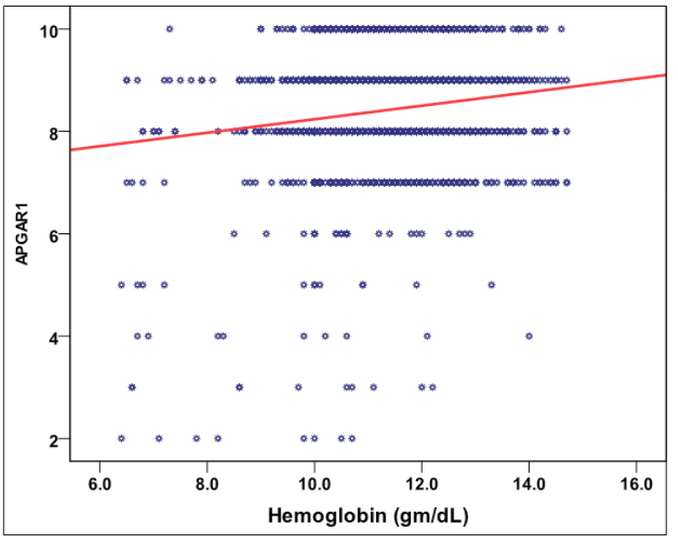
		Normal (N=917)	Mild (N=439)	Moderate (N=175)	Severe (N=21)	*P*
PPH		28 (3.1%)	18 (4.1%)	16 (9.1%)	5 (23.8%)	&<0.001*
ICU		0 (0.0%)	0 (0.0%)	7 (4.0%)	4 (19.0%)	&<0.001*
Transfusion		0 (0.0%)	0 (0.0%)	12 (16.9%)	21 (100%)	&<0.001*
Units	1-2			12 (100%)	5 (23.8%)	
	3-4			0 (0.0%)	12 (57.1%)	&<0.001*
	>4			0 (0.0%)	4 (19.0%)	

^ANOVA test, #Chi square test, &Fisher's Exact test, *Significant

Table 8: Comparison between anemia grades regarding neonatal complications

	Normal (N=917)	Mild (N=439)	Moderate (N=175)	Severe (N=21)	*P*
GA (weeks)	38.8±0.9	38.8±1.0	38.8±1.0	38.7±0.7	^0.930
Birth weight (kg)	3.16±0.56	3.14±0.59	3.02±0.46	2.66±0.38	^<0.001*
APGAR1	8.5±1.0	8.4±1.3	8.1±1.5	6.1±2.4	^<0.001*
APGAR5	8.7±1.0	8.5±1.2	8.3±1.4	6.5±2.3	^<0.001*
LBW	81 (8.8%)	42 (9.6%)	18 (10.3%)	4 (19.0%)	#<0.001*
NICU	72 (7.9%)	43 (9.8%)	19 (10.9%)	9 (42.9%)	#<0.001*
Death	7 (0.8%)	14 (3.2%)	16 (9.1%)	4 (19.0%)	&<0.001*
Intrauterine fetal death	0 (0.0%)	2 (0.5%)	2 (1.1%)	1 (4.8%)	&0.002*
Intrapartum fetal death	0 (0.0%)	0 (0.0%)	1 (0.6%)	1 (4.8%)	&0.003*
Early neonatal death	7 (0.8%)	12 (2.7%)	13 (7.4%)	2 (9.5%)	&<0.001*

Table 7 showed that PPH, ICU and transfusion were significantly different among anemia grades; were highest in severe followed by moderate then mild and lowest in normal. Table 8 showed that Low APGAR, NICU and death were significantly different among anemia grades; were highest in severe followed by moderate then mild and lowest in normal. Birth weight was significantly different among anemia grades; were lowest in severe followed by moderate then mild and highest in normal.



DISCUSSION

Iron deficiency anemia during pregnancy which is the most common nutritional disorder in pregnancy across the world is defined as a condition where hemoglobin (Hb) level in the blood is less than 11 g/d. According to World Health Organization, prevalence of anemia in pregnant women is 40% which should be considered as a serious public health problem. Although it is common at all stages of the life cycle, it is most frequently seen in young children and pregnant women[7].

Anemia is one of the most prevalent complications during pregnancy. It is commonly considered a risk factor for poor pregnancy outcomes and can result in complications that threaten the life of both mother and fetus, such as preterm birth, low birth weight, fetal impairment, and maternal and fetal deaths[8].

In the current study we aimed to assess the prevalence of anemia and its complication among pregnant women at Ain shams university maternity hospital. 1552 patients were included in our study and we found that the anemia was prevalent in 40.9 % of pregnant women, 28.3 % mild anemia, 11.3 % moderate while 1.3 % severe anemia. many studies showed the prevalence of anemia in pregnancy with different percentages.

Youssry *et al*.[2] who evaluate 2654 pregnant women at Ibn-Sina college hospital found that the prevalence of anemia was 42 % were anemic and they were sub-classified into mild anemic group 83.3 % and 16.7 % moderate to severe anemic group.While Gebreweld *et al*.[9] found that the overall prevalence of anemia was 11.6% which was lower than our prevalence.

