Original Article

Anaemia in Pregnancy among Pregnant Women in Lusaka District, Zambia

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ABSTRACT

Objectives: This study investigated the problem of anaemia in pregnancy and its associated factors.

Methods: The study involved 216 women booking for antenatal care between September 2015 and January 2016. A structured questionnaire was administered to all eligible women to determine their socio demographic and economic status, reproductive factors, health seeking behaviour and clinical state. Blood for a full blood count was collected. Women found with anaemia were immediately referred to their clinicians for further management.

Data was analysed using SPSS software. Inferential analyses were conducted using Chi square and T-test. For the historical independent variables with a known significant association with anaemia, a stepwise backward logistic regression was done.

Results: Out of 216 women enrolled in the study, Seventy nine (36.2%) were found to be anaemic. The mean haemoglobin was 11.2g/dl. Thirty six women (45.6%) had mild anaemia, forty one (51.9%) had moderate anaemia while two (2.5%) had severe anaemia.

In univariate analysis lower family income and lower intake of vegetables were statistically significant with p values of 0.020 and 0.023 respectively.

After adjusting for confounders, HIV infection remained significant with HIV positive women being 2.7 times more likely to have anaemia (OR 2.7, CI 1.06-6.70)

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Conclusion: Anaemia remains a public health problem among pregnant women in Zambia**.** Risk factors include HIV infection, Low intake of vegetables and low family income.

Recommendations: Women need continued education on importance of vegetable intake during pregnancy and involvement in legal income generating activities to boost family income. Women of reproductive age under HIV care need continuous education on anaemia prevention in pregnancy.

INTRODUCTION

Anaemia in pregnancy continues to be a threat to the lives of many pregnant women and their unborn children, a global public health problem affecting people from different parts of the world. World health Organization defines anaemia in pregnancy as haemoglobin level of <11g/dl. Because of the physiology of pregnancy, a small drop in haemoglobin is acceptable with the greatest hemodilution occurring during the late second to early third trimester, typically measured at 28 to 36 weeks

Prevention is clearly of critical importance, yet current coverage with antimalarial interventions and micronutrient supplementation is poor in many African countries. Ideally severe anaemia could be prevented and pregnancy outcomes improved with nutritional supplementation and infection control measures. The global prevalence is estimated to be 38.2%, affecting a staggering 32.4 million pregnant women. More than 50% of these women live in Africa. The prevalence of anaemia as a public health problem is categorised as follows: < 5% no public health problem, 5-19.9% mild , 20-39.9% moderate and > 40% severe public health problem. Zambia's

prevalence is estimated to be at 46.9% making anaemia in pregnancy a severe public health problem in the country.

This study is critical as countries under the United Nations reach out for the attainment of sustainable development goals (SDGs), on universal health coverage. Globally, iron deficiency is the most significant contributor to the onset of anaemia, contributing over 77490 maternal deaths, which translates to 27% of indirect maternal deaths. WHO rates iron deficiency anaemia (IDA) to be among the most important contributing factors to the global burden of disease. Maternal consequences of IDA include preterm delivery, perinatal mortality, and postpartum depression. Fetal and neonatal consequences include low birth weight and poor mental/ psychomotor performance. The recently released 2013/2014 Zambia Demographic Health Survey (ZDHS) has not captured how many pregnant women are anaemic.

METHODS

This was a cross-sectional study involving 216 pregnant women attending antenatal clinic at selected clinics in Lusaka district between September 2015 and January 2016. Systematic sampling was used to recruit women from the University Teaching Hospital, Chelston, Kanyama, Kabwata and Kalingalinga antenatal clinics. These clinics were selected based on their ability to do a full blood count at the time of submitting this proposal**.** The study population comprised of pregnant women booking for antenatal care at the study sites, who met the eligibility criteria.

Data was collected through an interviewer administered questionnaire. The data has been presented into frequencies, cross tabulations and diagrams as necessary. A descriptive analysis including measures of central tendency like the mean, measures of variability like standard deviation, range and bivariate analysis was done. Inferential analysis was carried out using chi square to study association between categorical variables while the T-test was used for continuous variables.

P value of < 0.05 at 95% confidence interval was considered statistically significant

A backward stepwise logistic regression was done to adjust for confounders. Historical factors known to have a significant association with anaemia in pregnancy, whose p values were at least 0.2 were included in the model. These included of vegetable intake, meat intake, fruit intake, income, residential, gestation age at booking, interdelivery time and HIV status.

RESULTS

The mean age for the women was 25.85 with a standard deviation of 5.988 years. Forty seven (21.8%) were single, one hundred and sixty nine (78.2%) were married. Four women (1.9%) had completely no education, fifty seven (26.4%) had primary education with one hundred and eighteen (54.6%) and thirty seven (17.1%) attaining secondary and tertiary education respectively. One hundred and fifty three (70.8%) were unemployed and sixty three (29.2) were either in employment or doing some form of business.

