

Frequency and Determinants of Maternal Anaemia in Early Postpartum Period

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Abstract

Objective: To determine the frequency and risk factors of maternal anaemia after delivery.

Methods: A cross-sectional study was carried out in two private tertiary care hospitals of Karachi over a period of six months from April to October 2017. A sample of 300 postpartum women was recruited in the study by convenient sampling.

Inclusion criteria were women more than 24 hours or up to one week following delivery of babies of more than 28 weeks of gestation and all booked cases of hospitals that consented to take part in research study. Exclusion criteria were women who had no antenatal visits and haemoglobin estimation in third trimester of pregnancy.

Data was collected using predesigned questionnaire after taking informed consent. Haemoglobin levels were noted in early pregnancy, third trimester and postpartum period.

Results: The study group comprises of 135 (47.9%) women with postpartum anaemia, whereas 147 (52.1%) women had normal level of haemoglobin. A total of 72 (25.5%) women had a rise in haemoglobin, 192 (62%) women had low and 18 (6.4%) women had unchanged postpartum haemoglobin as compared to the third trimester haemoglobin level.

The mean age of the study group was 27.59 ± 4.221 . Inadequate iron intake was noted in 66 (48.9%) women in the anaemic group, whereas it was found in 51 (34.7%) women in the non-anaemic group (p -value=0.000, OR=0.083). Anaemia was diagnosed during pregnancy in 105 (77.8%) women in anaemic group, whereas 33 (22.4%) women had anaemia during pregnancy in non-anaemic postpartum group (p -value=0.000, OR=0.083). Caesarean section was performed in 84 (62.3%) women with postpartum anaemia (p -value=0.010, OR=0.537). A total of 27 (20%) women with postpartum anaemia had episiotomy during normal vaginal or instrumental deliveries (p -value=0.042, OR=1.765).

Conclusion: Frequency of early postpartum anaemia is high. Anaemia during pregnancy, inadequate iron intake, vaginal delivery with episiotomy and caesarean section were significant risk factors.

Keywords: Anemia, hemoglobin, pregnancy, iron-deficiency anemia, episiotomy, caesarean section.

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Introduction

Postpartum anaemia is a neglected, though preventable, health issue. The early postpartum phase is usually given least importance and the

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women are not screened for anaemia. Anaemia is the most frequent puerperal complication. In healthy women, the prevalence of early postpartum anaemia is 14% to 24%. Frequency of postpartum anaemia is less clear due to lack of prospective studies even in developed countries. As the frequency of anaemia in third trimester is around 40%, the frequency of postpartum anaemia is expected to be high. Prevalence of maternal anaemia in early postpartum period ranges from 50% to 80% in under-developed countries, whereas studies in European countries show 50% prevalence of maternal anaemia 48 hours after delivery¹.

Hypervolemia and haemodilution of pregnancy disappears following delivery and rise in haemoglobin is expected in the first week postpartum².

This rise in haemoglobin counter balances the fall in haemoglobin due to peri-partum blood loss in healthy women. Milman et al. observed in his study of women with singleton pregnancy that haemoglobin levels rises from late third trimester to one week postpartum by 61%. It remains unchanged in 3% of the cases and fall in 36% cases³.

There is a lack of consensus on definition of postpartum anaemia. The World Health Organization (WHO) defined it as a haemoglobin level of less than 10 g/dL. In 90% of the cases, anaemia is due to iron deficiency⁴. Postpartum anaemia carries a high morbidity of 56%⁵ and it affects physical and mental health of women worldwide⁶. It impairs cognitive capabilities and has significant association with postpartum depression⁷. It affects breast feeding, mother and child bonding and results in reduced infant survival. It interferes with women's ability to resume her day-to-day activities and impairs the capacity and productivity of her work⁸. It causes restless legs and affects the function of epithelial tissues like skin, nails, hair, mouth and pharynx. Post-delivery anaemia puts women at risk of urinary tract infections⁹.