On the other hand Koura *et al*.[10] stated that prevalence of maternal anemia at delivery was 39.5%, in Benin. Nair *et al*.[11] in another study showed that 35% of pregnant Indian women had moderate to severe anemia.

In our study, we found that the mean age of the patients was 27.0±2.4, parity was 1.4±1.3 and 69.1% multiparous. A total of 284 pregnant women were included in Gebreweld *et al*[9] study who found that the mean age of the participants was 27.3 ± 4.5 years range from 18-40.

On the other hand Tayade *et al*.[12] showed that The mean age was 23.52±3.03 years, with a minimum 18 and maximum 35 years[12].

In the current study we evaluate the prevalence of anemia in relation to parity and found that higher frequency of anemia in multiparous 69.1 % in comparison to primigravida 30.9 % and also the Parity was significantly different among anemia grades; were highest in severe 81.0 % followed by moderate 80 % then mild 74.9 % and lowest in normal.

Youssry *et al*.[2] goes with our result as they found that anemia was more prevalent among multigravid women 60.1% which was significantly higher in moderate to severe compared to mild anemic group (66.1% vs 59%; $p = 0.048$ respectively) which goes with our result

This is consistent with previous study done by Zama *et al*.[13] in Nigeria and they concluded that multiparity was one of the etiological factors of anemia in pregnancy.

PPH is one of the most serious complications in anemic pregnant women. Our data revealed that 4.0% of the included women had complications in form of PPH, 0.3% in ICU and 2.0% had blood transfusion in the form of (48.4% had 1-2 units, 38.7% had 3-4 units and 12.9% had >4 units).

On the other hand, Nair *et al*.[14] found that there was 33 of the 1007 women (3.3%) had a PPH. Eleven women were reported to have a blood loss of 500–999 mL, 6 between 1000 and 1499 mL, another 6 had >1500 mL of blood loss in the first 24 h after delivery and for the remaining 10, estimates of blood loss were not available.

In 73% of the PPH cases, the reported cause was uterine atony (n=24); other causes included placenta praevia (n=2), placental abruption (n=1), uterine infection (n=2), tears/injuries (n=2) and retained placenta (n=2).

Also Youssry *et al*.[2] data revealed 3.3% among all anemic women had PPH (2.9% in mild cases and 5.4% in moderate and severe cases)[2] this is in agreement with previous studies concluded that anemia during pregnancy is associated with increased risk of PPH[15]. Nair *et al*.[11] in a recent study observed a 17-fold increased risk of PPH among pregnant women with moderate-severe anemia[11].

A few small studies have suggested that women with severe anaemia are more likely to have uterine atony due to impaired transport of oxygen and Hb to the uterus but there is no strong evidence. This could be a possible explanation for the increased risk of PPH observed among pregnant women with moderate– severe anaemia[16].

In the current study as regard neonatal outcome we found that mean gestational age was 38.8±0.9 weeks, birth weight 3.13±0.56 kg, Apgar 1st was 8.4±1.2,5th was 8.5±1.1

Also in our study as regard neonatal complications we found that 9.35 of them had LBW, 9.2% had NICU, 3.7% had APGAR1<7,death rate was in 2.6% of them and was either neonatal death in 2.2%, Inrapartum fetal death in 0.1% and Intrauterine fetal death in 0.3%.

On the other hand, Youssry *et al*.[2] results showed that LBW was 8% in anemic pregnant women, also Koura *et al*.[10]; Nair *et al*.[11]; and Hussein *et al*.[17] all reported 11.3%, 27% and 14% prevalence of LBW among anemic mothers respectively.

Moreover, Lone *et al*.[18] concluded that low birth weight babies were 9 times more common in anemic pregnant women compared to non anemic in 626 pregnant women.

As regard Apgar score, we reported 9.2% low one minute Apgar score in anemic women, and neonatal mortality was 0.7%, which is consistent with Lone *et al*.[18] reported that neonates of anemic women had 1.8 times increased risk having low Apgar scores at 1 minute. When pregnant women were treated with iron in Niger, Apgar scores were significantly higher in those infants whose mothers received iron[19].

Nair *et al*.[14] found that there was a high prevalence (n=263 of the 969, 27%) of low birthweight among live-born singleton pregnancies in the study population and a higher prevalence of small-for-gestational age (n=409 of the 969, 42%). There were 33 perinatal deaths of the 989 singleton pregnancies (3.3%), 20 stillbirths and 13 neonatal deaths which occurred either on the day of delivery or within 2 days of birth.

In the current study, we found that there were significant weak positive correlations between hemoglobin and birth weight and APGAR scores.

In consistent with our result Youssry *et al*.[2] found that significant positive correlation between maternal hemoglobin level and low birth weight (r = 0.325, $p = 0.016$), low Apgar score (r = 0.333, $p = 0.009$), and neonatal hemoglobin level (r = 0.421, $p = 0.001$), in addition to another significant positive correlation between neonatal hemoglobin level and low birth weight. On the other side other studies failed to find such relationship[20,21].

CONCLUSION

This study showed that anemia in pregnancy continues to be a health problem in Egypt, and economic factors may contribute to the situation as its prevalence was 40.9% among our cases which were low socioeconomic populations.

CONFLICT OF INTERESTS

There are no conflicts of interest.

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