Factors associated with anemia in pregnant women in Banke, Nepal


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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.

Results

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

<table>
<thead>
<tr>
<th>Age</th>
<th>n</th>
<th>%</th>
<th>β</th>
<th>95% CI</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>343</td>
<td>21%</td>
<td>REF</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20-24</td>
<td>624</td>
<td>38%</td>
<td>0.00</td>
<td>-0.18</td>
<td>0.18</td>
</tr>
<tr>
<td>25-29</td>
<td>468</td>
<td>29%</td>
<td>0.02</td>
<td>-0.20</td>
<td>0.24</td>
</tr>
<tr>
<td>30-34</td>
<td>135</td>
<td>8%</td>
<td>-0.32</td>
<td>-0.61</td>
<td>-0.03</td>
</tr>
<tr>
<td>35-39</td>
<td>68</td>
<td>4%</td>
<td>-0.30</td>
<td>-0.66</td>
<td>0.06</td>
</tr>
</tbody>
</table>

Education

None | 602 | 37% | REF |        |         |
Primary | 369 | 23% | 0.14 | -0.03  | 0.31    |
Secondary | 533 | 32% | 0.02 | 0.02   | 0.38    | +       |
Tertiary | 144 | 9%  | 0.08 | -0.19  | 0.31    |

Fruit and vegetable intake (amount given)

No | 619 | 38% | REF |        |         |
Yes | 1019 | 62% | 0.23 | 0.01   | 0.45    | +       |

Achieved minimum dietary diversity

No | 611 | 37% | REF |        |         |
Yes | 1037 | 63% | 0.04 | -0.18  | 0.24    |

ANC visit

No | 48 | 29% | REF | -0.35  | -0.59  | -0.11  | ++      |
Yes | 1170 | 71% |          |

MUAC (cm)

Normal | 544 | 33% | REF | -0.19  | -0.32  | -0.06  | ++      |
Low | 1094 | 67% |          |

First pregnancy

No | 1084 | 66% | REF | -0.07  | -0.09  | 0.22    |
Yes | 154 | 34% |          |

Improved water source

No | 53  | 3%  | REF | 0.36   | 0.01   | 0.71    | +       |
Yes | 1585 | 97% |          |

BMI

Normal | 1152 | 70% | REF |        |         |
Underweight | 280 | 17% | 0.12 | -0.04  | 0.29    |
Moderate weight | 167 | 10% | -0.11 | -0.32  | 0.10    |
Overweight | 39 | 2%  | -0.14 | -0.54  | 0.27    |

Minimum Dietary Diversity

No | 933 | 57% | REF |        |         |
Yes | 705 | 43% | 0.10 | 0.07   | 0.31    | +       |

Accepted iron supplements ever

No | 619 | 38% | REF |        |         |
Yes | 1019 | 62% | 0.23 | 0.01   | 0.45    | +       |

Interview with mother on dietary diversity

No | 611 | 37% | REF |        |         |
Yes | 1037 | 63% | 0.04 | -0.18  | 0.24    |

The prevalence of anemia among pregnant women was found to be 59.3%, with 29.0% having moderate anemia, 14.8% having severe anemia, and 5.2% having severe anemia.

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 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 1: Maternal anemia prevalence

Figure 2: Maternal anemia level

Figure 3: Interview with mother on Dietary Diversity

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References

2. Nepal Demographic and Health Survey (DHS) 2011.