PREVALENCE OF AND FACTORS ASSOCIATED WITH IMMEDIATE POSTPARTUM ANEMIA IN TWO TEACHING HOSPITALS, NORTHERN ETHIOPIA

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ABSTRACT

BACKGROUND: Anemia is a major global health problem affecting the health, quality of life, and working capacity of billions of people all over the world. Globally, it is estimated that 20% of maternal deaths are caused by peripartum hemorrhage and anemia. The frequency of postpartum anemia is poorly assessed especially in owner area.

OBJECTIVES: Determine the prevalence and associated risk factors of immediate postpartum anemia in the two teaching hospitals in Mekele, North Ethiopia.

METHODS: A facility based cross-sectional survey was employed in two teaching hospitals in northern Ethiopia. A sample of 236 consecutive postpartum women was included from April 1 to July 30, 2017 G.C. Socio-demographic and clinical factors were collected by a questionnaire and hemoglobin determined using CBC machine. A p-value <0.05 was considered significant. Variables which were significantly associated by bivariate analysis were further processed by multivariate analysis.

RESULT: The prevalence of immediate postpartum anemia was 24.2% (n=57). Even though bivariate analysis indicated that immediate postpartum anemia was significantly associated with age, residence, educational, parity, ANC, mode of delivery, episiotomy, and birthweight, on multiple analyses, the association persisted for residence, education level, and mode of delivery only. Immediate postpartum anemia was significantly lower among rural resident (AOR=0.34; 95%; CI=0.118, 0.998); and those delivered vaginally (AOR=0.13 and CI=0.038, 0.454) while it was significantly high among participants who were unable to read and write (AOR=14.4; 95% CI=2.27, 91.14).

CONCLUSION AND RECOMMENDATION: The prevalence of immediate postpartum anemia was high and it was significantly associated with residence, literacy level and vaginal delivery. It is recommended to have universal postpartum hemoglobin determination besides blood loss estimation after each delivery and clinical assessment for anemia. The study participants being women delivered in teaching hospitals, the prevalence may not be implied to the general population at community level.

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INTRODUCTION

There is no consensus on the definition of Postpartum anemia, but so far the WHO hemoglobin cut-off value of <100 g/L has been employed. It is recommended that postpartum anemia should be defined by hemoglobin <110 g/L at 1 week postpartum and <120 g/L at 8 weeks postpartum. The major causes of postpartum anemia are prepartum anemia combined with acute bleeding and anemia due blood losses at delivery[1,2]. Postpartum iron deficiency and anemia are major public health problems. In the United States, approximately 13 percent of women 0 to 6 months postpartum are iron deficient and 10 percent are anemic. In developing countries postpartum anemia is a major cause of maternal morbidity and mortality. 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[4,5,6,7,8]. The frequency of postpartum anemia is poorly elucidated. In developing countries, the prevalence of postpartum anemia is in the range of 50-80%. In healthy women after normal delivery, the prevalence of anemia (hemoglobin <110 g/L) 1 week postpartum is 14% in iron-supplemented women and 24% in non-supplemented women. In consecutive series of European women, the prevalence of anemia 48 h after delivery is approximately 50%.In unselected series of women who have not taken iron supplements, the prevalence of anemia (hemoglobin level <110 g/l) 48 h after delivery is approximately 50%. These figures emphasize that postpartum iron deficiency and anemia are continuing major health problems that should be given more attention[1,2,7].

The performance of postpartum hematocrit measurements after vaginal delivery to identify patients who are anemic is a standard practice in most hospitals and is the recommendation in most scientific bodies but we don't have such a practice in our facility; so this research will help as to know the disease burden and also the most common associated factors so that we can base either universal or selective postpartum anemia screening in our facility and also the country at large. There is no such published literature in our country and most national and international scientific bodies which have issued recommendations on postpartum recognize the lack of scientific evidence, which is reflected in the variety of recommendations published; this paper will have its own contribution for scientific evidence based practice and also can serve as a base for other related researches.

MATERIALS AND METHOD

A cross-sectional study was conducted at two public health facilities, Ayder Comprehensive Specialized Hospital and Mekelle Hospital in Mekele city, the capital city of Tigray region, north Ethiopia.

