

Anaemia in Expectant Mothers Presenting at Mabvuku Polyclinic Zimbabwe

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Abstract: Anaemia is associated with adverse pregnancy outcomes including maternal mortality, preterm delivery and low birth weight and is most prevalent in developing countries. The burden of anemia in pregnancy still remains poorly estimated and is a major concern in endemic countries including Zimbabwe. The general objective of the current study was to ascertain the magnitude of the anaemia in pregnant women attending Mabvuku Polyclinic from June 2017 to August 2017. The study was a cross-sectional design and conducted at Beatrice Road Infectious Diseases Hospital (BRIDH) laboratory which processes antenatal samples from Mabvuku Polyclinic. Of 249 expectant mothers included in the study, it was found that 72 (28.9%) were anaemic. Severe anaemia (Hb <7g/dl) occurred in 9 (3.61%), moderate anaemia (Hb 7 - 9.9 g/dl) in 36 (14.6%) and mild anaemia (Hb 10 - 10.9g/dl) in 27 (10.8%) of the presenting expectant mothers. The most common type of anaemia was microcytic hypochromic anaemia (32.1%). There was no significant difference in prevalence of anaemia by age-group or gravidity status among the expectant mothers. It was concluded that there was a high prevalence of anaemia in pregnancy affecting nearly one in every three expectant mothers presenting for antenatal care at Mabvuku Polyclinic. Targeted preventive measures are recommended for all expectant mothers such as prophylactic iron and vitamin supplementation.

Keywords: Anaemia, Pregnancy, Prevalence, Severity, Gravida

1. Introduction

The World Health Organisation [1] describes anaemia as a condition in which the number of red blood cells or their oxygen carrying capacity is insufficient to meet physiologic needs which vary by age, sex, altitude and pregnancy status. Anaemia in its severe form is associated with fatigue, tachycardia, and drowsiness. Pregnant women and children are particularly at higher risk.

Clinically, anaemia is any haemoglobin (Hb) level of less than 10.5 g/dL, regardless of age; however, the WHO [1] recommends maintaining an Hb level greater than or equal to 11.0 g/dL during pregnancy. According to WHO [1] anaemia can further be classified into mild anaemia (10-10.9g/dL), moderate anaemia (7.0-9.9g/dL) and severe anaemia (<7.0g/dL).

According to Van den Broek [2] anaemia is considered a major public health problem because of its association with

the extreme pregnancy outcomes, such as increased rates of maternal and perinatal mortality, preterm delivery and low birth weight (LBW). Anaemia tends to aggravate the sequence of postpartum haemorrhage and susceptible to puerperal infection of which both are the leading causes of maternal morbidity and mortality in developing countries. The prevalence of anaemia in pregnancy is of special concern in Zimbabwe, where 34.2% of all pregnant women were anaemic in 2011 [3]. There are many types of anaemia, each with its own specific cause. Harris [4] says anaemia can be either acute or chronic depending on the type of anaemia. The types of anaemias are classified according to their morphology;

a) Red cell size - The size of the red blood cell determines the type of the anaemia. Normocytic anaemia is characterised by red blood cells that are normal in size. Macrocytic anaemia is characterised by larger than normal red blood cells, and microcytic anaemia, is characterised by smaller than normal red blood cells.

b) Red blood cell colour - This reveals the levels of haemoglobin in the red blood cells. Normochromic anaemia is anaemia in which red blood cells are normal in colour, while hypochromic anaemia, is anaemia characterised by red blood cells that are pale.

c) Red blood cells shape - There are certain anaemias which are characterised by the shape of the red blood cells, for example sickle shaped cells which are characteristic for sickle cell anaemia. [4]

The most common type of anaemia is microcytic hypochromic anaemia. Microcytic anaemia is denoted by a mean cell volume (MCV) of less than 77% and hypochromic anaemia is denoted by a mean corpuscular haemoglobin concentration (MCHC) with of less than 31%, according to standards set by the Sysmex XT-400i machine. Iron deficiency anaemia (IDA) is the most common type of microcytic hypochromic anaemia. Iron deficiency anaemia is categorised by smaller than normal red blood cells, with low levels of haemoglobin, usually with a lower than normal MCV. [4]

Anaemia is considered as one of the most prevalent nutritional deficiency problems affecting pregnant women. Both the mother and foetus are at risk of facing anaemia mostly because pregnant women have to provide both nutrients and oxygen to the foetus hence the pregnant woman will require more nutrients, to ensure both the pregnant woman and foetus receive adequate nutrients for example iron to ensure red blood cells are being produced. [5]

Signs and symptoms include; fatigue, lower leg cramps, tachycardia, shortness of breath, pale skin, headaches, and brittle nails.

