

Background

- Anemia in pregnancy, defined as having a hemoglobin level less than 11 g/dL, is one of the many adverse health conditions that affect women in both developed and developing countries (WHO, 2006).
- Anemia through pregnancy is highly correlated with poor birth outcomes, especially low birth weight (LBW).
- The prevalence of anemia among pregnant women is reported to be 48% in Nepal (DHS 2011).
- Measuring the severity of anemia among pregnant women helps monitor health status and can contribute to a reduction in maternal morbidity and mortality.
- Also, an assessment of factors predisposing pregnant women to anemia helps enable policy makers implement targeted intervention activities.

Objectives and Methods

The objectives of this analysis were to:

- To examine the anemia status of pregnant women enrolled in a longitudinal birth cohort
- To understand the factors potentially associated with anemia

All currently enrolled pregnant women from 17 VDCs in Banke were included in this study (n=1638).

A HemoCue® Hb 301 System was used to screen capillary blood samples for anemia. A cut-off of less than 11 g/dL was used to define anemia in pregnant women. Questionnaires were also administered to obtain demographic information.

Descriptive statistics and bivariate correlation analysis were conducted. Multivariate logistic regression analyses were conducted with appropriate interaction terms and test for goodness of fit of the final model (Lemeshow-Hosmer Goodness of Fit). All analyses were conducted with Stata® SE version 14.



