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Magnitude of Anemia and Associated Factors among Pregnant Women Attending Antenatal Care in Nekemte Health Center, Nekemte, Ethiopia

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Abstract

Background: Anemia is defined as a condition in which there is less than the normal hemoglobin (HB) level in the body, which decreases oxygen-carrying capacity of red blood cells to tissues. Anemia in pregnancy also leads to premature births, low birth weight, fetal impairment and infant deaths. The aim of this study was to determine the magnitude of anemia and associated factors among Pregnant Women Attending Antenatal Care in Nekemte Health Center, Nekemte, Ethiopia.

Methods: A cross-sectional study was conducted among Pregnant Women Attending Antenatal Care in Nekemte Health Center (NHC) between May 20, 2011 and June 25, 2011. A total of 150 pregnant women were selected continently. Blood specimen was collected and processed based on standard operating procedures where hemoglobin level was determined by Cell-Dyn1800. A structured questionnaire was used to collect data on Socio-demographic and associated risk factors. Data were entered and analyzed using SPSS version 20 software. Logistic regressions were applied to assess any association between explanatory factors and outcome variables. P values <0.05 were taken as statistically significant.

Results: The total prevalence of anemia was 52%. Mild, moderate and severe anemia account for 50(64%), 17(21.8%) and 11(14.2%), respectively. Fifty three (68%) of the anemic pregnant women had normocytic normochromic RBCs. Anemia was significantly higher in pregnant women with diarrhea [AOR, 95% CI (5.6(1.7, 17.3), P<0.05] and in those with previous history of malaria [AOR, 95% CI (2.7(1.4, 9.33), P<0.05].

Conclusion: The prevalence of anemia in the study area is significantly high. Regular antenatal care follow up, adjustment of dietary and screening of parasitic infections are recommended to prevent impacts of anemia in pregnant women.

Background

Anemia is defined as a condition in which there is less than the normal hemoglobin (HB) level in the body, which decreases oxygen-carrying capacity of red blood cells to tissues. Anemia could be classified as mild, moderate and severe. It is more common in developing countries because of poor nutritional status and high prevalence parasitic infestation. Anemia is a major factor in women's health, especially reproductive health in developing countries. Severe anemia during pregnancy is an important contributor to maternal mortality [1].

Worldwide, anemia contributes to 20% of all maternal deaths. Anemia in pregnancy also leads to premature births, low birth weight, fetal impairment and infant deaths. The reduction in women's productivity places an economic burden on the families, communities and the societies. All of those showed the necessity of special control program for anemia in vulnerable population [2].

In developing countries, the cause of anemia during pregnancy is multi-factorial and includes nutritional deficiencies of iron, folate, and vitamin B12 and also parasitic diseases, such as malaria and hookworm. The relative contribution of each of these factors to anemia during pregnancy varies greatly by geographical location, season, and dietary practice. In sub-Saharan Africa, iron and folate deficiencies are the most common causes of anemia in pregnant women [3,4].

In Ethiopia anemia is one of the serious health problems among pregnant women. Prevalence rates of 40.5% in the general population and 47.2% in the children were reported from southwest Ethiopia [5]. Higher rates about 57% have also been reported in pregnant women in Jimma [6].

Although there are many studies conducted in Ethiopia that have reported the magnitude of anemia and associated factors among pregnant women, there is paucity of published data in the study area. The present study is, therefore, aimed to determine the prevalence of intestinal helminthes and associated anemia among pregnant women in Nekemte, Ethiopia.

Methods

Study setting and context

A comparative cross-sectional study was conducted in Nekemte Health Center (NHC), Nekemte, Ethiopia, between May 20 and June 25, 2011.

Study population and data collection

One hundred fifty (150) pregnant women (age between 25 and 49 years) were enrolled conveniently. In this study, pregnant mothers who were residents of Nekemte town and the surrounding, not recently transfused, who had no chronic medical diseases, no diagnosed

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haemoglobinopathies, and who had no early bleeding or antepartum hemorrhage were included. Pregnant women were informed about the objective of the study. Then blood specimens were collected from each patient after getting written consent. Structured questionnaire was used to assess independent variables.

Specimen collection and processing

EDTA anticoagulated whole blood was run on CellDyn 1800 to determine hemoglobin level. Anemia was defined based on WHO criteria [7].

Anemia

Hemoglobin level <11 g/dl for pregnant women [7].

Mild anemia

Hemoglobin level between 10-10.9 g/dl for pregnant women [7].

Moderate anemia

Hemoglobin level between 7.0-9.9 g/dl for pregnant women [7].

Severe anemia

Hemoglobin level <7.0 g/dl for pregnant women [7].