Worldwide, anaemia was responsible for 20% maternal mortality till 1995. Developed countries have reduced this mortality by initiating preventive measures, but developing countries are still facing the same challenge of high maternal mortality due to anaemia¹⁰. Almost all the studies in Pakistan are on anaemia during pregnancy, and we were unable to find studies on postpartum anaemia. The post-delivery period therefore remains the neglected part in maternity care in Pakistan and other developing countries.

In Pakistan, prevalence of anaemia among women of reproductive age, including pregnant and non-pregnant women (ages 15-49), rose from 49.2% in 2002 to 51.10% in 2011¹¹.

We, therefore, conducted the study to determine the frequency of postpartum anaemia and its risk factors so as to plan screening and interventional strategies to prevent this serious maternal health issue.

Patients and Methods

A cross-sectional study was carried out in two private hospitals of Karachi over a period of six months from April to October 2017. Study was approved by Ethical Review Board of Mamji Hospital Karachi and permission was taken from Saifee Hospital. Both are private tertiary care hospitals of Karachi. Each hospital is well equipped with ICU and NICU multidisciplinary care. Pregnant women are seen in antenatal clinic by consultant gynaecologist. Haemoglobin levels are checked at booking visit and in second and third trimester. Iron supplements are prescribed to every pregnant women from second trimester onwards and after delivery.

Delivery packages do not include postpartum haemoglobin estimation. Patient has to pay separately if need be.

Postpartum haemoglobin is not checked routinely in pregnant women in these hospitals unless anaemia is suspected clinically. Few consultants advised routine haemoglobin on second postoperative day of caesarean section due to extra cost.

Inclusion criteria were women more than 24 hours or up to one week following delivery of babies of more than 28 weeks of gestation and all booked cases of hospitals that consented to take part in research study.

Exclusion criteria were women who had no antenatal visits and haemoglobin estimation in third trimester of pregnancy.

Sample size was calculated to be 264 with 25% confidence interval, precision rate of 5% with prevalence rate of 22%. A total of 300 women were recruited for the study to have more precise result. Sampling technique was convenient sampling. Verbal consent was taken. Data was collected by au-

thors, doctors on duty and nursing staff of obstetrics and gynaecology department of the two hospitals.

Blood was taken for haemoglobin estimation 24 to 48 hours after delivery. Samples were collected in a tube containing EDTA and submitted to the hospital laboratory.

A predesigned questionnaire was used to collect socio-demographic, obstetric and laboratory data. Contact number and e-mail addresses were noted.

Variables included were age, ethnic group, social class, education and employment status, parity, number of antenatal check-ups, inadequate iron supplement, anaemia diagnosed during pregnancy, antepartum haemorrhage, multiple pregnancies, infection, pre-existing medical disorders, mode of delivery (including vaginal, instrumental and caesarean section), postpartum haemorrhage (PPH), chorioamnionitis, puerperal sepsis and third trimester and postpartum haemoglobin.

Third trimester anaemia is defined as haemoglobin less than 10.5 g/dL¹² and postpartum anaemia as less than 10 gm/dL⁴.

Data was entered in SPSS 16. Frequency was calculated by using descriptive statistics. Significant association of variables with anaemia was assessed by using binary and multinomial regression.

Results

The study group comprises of 47.9% women with postpartum anaemia, whereas 52.1% women had a normal level of haemoglobin. A total of 72 women showed a rise in haemoglobin following delivery when compared to third trimester haemoglobin. Approximately 68% women had low and 6.4% women had unchanged postpartum haemoglobin as compared to third trimester haemoglobin.

The mean age of the study group was 27.59 ± 4.221. Table 1 shows that 71.1% women with postpartum anaemia in the study group were Urdu speaking, 8.9% were Sindhi, 13.3% were Pashto

and 6.7% were Punjabi. Approximately 40% had tertiary education in the group of women with postpartum anaemia as compared to 40.8% in the group of women with normal levels of haemoglobin. Women with secondary education in the postpartum anaemia group were 33.3%, as compared to 30.6% in the non-anaemic group. Women with primary education were 26.7% in the postpartum anaemic group, as compared to 28.6% in women in the anaemic group. Middle-class women were 75.6% in the anaemic group and 75.5% in the non-anaemic group. Lower-class women were 24.4% and 28.6%, respectively, in the anaemic and non-anaemic groups. Moreover, 100% women in the anaemic and 93.9% women in the non-anaemic group were housewives. No woman was working in anaemic group, whereas 6.1% were working in non-anaemic group.

