Evaluation of Post-Partum Anemia and Its Risk Factors and Treatment

Gynecology and Women's Health Care Research Article

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Abstract

Iron deficiency anemia (IDA) in pregnancy, i.e., prepartum anemia, is associated with premature birth, low birth weight, and small for gestational age of the newborn and is furthermore closely associated with the occurrence of anemia after delivery of a child, i.e., in the postpartum period .Post-partum anemia is a common problem throughout the world. through this study aim of the work (frequency of post-partum anemia and risk factors for its development)

The study showed that percentage of antepartum anemia was about 64.3% this percentage postpartum increased to about 65.4% and 13.6% of those with antepartum normal hemoglobin level became anemic. The main causes of postpartum anemia are prepartum iron deficiency anemia in combination with excessive blood losses at delivery. Post-partum anemia is not affected by demographic data, obstetric history, ante-partum u/s finding and obstetric history. Antepartum bleeding was not significantly associated with postpartum anemia. The more the estimated blood loss during labor the more the postpartum anemia. Through follow up of post-partum anemia cases and treated it according type of anemia (oral, intravenous, folate supplementation and blood transfusion). Outcome of treatment of anemia after 8 weeks, 61.02 % was improved and 8.98 % was not improved, due to malabsorption or non-adherence to drug usage.

Conclusion: *The main causes of postpartum anemia in this study are prepartum iron deficiency anemia and the amount of blood loss at delivery. this study's results suggest that screening of women with peri delivery Hb < 10.5 g/dL and with increased intrapartum blood loss increase the detection rate of postpartum anemia leading to increased treatment and improved patient care.*

Introduction

An adequate iron status is essential for an uncomplicated course of pregnancy, a normal development of the fetus, and maturity of the newborn [1]. Iron deficiency anemia (IDA) in pregnancy, i.e., prepartum anemia, is associated with premature birth, low birth weight, and small for gestational age of the newborn and is furthermore closely associated with the occurrence of anemia after delivery of a child, i.e., in the postpartum period [1].

Postpartum iron deficiency and anemia are associated with an impaired quality of life from a physical and a psychological point of view and constitutes a significant health problem both in developed and developing countries [2]. Anemia after the delivery of a child (postpartum anemia) is a common problem throughout the world [3]. It has been estimated that of the ~500,000 maternal deaths occurring each year on a global scale in association with delivery, 20% are caused by peripartum hemorrhage and anemia [4, 5]. Postpartum anemia is closely connected with the presence of anemia in pregnancy prior to delivery (prepartum anemia, which inevitably will be aggravated after delivery due to blood losses [2]. In the Western countries, the prevalence of prepartum anemia in the third trimester is markedly lower in women who have taken iron supplements during pregnancy compared with non-supplemented women. The major causes of postpartum anemia are prepartum iron deficiency/anemia in combination with excessive blood losses at delivery [6-10, 2]. In Europe, in selected series of healthy women after normal delivery, the prevalence of anemia (hemoglobin level <11 g/dL) 1 week postpartum is 14% in women who have taken iron supplements in pregnancy vs. 24% in non-supplemented women. In developing countries, the prevalence of postpartum anemia is considerably higher, in the range of 70%–80% [10].

The post-partum period is defined as the period during which conditions return to the non-pregnant states [6]. Some studies have focused on iron administration to prevent anemia and the results obtained during pregnancy [7]. However, in Japan, it is conventionally reported that anemia will be alleviated by the 30th day post-partum recommends dietary therapy rather than prescribing iron tablets for p.o. administration when the hemoglobin level is between 9 and 11 g/dL and mean corpuscular volume (MCV) is between 85 and 100 µm3. If anemia is not alleviated by the 30th day post-partum, this will impede a full recovery from the delivery and will complicate childcare, resulting in increases in fatigue [8].

Aim

The aim of the study is to know the percentage of post-partum anemia and what are the risk factors for its development.

Patients and Methods:

- This study was a prospective cross section observational study
- This research was done according to Helsinki declaration for research in human being, an informed written consent was taken from all participants before recruitment in the study, after proper counseling and a very clear explanation of the purpose.