Magnitude of anemia

It refers to severity and prevalence of anemia. To study the morphology of red blood cells; thin blood film was made and stained. The Wright stained thin blood film was observed under oil immersion light microscopy. To keep the quality of the data, up-to-date reagents and chemicals were used following the standard operating procedures.

Statistical analysis

The data were cleaned, coded, double entered and analyzed using SPSS software version 20(SPSS INC, Chicago, IL, USA). Binary logistic regression was used to determine the association between anemia and demographic and clinical variables. Multiple logistic regressions were used to control the confounding factors. P values less than 0.05 were taken as statistically significant.

Ethical considerations

The study was conducted after it is ethically reviewed and approved by the Research and Ethical Committee of Wollega University. Then a letter informing Nekemte health center administrators was written and permission was obtained. All the information obtained from the study participants was coded to maintain confidentiality and data was collected after written informed consent signed. The positive results were timely reported to the clinicians for appropriate intervention.

Results

Socio-demographic characteristics of the participants

A total of 150 study participants were enrolled. Majority (41.3%) of the study participants were aged between 15 and 20 years. Eighty seven (58%) of pregnant women live in urban setting and 67 (44.7%) were illiterate (Table 1).

Magnitude of anemia and associated factors

The total prevalence of anemia was 52% (78/150) (Table 1). As summarized in the Table 1, the prevalence of anemia was higher in rural residents (62%). More over anemia showed higher incidence in patients aged 15-20 years old (66.1%) and in literate pregnant women (61.4%).

Variables		Anemia		Total N(%)
		Present N(%)	Absent N(%)	
Age Group (years)	15-20	41(66.1)	21(33.9)	62(41.3)
	21-25	17(48.6)	18(51.4)	35(23.3)
	26-30	12(41.4)	17(58.6)	29(19.3)
	31-35	7(35)	13(65)	20(13.4)
	36-40	1(25)	3(75)	4(2.7)
Residence	Rural	39(62)	24(38)	63(42)
	Urban	39(44.8)	48(53.2)	87(58)
Education	Illiterate	27(40.3)	40(59.7)	67(44.7)
	Literate	51(61.4)	32(38.6)	83(55.3)
Total		78(52)	72(48)	150(100)

Table 1: Socio-demographic characteristics of pregnant women attending antenatal care in NHC from May 20, 2011 to June 25, 2011, Nekemte, Ethiopia (N=150).

Variables		Anemia		COR(95% CI) P		AOR (95%CI) P	
		Present N(%)	Absent N(%)	1			
Trimester	First	23(29.8)	54(70.2)	3.1(0.6, 7.2)	0.31		
	Second	39(81.3)	9(18.7)	0.75(0.23,3.1)	0.08		
	Third	16(51.6)	15(48.4)	3.8(1.3,11.4)	0.002*		
Diarrhea	Yes	51(68)	24(32)	1		5.6(1.7,17.3)	0.021*
	No	27(36)	48(64)	2.0(1.2,5.6)	0.043*	1	
Residence	Rural	39(62)	24(38)	1		1.44(1, 4.8)	0.07
	Urban	39(44.8)	48(53.2)	0.42(0.01,2.11)	0.42	1	
Education	Illiterate	27(40.3)	40(59.7)	1			
	Literate	51(61.4)	32(38.6)	1.6(1.02,7.12)	0.03*		
P. malaria	Yes	37(58.7)	26(41.3)	1		2.7(1.4,9.33)	0.02*
	No	41(47)	46(53)	1			
Age Group	15-20	41(66.1)	21(33.9)	1.5(0.2,3.2)	0.43		
	21-25	17(48.6)	18(51.4)	0.5(0.1,3.1)	0.8		
	26-30	12(41.4)	17(58.6)	0.7(0.01,1.17)	0.35		
	31-35	7(35)	13(65)	0.12(0.03,1.11)	0.89		
	36-40	1(25)	3(75)				

*Significant at P value <0.05, AOR= adjusted odds ratio, COR: Crude Odds Ratio, P: P value, IPs: Intestinal Parasites, Education: Educational Status, p. malaria: previous history of malaria

Table 2: Association of risk factors with anemia among pregnant women attending antenatal care in NHC from May 20, 2011 to June 25, 2011, Nekemte, Ethiopia (N=150).

When anemia was characterized by severity; mild, moderate and severe anemia account for 50(64%), 17(21.8%) and 11(14.2%), respectively. RBC morphology showed that 53 (68%) of the anemic pregnant women had normocytic normochromic RBCs where the rest RBCs showed microcytic hypochromic morphology.

Majority of the pregnant women (51.3%) were on their first trimester of which 23 (29.8%) were anemic. Diarrhoea was seen in 75 (50%) of the pregnant women and 51(68%) of them were anemic. Sixty three (42%) of the study participants had previous history of malaria infection and 37(58.7) of them were anemic (Table 2).