A sample size of 236 was calculated using the formula for single population proportion with 95% confidence interval (z=1.96), 5% degree of precision, and p-value of 19% for of immediate postpartum anemia [6]. All women in their immediate postpartum period were recruited and data was collected from eligible participants until the sample size is achieved. It took three months (April 1 to July 30, 2017) to achieve the required sample size. Eligible participants were parturient who had vaginal or cesarean deliveries. Women delivered by cesarean hysterectomy or laparotomy after uterine rupture were excluded.

Socio-demographic, reproductive and clinical characteristics (including iron supplementation and hemoglobin level) were collected using a questionnaire from clinical records and by interviewing women in their immediate postpartum period. At the same time, participants' hemoglobin were documented. Immediate postpartum anemia was defined as hemoglobin <10 gm/dl within 48 hours of delivery. Data was entered, cleaned, checked for completeness and analyzed using SPSS version 23. Variable found to be associated with postpartum anemia were further assessed by multivariable logistic regression. Two sided values, statistical significance of p-value < 0.05, and odds ratio of 95% confidence intervals were used to determine associations.

Participants were approached before being discharged from the hospitals and within 48 hours of delivery, at a time they were comfortable for interview. They were interviewed in Tigrigna, the local language of the region, after briefing them on the purpose and objectives of the study and consent secured by trained data collectors. The proposal was approved by the Research and Community Service Ethical Review Committee of Mekelle University College of health Sciences.

RESULTS

Among the 236 participants, 24.2% (n=57) of them had anemia (Hg< 10 gm/dl) in their immediate postpartum period with a mean hemoglobin (±1SD) of 11.65 (±1.76) mg/dl, ranging from 5.2 to 16.3 mg/dl.

The age of all respondents ranged from 17 to 40 with a mean (±1SD) of 26.3 (± 4.86 SD) years. Most of them were in the age group of 20 to 29 years (n=157, 67.9%), married (n=230, 97.5%), urban residents (n=120, 50.8%), Orthodox Christians (n=219, 92.8%), and Tigre in ethnicity (n=234, 99.2%), educated up to grade 9 to 12 (n=87, 36.9%), housewives (n=123, 52.1%) and had no personal income (n=140, 59.3%) (Table 1).

Among the socio-demographic variables, age, income, education and residence are significantly associated with immediate postpartum anemia. Immediate postpartum anemia was significantly associated (P <0.05) with urban residence (30.0%) than rural residence (18.1%). Anemia also had a significant increasing trend (P <0.05) with increasing age, but a decreasing trend with increasing educational level (Table 1).

Table 1: Sociodemographic characteristics of 236 immediate postpartum participants at Ayder Comprehensive Specialized and Mekelle hospitals, 2017

Characteristics	Postpartum Hemoglobin		Total	p-value
	< 10 gm/dl	> 10 gm/dl		
	No (row %)	No (row %)	No (column %)	
Age				
20-29	34(16.5)	138(83.5)	172 (72.9)	0.016
30-34	23(31.9)	41(68.1)	64 (27.1)	
Residence				
Rural	21 (18.1)	95(81.9)	116 (49.2)	0.034
Urban	36 (30.0)	84(70.0)	120 (50.8)	
Religion				
Christian	52(23.3)	171 (76.7)	219(92.8)	0.393
Islam	5(38.5)	8(61.5)	13(5.5)	
Ethnicity				
Tigrigna	55(23.5)	179(76.5)	234(99.2)	0.999
Amhara/ Afar	2(100)	0 (0.0%)	2(0.8)	
Marital status				
Single*	1(20.0)	5(80.0)	5(2.1)	0.830
Married	56(24.3)	174(75.6)	230(97.5)	
Educational status				
Illiterate/read & write	20(66.7)	12(33.3)	32(13.6)	0.000
1 to 8 grade	37(26.9)	167(73.1)	204(86.4)	
Occupation				
Student	3(27.3)	8(72.7)	11(4.7)	0.016
Private business	4(13.3)	26(86.7)	30(12.7)	
Employee	11(17.0)	46(83.0)	57(24.2)	
House wife	30(24.4)	93(75.6)	123(52.1)	
Farmer	8(66.7)	4(33.3)	12(5.1)	
Others**	1 (33.3)	2 (66.7)	3 (1.3)	
Family income/month				
≤ 2000	11(37.9)	18(62.1)	29(12.3)	0.129
2001-5000	30(23.1)	100(76.9)	130(55.1)	
5001-10000	12(17.9)	55(82.1)	67(28.4)	
≥ 10001	4(40.0)	6(60.0)	10(4.2)	

* One of the 5 was a divorcee

** Two of them were daily laborers while the third was sex worker

Most of the respondents were para 1-4 (n=222, 94.1%) with a mean (±1SD) of 2.0(±1.3) previous deliveries. Parity was significantly associated (P<0.05) with parity of 5-9 (n=7, 50%). There was no association with previous multiple pregnancy or abortion (Table 2).