Conducted at Obstetrics and Gynecology department of Zagazig University during the period (from September 2017 to January 2018).

- Population in patients around 6000 in one year delivered.
- Confidence interval (CI):95%.
- Power:80%.
- Frequency:20%.
- so, sample size 361 case.

The Inclusion Criteria:

All cases who delivered vaginally in Zagazig University Hospital. During the period (from September 2017 to January 2018).

The exclusion criteria:

- Patient who had medical or surgical disorder affecting hemoglobin level: including: fever, infection, diabetes mellitus, liver disease, renal disease, tuberculosis, cardiovascular disease, gastrointestinal symptoms/disease blood disease or cancer.
- Peripartum blood transfusion.
- Multiple gestation
- Cesarean section
- Vaginal birth after cesarean section
- Hypertensive disorder

All patients were undergone the following

Consent was taken from all patients

- Complete history taking, history of iron supplementation during pregnancy.
- History of antepartum bleeding.
- Complete clinical examination.

Complete blood picture (CBC) test was done and recorded for every patient enrolled in the study within 2 weeks before delivery and within two weeks after delivery, 3ml of blood was withdrawn by venipuncture into dry plastic tube containing EDETA solution. Hemoglobin (HB) concentration, hematocrit value (HCV), and other indices (mean corpuscular hemoglobin or MCH, mean corpuscular hemoglobin concentration or MCHC, and mean corpuscular volume or MCV) was tabulated and recorded for every patient in the study.

Cases of PPA diagnosed at Level of hemoglobin concentration <10gm/dl). Case with PPA and (severe anemia below 8gm/dl) was compared with cases without PPA as regarding:

- HB before delivery.
- Antepartum hemorrhage.
- Estimated blood loss during labor.

Cases who need treatment were given oral or intravenous iron., plus folic acid and vitamin B12 according to the type of anemia and cases with hemoglobin less than 6gm/dl were given blood transfusion. (Treatment with iron supplements was performed according to the following protocol; women with Hb > 9 g/dL were treated with oral iron supplements (usually those that were taken during pregnancy), women with Hb ≤ 9 g/dL received in addition one dose of I.V. 500 mg iron sucrose. Women with Hb between 7 and 7.9 g/dL with anemia-related symptoms or with Hb < 7 g/dL regardless of symptoms also received a transfusion of packed red blood cells).

- Follow up CBC was done 8 weeks after delivery

Statistical Analysis

All data were collected, tabulated and statistically analyzed using SPSS 20.0 for windows (SPSS Inc., Chicago, IL, USA) and MedCalc 13 for windows (MedCalc Software bvba, Ostend, Belgium). Quantitative data were expressed as the mean ± SD & median (range), and qualitative data were expressed as absolute frequencies (number) & relative frequencies (percentage).

Results

Initially, 409 included in this study. 34 patients refused Participation,14 missed follow up lastly 361involved in the study. Sample size 361 case the study showed postpartum anemia 236 case percentage of postpartum anemia is 65.4%. The study showed that percentage of antepartum anemia was about 64.3% this percentage postpartum increased to about 65.4% and 13.6% of those with antepartum normal hemoglobin level became anemic.

Types of postpartum anemia

- mild normocytic normochromic anemia(HB 10 g/dl) (100 case).
- mild microcytic hypochromic anemia (68 case).

- moderate normocytic normochromic anemia(HB 8-9.5 g/dl) (33 case).
- moderate microcytic hypochromic anemia (27 case).
- severe normocytic normochromic anemia (HB< 8 g/dl) (3 case).
- severe microcytic hypochromic anemia (5 case).

The main causes of postpartum anemia are prepartum iron deficiency/anemia and intrapartum blood loss at delivery. Post-partum anemia is not affected by demographic data, obstetric history , ante-partum u/s finding. Antepartum hemorrhage was not significantly associated with postpartum anemia. The more the estimated blood loss during labor the more the postpartum anemia .Through follow up of post-partum anemia cases and treated it according type of anemia (oral , intravenous , folate supplementation and blood transfusion) Outcome of treatment of anemia after 8 weeks 61.02 % is improved &38.98 % is not improved.