Overall prevalence of anaemia was found to be 36.6%. The mean haemoglobin was 11.2g/dl. Thirty six women (45.6%) had mild anaemia, forty one (51.9%) had moderate anaemia while two (2.5%) had severe anaemia. Twenty seven women (34.2%) had microcytic anaemia, Fifty two (65.8%) had normocytic anaemia and fifty three (67.1%) had hypochromic anaemia.

Table 1: Overall Prevalence of Anaemia and Characteristics

Variable	Number	Percentage (%)
Prevalence of anaemia		
Anaemia>11g/dl	79	36.6
No anaemia< 11g/dl	137	63.4
Severity of Anaemia		
Mild 10.9g/dl-10.0g/dl	36	45.6
Moderate 9.9g/dl-7.1g/dl	41	51.9
Severe< 7g/dl	2	2.5
Aetiological type (MCV)		
Normocytic (80-90fl)	52	65.8
Microcytic<80fl	27	34.2
MCH		
Normocytic (28-33fl)	26	32.9
Hypochromic<28fl	53	67.1

Women, who consumed green leafy vegetables more often and those with a higher income,were less likely to have anaemia with p values of 0.023 and 0.020 respectively. There was no significant difference on meat and fruit intake (Table 2)

Table 2: Anaemia in relation to nutrition and economic Status

Variable	Presence of Anaemia	number	Mean	SD	P
Days consumed meat past week	No	137	3.2	2.0	0.856
	Yes	79	3.2	2.1	
Days consumed fruit past week	No	137	5.4	2.4	0.162
	Yes	79	5.0	2.5	
Days consumed vegetables past week	No	137	6.3	1.6	0.023*
	Yes	77	5.7	1.9	
Income (Zmw)	No	127	2944.9	3452.9	0.020*
	Yes	77	1926.2	2112.6	

Socio demographic characteristics

Anaemia was found to be more prevalent in women older than 35years. I found that 8 (8.9%) had anaemia and 8 (5.3 %) were not anaemic. Comparatively for the younger women, those less than 20 years, 21 (15.3%) had no anaemia and 11(13.9%) had anaemia, for age group between 20 and 35 years, 108 (78.8%) had no anaemia and 61 (77.2 %) had anaemia. Statistical analysis ruled out age being a factor in predicting anaemia, however there was a trend towards older women being more anaemic. Women coming from low density areas were less likely to have anaemia, of this population, 36 (26%) had no anaemia whereas women coming from high density were more likely to have anaemia 56 (40.9%) vs. 45 (57.0). However this was not statistically significant, P value 0.062.

Marriage was not a factor in determining anaemia in pregnancy as the 2 groups were similar, p value 0.948. Of the single women 30(21.9%) had no anaemia, 17 (21.5%) had anaemia. For married women 107 (87.1) had anaemia 62(78.5%) had anaemia. Level of education had no impact on the presence of anaemia.

Infectious causes

In this study, 10 women gave a history of having been treated for malaria and 6.3% had anaemia and 3.7% had no anaemia, however there was no statistical significance. A weak association was found between HIV infection and anaemia, 9.6% of the HIV positive were not anaemic, and 17.7% were anaemic, p value=0.085

Obstetric Factors

Eighty one (37.5%) were primigravidas, one hundred and thirty five were multigravida (62.5%); the mean parity was 2.37 with a standard deviation of 1.5.Majority of our clients booked in the third trimester.

These characteristics are summarised in table 3 below.

Table 3: Obstetric Characteristics

Variable	No Anaemia number (%)	Anaemia number (%)	P value
Gravida			0.546
o Prime gravida	48 (35.0)	33 (41.8)	
o Multigravida	81 (65.0)	43 (54.4)	
o Grand multiparity	8 (5.8)	3 (3.8)	
Inter delivery time			0.167
o < 36 months	44 (49.4)	17 (37.0)	
o >36 months	45 (50.6)	29 (63.0)	
Gestation age			0.21
o 1st Trimester	15 (10.9)	5 (6.3)	
o 2nd Trimester	114 (83.2)	65 (82.3)	
o 3rd Trimester	8 (5.8)	9 (11.4)	
Family planning			0.398
o Yes	68 (49.6)	34(46.3)	
o No	69 (50.4)	44 (56.4)	

Using backward stepwise regression, HIV positivity remained a significant factor; HIV positive women were 2.7 times likely to have anaemia (CI= 1.02-6.7, p= 0.037).

Table 4: Step 6 (Final) of Logistic Regression

Variable	Odds ratio	P value	95% conf. interval
Residence (Density)			
o Medium	0.56	0.241	0.24-1.42
o Low	0.42	0.060	0.15-1.04
Interdelivery >36	1.94	1.832	0.85-3.91
HIV Positive	**2.69**	**0.037**	**1.06-6.70**

DISCUSSION

Introduction

This study has revealed that low intake of vegetables and low socioeconomic statuses are significant contributors to anaemia in pregnancy. HIV positive women are 2.7 times more likely to have anaemia; High parity has shown a tendency towards anaemia. The findings of this study shows improvement in some independent variables compared to most research findings and hypothesis, which could be attributed to overall improvement of healthcare in the population studied.