Table 2: Obstetrics characteristics of 236 immediate postpartum participants at Ayder Comprehensive Specialized and Mekelle hospitals, 2017

FACTORS	Postpartum Hemoglobin		Total	p-value
	< 10 gm/dl	> 10 gm/dl		
	No (%)	No (%)	No (%)	
Parity				
1-4	50(22.5)	172(77.5)	222(94.1)	0.027
5-9	7(50.0)	7(50.0)	14(5.9)	
History of multiple pregnancy				
Yes	1(50.0)	1(50.0)	2(0.8)	0.416
No	56(23.9)	178(76.1)	234(99.2)	
Previous abortion				
Yes	1(7.7)	12(92.3)	13(5.5)	0.186
No	56(25.1)	167(74.9)	223(94.5)	

Almost all (except 1) of the participants (n=235, 99.6%) had antenatal care: 165 (n=70.2%) had 1 to 4 visits and the remaining 70 (29.8%) had more than 5 visits. Participants with more than 5 visits (n=11, 15.7%) were less likely to have anemia than those with 1-4 visits (n=46, 27.9%) with borderline significance (p=0.05). Most of the participants (n=207, 87.7%) had iron supplementation but 17 (18.2%) participants only took the supplementation for more than 3 months. Anemia was not significantly associated with iron supplementation (Table 3).

Table 3: ANC and iron supplementation among 236 postpartum participants in ACSH and Mekelle hospital, 2017.

Characteristics	Postpartum Hemoglobin		Total	p-value
	< 10 gm/dl>	> 10 gm/dl		
	No (%)	No (%)	No (%)	
ANC follow up (n=236)				
Yes	57(24.3)	178(75.7)	235(99.6)	1.000
No	0	1(100)	1(0.4)	
Number of ANC follow up (n=235)				
1-4	46(27.9)	119(72.1)	165(70.2)	0.050
>=5	11(15.7)	59(84.3)	70(29.8)	
Iron supplementation (n=236)				
Yes	48(23.2)	159(76.8)	207(87.7)	0.358
No	9(31.0)	20(69.0)	29(12.3)	
Duration of Iron supplementation (in months) (n=207)				
1	17(21.8)	61(78.2)	78(37.7)	0.834
2	22(28.6)	55(71.4)	77(37.2)	
3	5(14.3)	30(85.7)	35(16.9)	
4	3(21.4)	11(78.6)	14(6.8)	
6	1(33.3)	2(66.7)	3(1.4)	

Almost all of the participants (n=233, 98.7%) had singleton pregnancy; only 3 (1.3%) had twin gestations. Most of the newborns were delivered vaginally (n=179, 75.8%) and had birthweight less than 4,000 g (n=217, 91.9%). Immediate postpartum anemia was significantly higher among cesarean deliveries (n=29, 50.9%), vaginally deliveries with no-episiotomy (n=43, 29.3%), and vaginal deliveries with second or third degree perineal tear (n=11, 36.7%). Similarly, birth weight of more than 4,000 g (n=10, 52.6%), PPH (n=6, 59.3%) and APH (n=6, 100%) were also significantly associated with anemia (Table 4).

Table 4: Intrapartum events and obstetric complications among 236 immediate postpartum participants at ACSH & Mekele hospitals, 2017

Multiplicity of pregnancy				
Singleton	56(24.0)	177(76)	233(98.7)	0.711
Multiple	1(16.6)	2(83.4)	3(1.3)	
Mode of delivery				
Vaginal delivery	28(15.6)	151(84.4)	179(75.8)	0.0001
Cesarean delivery	29(50.9)	28(49.1)	57(24.2)	
Episiotomy				
Yes	14(15.7)	75(84.3)	89(37.7)	0.020
No	43(29.3)	104(70.7)	147(62.3)	
Neonatal birth weight				
<3,999	47(21.7)	170(78.3)	217(91.9)	0.003
≥4,000	10(52.6)	9(47.4)	19(8.1)	

On the basis the variables found to be significant in the bivariate analysis, residence, educational status of women, estimated blood loss during delivery, and mode of delivery were significantly associated with immediate postpartum anemia in multiple logistic regression analysis, too. The women who came from rural areas are 66% less likely to develop postpartum anemia when compared to those who came from urban areas (AOR=0.34 and CI=0.118, 0.998). Mothers who were unable to read and write were 14.4 times more likely to have postpartum anemia when compared to those who had formal education (AOR=14.4 and 95% CI=2.27, 91.14).