Table 1: Prevalence of postpartum anemia in the studied pregnant women.

Postpartum anemia	Total (N=361)	
	No	%
Absent	125	34.6%
Present	236	65.4%
Mild normocytic normochromic (HB 9-10 g/dl)	100	42.37%
Mild microcytic hypochromic	68	28.81%
Moderate normocytic normochromic (HB 8-9 g/dl)	33	13.98%
Moderate microcytic hypochromic	27	11.44%
Severe normocytic normochromic (HB <8 g/dl)	3	1.27%
Severe microcytic hypochromic	5	2.12%

Table 2: Prevalence of antepartum anemia in the studied pregnant women.

Antepartum anemia	Total (N=361)	
	No	%
Absent	129	35.7%
Present	232	64.3%
Mild normocytic normochromic	105	45.26%
Mild microcytic hypochromic	77	33.19%
Moderate normocytic normochromic	20	8.62%
Moderate microcytic hypochromic	20	8.62%
Severe normocytic normochromic	5	2.16%
Severe microcytic hypochromic	5	2.16%

Table 3: Relation between antepartum anemia and postpartum anemia in the studied pregnant women.

		Postpartum anemia		Total
		Absent	Present	
Antepartum anemia	Absent	80 (22.2%)	49 (13.6%)	129 (35.7%)
	Present	45 (12.5%)	187 (51.8%)	232 (64.3%)
Total		125 (34.6%)	236 (65.4%)	361 (100%)

Table 4: Relation between type of antepartum anemia and postpartum anemia in the studied pregnant women.

		Postpartum anemia							Total
		No anemia	Mild NN	Mild MH	Mod. NN	Mod. MH	Sev. NN	Sev. MH	
Antepartum anemia	No Anemia	80 (22.2%)	28 (7.8%)	14 (3.9%)	5 (1.4%)	1 (0.3%)	0 (0%)	1 (0.3%)	129 (35.7%)
	Mild NN	23 (6.4%)	54 (15%)	9 (2.5%)	9 (2.5%)	7 (1.9%)	1 (0.3%)	2 (0.6%)	105 (45.26%)
	Mild MH	15 (4.2%)	13 (3.6%)	37 (10.2%)	5 (1.4%)	7 (1.9%)	0 (0%)	0 (0%)	77 (33.19%)
	Mod. NN	3 (0.8%)	3 (0.8%)	4 (1.1%)	9 (2.5%)	1 (0.3%)	0 (0%)	0 (0%)	20 (8.62%)
	Mod. MH	3 (0.8%)	1 (0.3%)	4 (1.1%)	3 (0.8%)	9 (2.5%)	0 (0%)	0 (0%)	20 (8.62%)
	Sev. NN	0 (0%)	1 (0.3%)	0 (0%)	1 (0.3%)	1 (0.3%)	2 (0.6%)	0 (0%)	5 (2.16%)
	Sev. MH	1 (0.3%)	0 (0%)	0 (0%)	1 (0.3%)	1 (0.3%)	0 (0%)	2 (0.6%)	5 (2.16%)
Total		125 (34.6%)	100 (42.37%)	68 (28.81%)	33 (13.98%)	27 (11.44%)	3 (1.27%)	5 (2.12%)	361 (100%)

Table 5: Relation between demographic data and postpartum anemia.