In binary logistic regression; trimester, educational status and age group did not show any significant association with anemia; but presence of diarrhoea [COR, 95% CI (3.8 (1.3, 11.4), P<0.05], residence [COR, 95% CI (2.0 (1.2, 5.6), P<0.05] and previous history of malaria [COR, 95% CI (1.6(1.02, 7.12), P<0.05] showed significant association with anemia (Table 2).

After adjusted with multinomial logistic regression analysis; presence of diarrhoea [AOR, 95% CI (5.6(1.7, 17.3), P<0.05] and previous history of malaria [AOR, 95% CI (2.7(1.4, 9.33), P<0.05] were independent predictors of anemia in pregnant women (Table 2). Therefore diarrheic pregnant women and those with previous history of malaria had 5.6 and 2.7 time likelihood of being anemic than their counterparts.

Discussion

The World Health Organization (WHO) estimates that the highest proportion of individuals affected by anemia are in Africa and that in Ethiopia anemia is a severe problem for both pregnant and non-pregnant women of childbearing age [8].

The prevalence of anemia in this study area is 52% (78/150). This result is much higher than across sectional study carried out in Gondar (23%), in the University of Port Harcourt Teaching Hospital, Port Harcourt in Nigeria which had shown a prevalence rate of 23.2% and in Thailand showed a prevalence rate of 14.1% [9-11]. This may be due to a difference in socio-economic and educational status between the study populations in the two study areas. The result of the present study is consistent with a study done in Jimma (57%) and Peru (50%) [12,13].

The prevalence of anemia in this study is lower than a study done in Northern Ethiopia (62.7%), India (92.38%) and highlands of Tibet (China) (70%) a [14-16]. This might be due to differences in sample size, geographic area and diarrhea status. Other similar studies conducted in east Anatonian province; Turkey, the highlands of Tanzania and in rural areas of Kenya had shown prevalence of 27.1%, 28% and 33% respectively [17-19].

Anemia in pregnancy is related to different socio-demographic factors [20]. In different studies, age, educational status, economic position have been found to be significantly associated with anemia during pregnancy [21,22]. This study assessed socio-demographic variables associated with anemia but no socio-demographic variables had shown statistically significant association with anemia which is in contrast with studies from Jimma [12] which showed a statistical significant association between education. The difference might be due to high percentage of literacy in the current study.

Out of all anemic pregnant mothers; mild, moderate and severe anemia account for 50(64%), 17(21.8%) and 11(14.2%), respectively. This result is somewhat lower than a study conducted in in Jimma and Kenya where moderate anemia accounted for 74.3% and 68%, respectively [12,17]. This inconsistency may be because of the strengthened health education given on risk factors and prevention of anemia and interventions given at health institutions during ANC follow up in an attempt to reduce the prevalence and severity of anemia among pregnant mothers. In addition, it might because of time and place difference between the present study and the study conducted in Kenya and in Jima.

Fifty three (68%) of the anemic pregnant women had normocytic normochromic RBCs where the rest RBCs showed microcytic hypochromic morphology. In the present study anemia was significantly higher and associated with diarrhoea [AOR, 95% CI (5.6(1.7, 17.3), P<0.05] and previous history of malaria [AOR, 95% CI (2.7(1.4, 9.33), P<0.05] which is partially similar with a study done in Benin where multivariate logistic regression showed that malaria infection; second trimester of gestation and vitamin B12 deficiencies were associated with a higher risk of anemia [23].

Conclusion

The prevalence of anemia in the study area is significantly high. Mild anemia was also significantly high. Normocytic normochromic and microcytic hypochromic anemia were identified to be high. diarrhoea and previous history of malaria significantly increased anemia in pregnant women. Regular antenatal care follow up, adjustment of dietary and screening of parasitic infections are recommended to prevent impacts of anemia in pregnant women.

Competing interests

All authors declare that they have no conflict of interest associated with the publication of this manuscript.

Authors' contributions

Conceived and designed the experiments: MF, AM, BW, CB, DG, GS, MK. Performed the experiments: MF, AM, BW, CB, DG, GS, MK. Analyzed the data: MF, AM, BW, CB, DG, GS, MK and HM. Contributed reagents/materials/analysis tools: MF, AM, BW, CB, DG, GS, MK. Wrote the paper: MF, AM, BW, CB, DG, GS, MK. Assisted with design, analysis, and interpretation of data: HM. Critical review of the manuscript: HM. Read and approved the final manuscript: MF, AM, BW, CB, DG, GS, MK, HM. Critical appraisal of the manuscript: MF, AM, BW, CB, DG, GS, MK.

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