Picture 1 and 2: Study nurses measuring maternal hemoglobin levels

Results

Figure 1. Maternal anemia prevalence

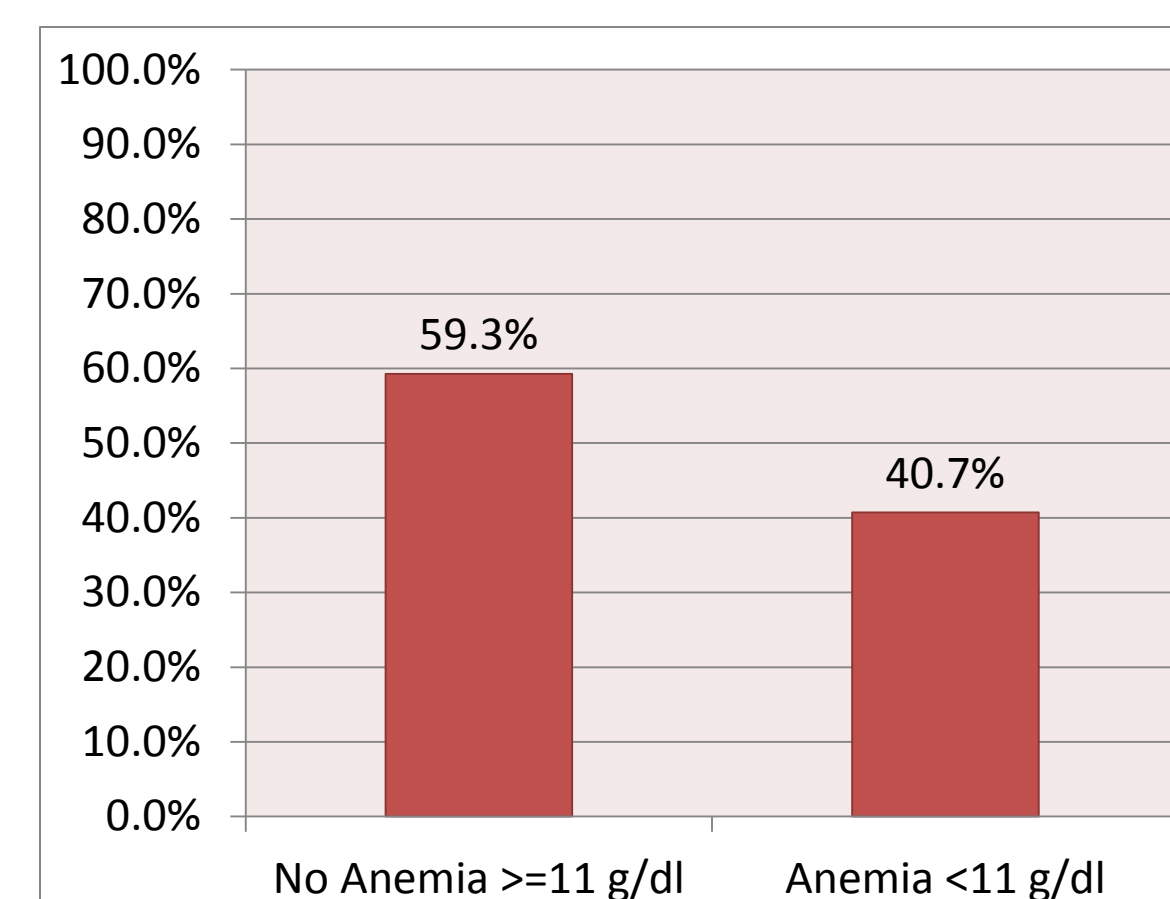


Figure 2. Maternal anemia level

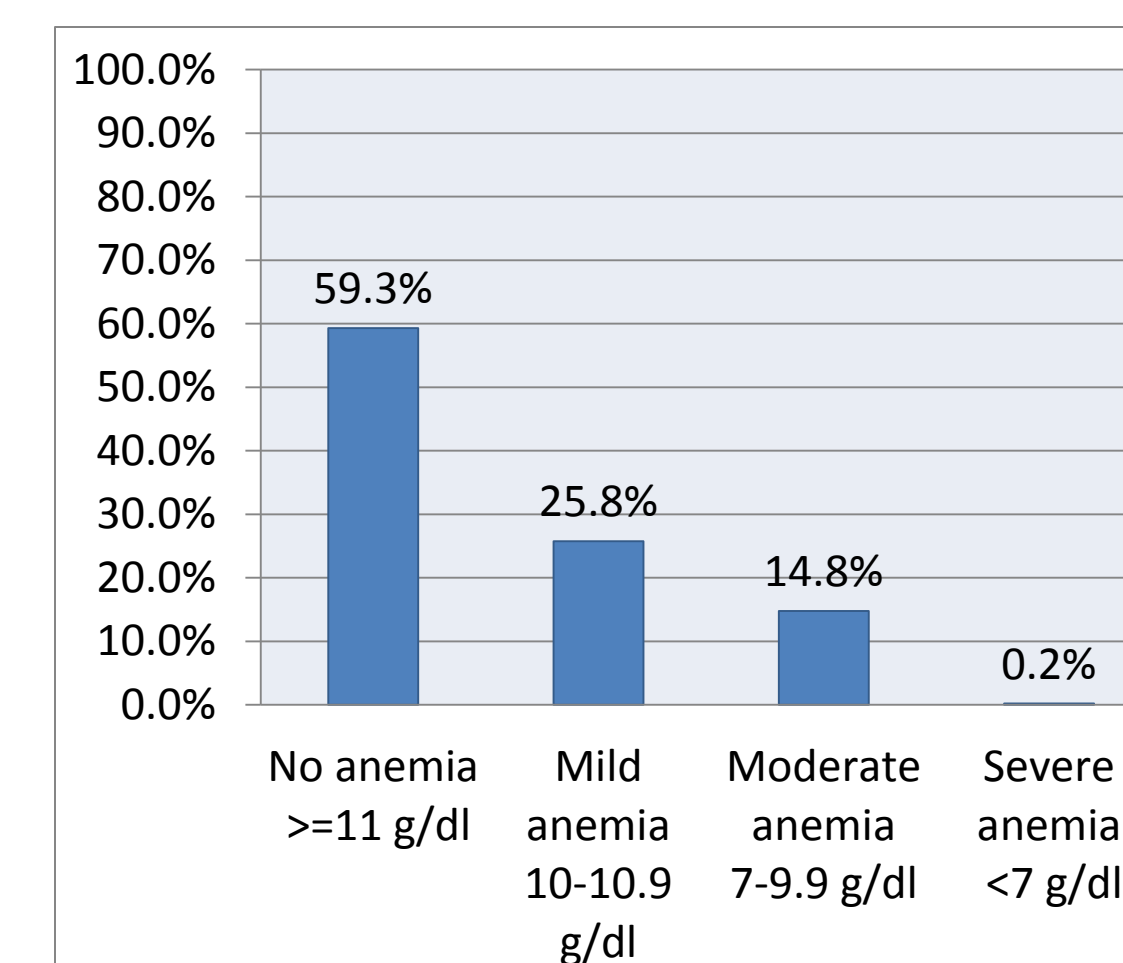


Table 1: Descriptive statistics and linear regression output of determinants of hemoglobin levels during pregnancy