Demographic data	Total (N=361)	Postpartum anemia				Test	p-value (Sig.)
		Absent (N=125)		Present (N=236)			
		No	%	No	%		
Age (years) Mean ± SD		27.59 ± 6.16		26.75 ± 5.97		-1.132•	0.258 (NS)
Median (Range)		27 (18 – 42)		26 (17 – 40)			
Residence						0.331‡	0.565 (NS)
Rural	215	77	35.8%	138	64.2%		
Urban	146	48	32.9%	98	67.1%		
Obstetric history	Total (N=361)	Postpartum anemia				Test	p-value (Sig.)
		Absent (N=125)		Present (N=236)			
		No.	%	No.	%		
Gravidity							
Primi	99	31	31.3%	68	68.7%	0.661‡	0.416 (NS)
Multi	262	94	35.9%	168	64.1%		
Parity							
Mean ± SD		1.60 ± 1.40		1.41 ± 1.30		-1.210•	0.226 (NS)
Median (Range)		2 (0 – 7)		1 (0 – 5)			
Previous VD							0.920 (NS)
Mean ± SD		0.56 ± 1.10		0.51 ± 0.98		-0.100•	
Median (Range		0 (0 – 4)		0 (0 – 5)			
Previous abortion						-1.300•	0.194 (NS)
Mean ± SD		0.44 ± 0.80		0.43 ± 1.30			
Median (Range)		0 (0 – 4)		0 (0 – 15)			

Table 6: Relation between ante-partum U/S , obstetric history and postpartum anemia.

Ante-partum U/S	Total (N=361)	Postpartum anemia				Test‡	p-value (Sig.)
		Absent (N=125)		Present(N=236)			
		No.	%	No.	%		
Viability of fetus Viable IUFD	 346 15	 120 5	 34.7% 33.3%	 226 10	 65.3% 66.7%	0.012	0.914 (NS)
Sex of baby Male Female	 180 181	 53 72	 29.4% 39.8%	 127 109	 70.6% 60.2%	4.258	0.039 (NS)
Fetal weight 2500-3000mg 3000-3200 Less than 2500	 312 10 2	 105 5 1	 33.7% 50% 50%	 207 5 1	 66.3% 50% 50%	1.552	0.670 (NS)
Amniotic fluid Normal Oligohydramnios Polyhydramnios Anhydraminos	 330 26 4 1	 110 10 4 1	 33.3% 38.5% 100% 100%	 220 16 0 0	 66.7% 61.5% 0% 0%	9.853	0.020 (NS)
Partum history	Total (N=361)	Postpartum anemia				Test	p-value (Sig.)
		Absent(N=125)		Present (N=236)			
		No	%	No	%		
Gestational age (weeks) Mean ± SD Median (Range)		 37.04 ± 2.72 38 (27 – 43)			 36.77 ± 3.45 37 (22 – 42)	-0.074	0.941 (NS)
Mode of delivery VD Instrumental delivery	 91 270	 31 94	 34.1% 34.8%	 60 176	 65.9% 65.2%	0.017	0.897 (NS)
Viability of baby Non viable Viable	 15 346	 5 120	 33.3% 34.7%	 10 226	 66.7% 65.3%	.012	0.914 (NS)
Onset of labour induced spontaneous	 15 346	 5 120	 33.3% 34.7%	 10 226	 66.7% 65.3%	.012	0.914 (NS)
without Augmentation With augmentation	 346 15	 120 5	 34.7% 33.3%	 226 10	 65.3% 66.7%	0.012	0.914 (NS)
Fetal weight 2500-3000mg 3000-3200 Less than 2500	 312 10 2	 105 5 1	 33.7% 50% 50%	 207 5 1	 66.3% 50% 50%	1.552	0.670 (NS)

Episiotomy no yes	346 15	120 5	34.7% 33.3%		226 10	65.3% 66.7%	0.012	0.914 (NS)
Placental delivery manual spontaneous	15 346	5 120	33.3% 34.7%		10 226	66.7% 65.3%	.012	 0.914 (NS)
Analgesia sedation local	15 346	5 120	33.3% 34.7%		10 226	66.7% 65.3%	.012	0.914 (NS)

Table 7: Ante-partum RBCs indices in case with or without postpartum anemia.