Prevalence of anaemia

The findings of this study shows that anaemia continues to be a problem among pregnant women, though there is an improvement from severe to a moderate public health problem, which could be attributed to overall improvement of healthcare in the population studied. The population studied was urban based which could mean easier access to health care facilities. There are also a number of health messages and strategies developed by the government and cooperating partners aimed at improving maternal and child health e.g. micronutrient supplementation and the use of traditional birth attendants to sensitise and encourage women to attend ante natal clinics and give birth from health facilities, a key strategy to engage these community attendants who otherwise would be conducting deliveries in homes.

Factors associated with anaemia in pregnancy

Iron deficiency anaemia

This study found that 35% of the women had microcytic anaemia and 65% had normocytic anaemia. A study conducted at the University Teaching Hospital in Lusaka, Zambia, on the aetiology of anaemia in pregnancy, showed that of all the women with anaemia, 84.2% had microcytic anaemia.

This study found that there was no association between anaemia and frequency of consumption of meat and meat products. This could be explained by the fact that the population studied was urban based and both anaemic and non-anaemic participants had a similar intake of meat and meat products rich in haem iron. The mean frequency of consumption of meat in the anaemic and non-anaemic groups was exactly the same with a mean of 3.2 days in a week.

Other Nutritional deficiencies

Frequency of consumption of fruits also showed no significant association with anaemia in pregnancy p value > 0.05. Monsen (1988) found that consumption of fruit two or more times per week was associated with a decreased risk of anaemia. Given the fact that a large percentage of iron in these diets is from non heme sources, the decreased risk may be attributed to the presence of vitamin C, which is known to enhance the absorption of non haeme iron.

There was a significant association between frequency of consumption of vegetables and presence of anaemia, similar to the case control study done by Chipaya in Lusaka urban district. During univariate analysis, consumption of vegetables was a statistically significant factor for developing anaemia. Nutritional recommendations for improving the outcome of pregnancy emphasize the importance of ensuring that women are in good nutritional status prior to conception.

Maternal age

This study found a weak association between anaemia in pregnancy and maternal age. The women who were older than 35 years were more likely to have anaemia.

Other studies have found different age groups to have more anaemia. Kaur found the highest prevalence of anaemia, among women less than 30 years of age. Older women are more predisposed to anaemia as most times they are of higher parity and are more prone to pregnancy related complications.

Socio economic status

This study considered employment status of the woman, her spouse, whether or not the woman is doing some income generating activities (Business) and overall family income to assess the socio economic status.

There was no significant association and employment status of either spouse with presence of anaemia. This is not a unique result as very few women were in employment. Besides the few who were employed could have had long working hours with a very low income. Hence being in employment did not necessarily translate into a good social economic status.

The findings of this study revealed that the low income group comprised a significantly higher proportion of women with anaemia. A good social economic status gives family a chance to have balanced diet, easier access to health facilities and make healthier choices generally.

Education was not a factor in this study because most women had some education, except for about 2% who completely had no education. Marriage was not a factor.

Infectious causes

HIV infection was statistically significant after logistic regression. HIV positive women were 2.7 times more likely to have anaemia. A study done in Enugu, Nigeria showed an increase in prevalence of malaria among pregnant women living with HIV and AIDS, explained by the finding that HIV infection is associated with lower serum folate and serum ferritin in pregnancy .

The findings of this study on malaria should be taken with caution as malaria in Lusaka district has been said to have been eradicated. The diagnosis of malaria was based on the patient's report with no accompanying laboratory result for confirmation. This on its own has the potential to dilute the result. The other explanation is that the women, who were asymptomatic for malaria, were not captured as we relied on only those that were symptomatic and treated for malaria.

Reproductive characteristics

Gravidity/ parity

Gravidity was an important variable in this study, with a trend towards more prime gravidas having anaemia than the multigravida. This is similar to Chipaya who found no significant association between anaemia in pregnancy and high parity. The findings of this study have been interpreted in such a way that the study participants are of low parity with a mean parity of 2, hence protected from risk factors that predispose high parity women to anaemia.

Gestation age (Trimester) at booking

The risk of developing anaemia increases with the age of pregnancy (trimester). This risk was higher in third trimester when compared with those in the first and second trimesters. This finding is consistent with studies done in Saudi Arabia and India.

The p value of > 0.05 in this study could be explained by the fact that there were very few women booking for antenatal in the third trimester.

CONCLUSION

Anaemia remains a public health problem in Lusaka with about a third of the pregnant women being

anaemic, despite the results showing a reduction from 46.9% to 36.6%. In univariate analysis low socioeconomic status and poor intake of vegetables were significantly associated with anaemia, after adjusting for confounders; only HIV infection had a significant association.

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