	n	%	β	95% CI		p-value
Age			REF			
<20	343	21%				
20-24	624	38%	0.00	-0.18	0.18	
25-29	468	29%	0.02	-0.20	0.24	
30-34	135	8%	-0.32	-0.61	-0.03	*
35-39	68	4%	-0.30	-0.66	0.06	
Education			REF			
None	602	37%				
Primary	369	23%	0.14	-0.03	0.31	
Secondary	523	32%	0.20	0.02	0.38	*
More than secondary	144	9%	0.08	-0.19	0.35	
Trimester			REF			
First	366	22%				
Second	1096	67%	-0.56	-0.75	-0.37	***
Third	176	11%	-0.48	-0.75	-0.21	***
Iron pills (bought or given)			REF			
No	619	38%				
Yes	1019	62%	0.23	0.01	0.45	*
Received drugs for intestinal worms			REF			
No	611	37%				
Yes	1027	63%	0.04	-0.18	0.26	
ANC visit			REF			
No	468	29%				
Yes	1170	71%	-0.35	-0.59	-0.11	**
MUAC (cm)			REF			
Normal	1094	67%				
Low	544	33%	-0.19	-0.32	-0.06	**
First pregnancy			REF			
No	1084	66%				
Yes	554	34%	0.07	-0.09	0.23	
Improved water source			REF			
No	53	3%				
Yes	1585	97%	0.36	0.02	0.71	*
HFIAS category			REF			
Food secure	1152	70%				
Mildly food insecure	280	17%	0.12	-0.04	0.29	
Moderately food insecure	167	10%	-0.11	-0.32	0.10	
Severely food insecure	39	2%	-0.14	-0.54	0.27	
Minimum Dietary Diversity			REF			
No	933	57%				
Yes	705	43%	0.20	0.07	0.33	*

Sources: TPI data; Significance: * p<0.05, ** p<0.01, *** p<0.001; Contrast/reference category denoted REF

Key Findings

- Mean hemoglobin was 11.2+/-1.3 g/dL, and anemia prevalence was 40%.
- Women between 30-34 years had significantly lower hemoglobin levels compared to women under 20 years.
- Women with secondary school education had significantly higher hemoglobin (p=0.031) than those women with no education.
- Hemoglobin levels were significantly lower in the second (p=0.0000) and third trimester (p=0.0000).
- Having access to any iron supplement was associated with higher hemoglobin (p=0.043) while attending antenatal clinic was associated with lower hemoglobin (p=0.005) as was a low MUAC (p=0.005).
- Women in households with an improved water source and having achieved minimum dietary diversity had significantly higher hemoglobin levels (p=0.040 and p=0.003 respectively).

Conclusions

- Anemia prevalence was high in pregnant women recruited for a longitudinal study in Banke, Nepal.
- Multivariate analyses show factors such as improved water source, achieving minimum dietary diversity, use of iron supplements and education positively associated with serum hemoglobin while increasing age, attending antenatal clinic, low MUAC were negatively associated.
- Women who had ANC visits were more likely to be anemic, possibly a function of health seeking behavior by those who are anemic.
- We find no other individual or household factors associated with the prevalence of anemia implying a condition that is pervasive across all the women in the sample.
- The authors found no other individual or household factors associated with the prevalence of anemia implying a condition that is pervasive across all the women in the sample.



Figure 3: Interview with mother on Dietary Diversity

Acknowledgements

Funding sources: Support for this research was provided by the Feed the Future Innovation Lab for Nutrition, which is funded by the United States Agency for International Development under grant ID: AID-OAA-L-1-00006. The opinions expressed herein are solely those of the authors.

The authors would like to express special gratitude to the Nutrition Innovation Lab team and the study participants, without whom this research would not have been possible.

For further information contact johanna.andrews@tufts.edu

References

- World Health Organization Iron and folate supplementation: Integrated management of pregnancy and childbirth. 2006. Available from: www.who.int/entity/making_pregnancy_safer/publications/StandardsI.8N.pdf.
- Nepal Demographic and Health Survey (DHS) 2011.