Table 2 showed 46.7% women were primiparous in the anaemic group, as compared to 51.1% women in the non-anaemic group (p-value=0.033, OR=0.336). Multiparous women were 42.2% in the anaemic group as compared to 44.9% in the non-anaemic group (p-value=0.039, OR=0.345). Approximately, 70% women had more than four antenatal visits in the anaemic group as compared to 75.5% in the non-anaemic group. Women having less than four antenatal visits were 28.9% in anaemic group as compared to non-anaemic group.

Inadequate iron intake was noted in 48.9% women in the anaemic group, whereas it was found in 34.7% in the non-anaemic group (p-value=0.000, OR=0.083).

Anaemia was diagnosed during pregnancy in 77.8% women in the anaemic group, whereas 22.4% women had anaemia during pregnancy in non-anaemic postpartum group (p-value=0.000, OR=0.083).

Women with postpartum anaemia had infections during pregnancy in 11.4% of cases and non-anaemic postpartum women had infections during pregnancy in 16.3% of cases. Medical disorders were found in 15.5% women with postpartum

anaemia, whereas it was found in 14.3% women with normal postpartum haemoglobin levels.

A total of 48 (35.6%) women with postpartum anaemia delivered vaginally, as compared to 69 (46.9%) women with normal postpartum haemoglobin who delivered vaginally. Instrumental delivery was attempted in 2.2% of women with postpartum anaemia, whereas 4.1% had instrumental delivery in non-anaemic postpartum women. Approximately 20% women with postpartum anaemia had an episiotomy during normal vaginal or instrumental deliveries as compared to 45 (30.6%) women with normal postpartum haemoglobin delivering vaginally (p-value=0.042, OR=1.765). Caesarean section was performed in 84 (62.3%) women with postpartum anaemia as compared to 69 (46.9%) women with normal haemoglobin levels (p-value=0.010, OR=0.537).

Discussion

Our study group comprised mainly of middle social class educated women. Majority of women had tertiary or secondary education. The mean age of the study group was 27.59 ± 4.211 . This is the group which should be expected to have lowest rate of health issues, however frequency of postpartum anaemia in our study group was 47.9%. Prevalence of anaemia greater than 40% is considered as a severe problem of public health by WHO⁴, which demands urgent preventive and corrective health strategies. Despite the fact that our study group comprises mainly of educated middle class women still the frequency of anaemia is high. This showed poor health strategies even in private hospitals and needs mandatory standards of maternity services for pregnant women in both public and private sectors.

High frequency of postpartum anaemia noted in our study is comparable to studies of Agarwal et al. in India, Petraro et al. in Tanzania and Milman et al.¹³⁻¹⁵, which showed 50% to 80% prevalence. It is also comparable to the prevalence of 64% found by Sserunjogi et al. in a study in Eastern Uganda¹⁶ which indicates the failure of health authorities to

implement preventing health strategies against anaemia during pregnancy and the postpartum period.

The rise in postpartum haemoglobin when compared to third trimester haemoglobin was 25.5% in our study. This is significantly low as compared to the study by Milman et al.³ who reported a 61% rise. Postpartum fall in haemoglobin was high (68%) in our study as compared to Milman et al. (36%).

Nearly 79 women in the anaemic group were also anaemic during pregnancy, so new cases of anaemia diagnosed postpartum were around 21% in our study. Innocent et al.¹⁷ conducted a study on new cases of anaemia after delivery and observed the incidence of postpartum anaemia of 29.9%. Iron deficiency anaemia accounts for nearly 75% cases of anaemia in pregnancy¹⁸.

Inadequate iron intake showed significant association with postpartum anaemia in our study group.

Inadequate haematinic iron and folic acid supplements during pregnancy is a cause of postpartum anaemia as shown in various studies¹⁹.

Nkechi et al.²⁰ observed positive associations of urban population, adequate antenatal visits with micronutrients compliance by pregnant women. Unfortunately, despite 70% of women in our study group having more than four antenatal visits and all of them being part of the urban population, still compliance with oral iron and folate supplement was poor. Public awareness of complications of anaemia and preventive strategies against it would be an important step in addressing this health issue.