Ante-partum RBCs indices	Postpartum anemia		Test•	p-value (Sig.)
	Absent (N=125)	Present (N=236)		
RBCs count (x10^6/mm^3) Mean ± SD Median (Range)	4.34 ± 0.51 4.30 (3.20 – 6.50)	3.88 ± 0.56 4 (1.80 – 5.20)	-7.050	<0.001 (HS)
Hematocrit (%) Mean ± SD Median (Range)	35.98 ± 3.03 35.50 (29.80 – 47.50)	30.85 ± 3.86 30.95 (15.50 – 41.10)	-11.420	<0.001 (HS)
Hemoglobin (g/dl) Mean ± SD Median (Range)	12.39 ± 0.91 12.40 (10.30 – 15.50)	10.45 ± 1.25 10.60 (5.40 – 11)	-12.840	<0.001 (HS)
MCV Mean ± SD Median (Range)	83.32 ± 6.30 84 (63 – 100)	79.58 ± 7.71 80.70 (56 – 96)	-4.348	<0.001 (HS)
MCH Mean ± SD Median (Range)	28.10 ± 2.51 28.10 (20.10 – 34.10)	26.45 ± 3.20 27 (18.40 – 34.60)	-4.907	<0.001 (HS)
MCHC Mean ± SD Median (Range)	33.50 ± 1.54 34 (27.50 – 36.30)	33.14 ± 1.81 33.40 (28 – 37.60)	-2.018	<0.001 (HS)
RWD Mean ± SD Median (Range)	14.42 ± 1.80 14 (11.30 – 21)	15.16 ± 2.68 14.50 (3.10 – 26.90)	-2.807	<0.001 (HS)

Table 8: Relation between ante-partum hemorrhage and postpartum anemia.

Ante-partum hemorrhage	Total (N=361)	Postpartum anemia				Test‡	p-value (Sig.)
		Absent (N=125)		Present (N=236)			
		No	%	No	%		
APH Absent Present	 293 68	 105 20	 35.8% 29.4%	 188 48	 64.2% 70.6%	1.006	0.316 (NS)
Estimated blood loss during labour	Total (N=361)	Postpartum anemia				Test‡	p-value (Sig.)
		Absent (N=125)		Present (N=236)			
		No	%	No	%		
200-300 cc (VD) >300 cc (VD) 500-1000 cc (CS) >1000 cc (CS)	56 35 184 86	23 8 74 20	41.1% 22.9% 40.2% 23.3%	33 27 110 66	58.9% 77.1% 59.8% 76.7%	10.622	0.014 (S)

Table 9: Treatment of postpartum anemia and its outcome in the studied women.

Treatment of postpartum anemia	Total (N=236)	
	No	%
Treated Treated by oral iron Treated by IV iron Treated by blood transfusion	236 168 60 8	 71.18% 25.42% 3.38%
Outcome of treatment of postpartum anemia	Total (N=236)	
	No	%
Treated Improved Not improved	236 144 92	 61.02 38.98

Discussion

Iron deficiency anemia (IDA) in pregnancy, i.e., prepartum anemia, is associated with premature birth, low birth weight, and small for gestational age of the newborn and is furthermore closely associated with the occurrence of anemia after delivery of a child, i.e., in the postpartum period [1]. Postpartum iron deficiency and anemia are associated with an impaired quality of life from a physical and a psychological point of view and constitutes a significant health problem both in developed and developing countries the study showed percentage of postpartum anemia is 64.3% ,absence of postpartum anemia is 35.7% & showed that postpartum anemia is not affected by demographic data(age, residence) [9].

In Europe, in selected series of healthy women after normal delivery, the prevalence of anemia (hemoglobin level <11 g/dL) 1 week postpartum is 14% in women who have taken iron supplements in pregnancy vs. 24% in non-supplemented women [10]. In unselected series of women who have not taken iron supplements, the prevalence of anemia (hemoglobin level <11 g/dL) 48 h after delivery is approximately 50% [2]. In developing countries, the prevalence of postpartum anemia is Postpartum anemia is closely connected with the presence of anemia in pregnancy prior to delivery (prepartum anemia which inevitably will be aggravated after delivery due to blood losses [2].