Participants delivered by cesarean section had 7.6 times more likely to develop postpartum anemia than those who delivered vaginally. (AOR=7.574 and CI=2.184, 26.267).

Table 4: Bivariate and multiple logistic regression analysis of factors Associated with immediate postpartum anemia in ACSH and Mekelle hospital, Tigray Region, 2017. (N=236)

Variables	Immediate postpartum hemoglobin		P value	Crude OR	Adjusted OR
	Yes (%)	No (%)	<5%	(95% CI)	(95% CI)
Residence					
Rural	21(18.1%)	95(81.9%) 0.05	0.52	(0.279,0.952)	0.34(0.118,0.998)
Urban	36(30%)	84(70%)			
Educational status					
Unable to read and write	16(61.5%)	10(38.5%) 0.005	6.59	(3.456,28.682)	14.4(2.27,91.14)
Above this status	41(19.5%)	169(80.6%)			
Mode of delivery					
Vaginal	28(15.6%)	151(84.4%)			
Cesarean	29(50.9%)	28(49.1%) 0.001	5.585	(2.894,10.780)	7.574(2.184,26.267)

Multiple logistics analysis was undertaken on those variable found to be significantly associated with immediate postpartum anemia. These variables were age, residence, educational, parity, ANC, mode of delivery, episiotomy, and birthweight. Besides the binary significant association, residence, education and mode of delivery were also found to be significantly associated on the logistic analysis: Women from rural areas were 66% less likely to develop postpartum anemia when compared to those who came from urban areas (AOR=0.34 and CI=0.118, 0.998). Mothers who were unable to read and write were 14.4 times more likely to have postpartum anemia when compared to those who have formal education (AOR=14.4 and 95% CI=2.27, 91.14). The mothers who were delivered by cesarean section were 7.6 times more likely to develop postpartum anemia than those who delivered vaginally (AOR=7.574 and CI=2.184, 26.267).

DISCUSSION

This study is a hospital-based study. The prevalence of anemia in the immediate postpartum period was 24.2%. This finding is in line with the study done in the largest university obstetric department in Germany on women delivering between 1993 and 2008 which showed that the prevalence of immediate postpartum anemia was 22%13. also it is in line with studies done in Raleigh, North Carolina in 2002 showed prevalence of 19.1 %[6]. This finding was lower when compared with the study done in Spain which is published in 2016 which showed that the prevalence of postpartum anemia was 49.7%; But this study uses a cut of value of hemoglobin less than 11 g/dl and the study was done for a longer period of time in different ethnic background population that may explain the difference in the prevalence[16].

Area of residence had also significant association with postpartum anemia with mothers who came from rural areas were 66 times less likely to have postpartum anemia than who came from urban areas. The most likely explanation will be those mothers who came from rural areas to deliver in the studied hospitals have ether good medical seeking behavior or have come with a referral because of anticipated risks and probably given more attention during ANC and labor and delivery time.

Educational status of the mothers had also significant association with postpartum anemia with the odds of developing postpartum anemia is 14.4 for mothers who are unable to read and write when compared to mothers who have formal education. The possible explanation for this will be mothers who are unable to read and write have less medical seeking behavior and may not take the iron supplementation properly.

Mode of delivery had also significant association with postpartum anemia with mothers who deliver via cesarean section were 7.6 times more likely to have postpartum anemia than who deliver vaginally. This study is in line with a study done in Spain in 2016 which showed mode of delivery is one of the most important risk factors for postpartum anemia[16].

The results from this study shows that the prevalence of postpartum anemia is high and the prevalence after vaginal delivery was 11.9% which shows there is a significant number of women who have postpartum anemia after vaginal delivery which will be missed with the current protocol that we are using. Further research is recommended to extend the assessment to health centers and community level to ascertain the prevalence and associated factors to the development of postpartum anemia.

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