Women with postpartum iron deficiency anaemia should be given iron and folate therapy during lactation for at least three months as recommended by WHO in countries with prevalence of anaemia more than 40%²¹. Furthermore, weekly haematinic supplements are recommended by WHO for reproductive age women in populations with high prevalence of anaemia (above 20%)¹⁷.

Caesarean section and episiotomy shows significant association with postpartum anaemia in our study. Delivery other than normal vaginal delivery was found to be a significant risk factor for postpartum anaemia¹⁴. There is a tendency to underestimate blood loss following delivery by the obstetrician²². Asia stands second, globally, as an area with highest caesarean section rates²³. Caesarean section rates should be optimised by monitoring at hospital and sub-national level to avoid morbidity associated with it. Robson's classification system should be adopted as recommended by WHO²⁴ to audit caesarean rate. The classification is now widely adopted worldwide²⁵.

Infections and medical disorders did not show a significant association in our study as compared to other studies²⁶ because of different population characteristics.

The approach to this serious health problem should be tailored according to specific aetiology in local population, as at times, solution is inexpensive and effective²⁷. Public awareness, screening and correction of anaemia, particularly postpartum, should be routine and included in hospital packages.

Our study highlights the deficiency in the standard of maternity care in private hospitals. Health authorities should set and monitor the required standards of maternity services. This will reduce the number of anaemic women in the community.

Limitations of the study were the small number of women included in the study. Number of women with normal vaginal delivery were less as most women were discharged early and did not turn up with postpartum haemoglobin report.

Conclusion

Frequency of postpartum anaemia is high. Anaemia during pregnancy, inadequate iron intake and caesarean section were significant risk factors

Conflict of Interest

Authors have no conflict of interests and no grant/funding from any organisation.

Table 1. Socio-demographic characteristic of the study group (n= 282)
Mean age of study group (years) 27.59 ± 4.221, range= 18-39

Socio demographic	Postpartum anaemia		p-value (SD)
	Yes, n= 135 No. (%)	NO, n= 147 No. (%)	
Ethnicity			
Urdu speaking	96 (71.1)	111 (75.5)	
Sindhi	12 (8.9)	9 (6.1)	
Pashto	18 (13.3)	12 (8.2)	
Punjabi	9 (6.7)	12 (8.2)	
Balochi	0 (0)	3 (2)	
Education			
Primary	36 (26.7)	42 (28.6)	
Secondary	45 (33.3)	45 (30.6)	
Tertiary	54 (40)	60 (40.8)	
Social class			
Middle	102 (75.6)	105 (71.4)	
Lower	33 (24.4)	42 (28.6)	
Employment status			
House wife	135 (100)	138 (93.9)	
Working	0 (0)	9 (6.1)	

Table 2. Obstetric risk factors for postpartum anaemia

Risk factors	Postpartum anaemia		p-value (OR)
	Yes No. (%)	No No. (%)	
Antenatal risk factors			
Parity			
Primiparous	63 (46.7)	75 (51.1)	0.033 (0.336)
Multiparous	57 (42.2)	66 (44.9)	0.039 (0.345)
Grand multiparous	15 (11.1)	6 (4.1)	
Antenatal visit			
more than 4 visits	96 (71.1)	111 (75.5)	
Less than 4 visits	39 (28.9)	36 (24.5)	
Inadequate iron intake	66 (48.9)	51 (34.7)	0.016 (0.555)
Anaemia diagnosed during pregnancy			
Infection	105 (77.8)	33 (22.4)	0.000 (0.083)
Medical disorder	15 (11.4)	24 (16.3)	
Medical disorder	21 (15.5)	21 (14.3)	
Intrapartum risk factors			
Vaginal delivery	48 (35.6)	69 (46.9)	
Instrumental delivery	3 (2.2)	6 (4.1)	
Episiotomy	27 (20)	45 (30.6)	0.042 (1.765)
Caesarean section	84 (62.3)	69 (46.9)	0.010 (0.537)

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