The study showed percentage of types postpartum anemia

Mild normocytic normochromic anemia 42.37% & Mild microcytic hypochromic anemia 28.81%& Moderate normocytic normochromic 13.98%& Moderate microcytic hypochromic 11.44%& Severe normocytic normochromic 1.27%& severe microcytic hypochromic 2.12%. The study showed that cases with postpartum anemia had a mean antepartum HB at 10.45 g/dl and cases without postpartum anemia had a mean antepartum HB at 12.39 and cases with antepartum anemia was significantly associated with postpartum anemia & percentage of antepartum anemia was about 64.3% this percentage postpartum increased to about 65.4% and 13.6% of those with antepartum normal hemoglobin level became anemic.

In a Danish series in 1991 of iron-supplemented women after a normal singleton pregnancy and delivery, the mean hemoglobin concentration 1-week postpartum was12.7 g/dL (95% CI 10.2–14.7), whereas non-supplemented women had a mean hemoglobin of 11.8 g/dL (95% CI 9.7–13.9) [11].

The study showed percentage of types of antepartum anemia

mild normocytic normochromic 45.26% & mild microcytic hypochromic 33.19% & moderate normocytic normochromic 8.62% & moderate microcytic hypochromic 8.62% & severe normocytic normochromic 2.16% & severe microcytic hypochromic 2.16%.

Studies on healthy Scandinavian pregnant women without iron deficiency, singleton pregnancy, and living at sea level have shown that in late third trimester, the fifth percentile for the hemoglobin concentration is 11–11.1 g/dL and the lower reference value of the 95% confidence interval (CI), corresponding to the 2.5th percentile, is 10.8g/dL [11-14].

The study showed that antepartum hemorrhage was not significantly associated with post-partum anemia. The study showed that the more the estimated blood loss during labor the more the postpartum anemia. In a Dutch study comprising 367 women with vaginal deliveries and a low risk of postpartum hemorrhage ,blood losses within 1 h of delivery of placenta were measured by a gravimetric method [15].

Median (5–95 percentile) blood losses were 375 ml (125–1,500); losses were ≥500 ml in 38% and ≥1,000 ml in 10% of the women, which are higher than in studies using subjective estimates of blood losses [16]. In New South Wales blood losses >500 ml was observed in 13.1% of deliveries. Among deliveries in Norway in 1999–2004, severe obstetric hemorrhage >1,500 ml within 24 h postpartum occurred in 1.1% [17]. Postpartum hemorrhage occurs in 4–6% of all deliveries but there are considerable discrepancies between blood losses estimated by midwifes/obstetricians and true blood losses [18].

In Denmark in 2002–2005, postpartum hemorrhage (estimated blood losses>500 ml) occurred in 5.1% of primipara corresponding to 3,500 deliveries per year [19]. This study showed that 71.18% treated by oral iron, 25.42% treated by IV iron , 3.38% treated by blood transfusion & outcome of treatment of anemia after 8 weeks 61.02% is improved & 38.98% is not improved. In women taking 66 mg ferrous iron/day during pregnancy, anemia (hemoglobin level <11 g/dL) at 1 week postpartum was observed in 14% vs. in 22% of women taking placebo tablets [20, 11]. Eight weeks postpartum, anemia (hemoglobin level <12.1 g/dL) was observed in 6%–8% of women who had been taking iron vs. 16% in women taking placebo [11, 20, 21]. oral iron therapy should be the first therapeutic option in women having slight-to-moderate IDA with hemoglobin levels of 9.5–12 g/dL.

They should initially be treated with ferrous iron 100–200 mg/day [22]. Such high doses of iron should preferably be administered between meals as a sustained release iron preparation in order to optimize absorption and reduce gastrointestinal side effects [23]. Following treatment for 2 weeks, the therapeutic response should be checked by measurement of hemoglobin. In order to keep the solution stable, iron sucrose should be dissolved in a maximum of 200 ml isotonic saline, infused over a minimum of 30 min ; repetitive doses should be administered with a minimum of 3-days interval [22]. At profound anemia with hemoglobin level of <6 g/dl, blood transfusion should be considered [23, 24].

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