WHO estimated that 58.27 million pregnant women worldwide are anaemic, of which 95.7% reside in developing countries. In 2011, it was recorded that 34.2% of all pregnant women in Zimbabwe were anaemic [3]. According to Oliver [6] despite the fact that the severity of the anaemia differs from mild, moderate to severe anaemia the effects of anaemia in pregnant women include preterm child birth, low birth weight for the infant, and placenta abruption (a complication in pregnancy, where the placenta lining separates from the uterus of the mother prior to delivery.). Placenta abruption deprives the foetus of oxygen and nutrients and causes heavy bleeding within the pregnant woman. [6]

Currently there are very few studies done on anaemia in pregnant women in Zimbabwe hence there are gaps in knowledge of the magnitude and extent of anaemia in Zimbabwe. Due to this gap in the statistics, we do not know the true severity of anaemia in pregnant women. Anaemia is one of the most widespread public issues especially in high density residential areas such as Mabvuku, Harare, Zimbabwe. This has essential health, welfare, social and economic consequences; impaired cognitive development, reduced physical work capacity, and in severe cases, increased risk of mortality. Given the potential magnitude of this problem, greater efforts need to be put in place to determine the actual dominance of anaemia. The general objective of the present study was to ascertain the magnitude

of anaemia in pregnant women at Mabvuku Polyclinic.

2. Materials and Methods

2.1. Study Area and Population

The study was conducted at Beatrice Road Infectious Diseases Hospital (BRIDH) laboratory which processes samples from the ante-natal clinic housed under Mabvuku polyclinic. The study population comprised of pregnant women at the reproductive age of 15 to 49 years [1] inclusive attending antenatal clinic at Mabvuku Polyclinic.

2.2. Study Design

The study was a cross-sectional design and conducted from June 2017 to August 2017.

2.2.1. Inclusion Criteria

Laboratory records of patients who were pregnant and had a full blood count test done from June to August 2017.

2.2.2. Exclusion Criteria

Women with missing data on their laboratory records and women below 15 years or above 50 years were excluded from the study.

2.3. Sample Size and Sampling Procedure

2.3.1. Sample Size Determination

A sample size of 295 was calculated using Fishers formula.

$$\frac{z^2 p(1 - p)}{m} = \text{sample size}$$

Where

p = expected prevalence of anaemia in Zimbabwe which was assumed to be 26%.

m = degree of precision or a tolerance error margin or width of the confidence interval (a measure precision of the estimate). In this study an error margin of .05 was used.

z = Z statistic for a level of confidence or is the normal distribution critical value for a probability of.

$$\text{Therefore } n = 962 * 0.26 (1 - 0.26) = 295 \quad 0.05.$$

A total of 249 samples were used in the study, 19 did not meet the inclusion criteria, and 27 had missing information.

2.3.2. Sampling Technique

All the participants who met inclusion criteria were enrolled until the study sample size was achieved.

2.4. Data Collection

2.4.1. Data Collection Tools

The study employed a standard structured data abstraction form to collect information from all study participants who fulfilled the inclusion criteria.

2.4.2. Data Collection

Once ethical clearance was obtained from Africa

University Research Ethics Committee (AUREC), and approval from City of Harare headquarters was obtained, data collection was conducted. Anonymized patient data were abstracted from the BRIDH haematology results log book to the research data abstraction form whilst ensuring confidentiality was maintained. Information was transcribed from the laboratory result books to data collection in a password protected laptop. Back-up copies were saved onto google drive and in an external hard drive. The data collection forms used during data collection procedure were filed and stored away after data analysis. Data were extracted for the time period from June to August 2017.

2.5. Data Processing and Analysis

The collected data were transferred onto an Excel spreadsheet onto a password protected computer. Data were analyzed to determine frequency distributions and descriptive statistics of anemia in pregnancy. A Chi-square test was used to determine association amongst anaemia, age and parity.

2.6. Ethical Clearance

The study was approved by AUREC.

3. Results

3.1. Prevalence of Anaemia in Pregnancy

From a total of 249 expectant mothers enrolled in the study, 72 showed a haemoglobin level below 11.0g/dl, indicating an overall 28.9% anaemia prevalence rate.

3.2. Frequency Rate of the Different Types of Anaemia

Of the women who were found to be anaemic, the most common type of anaemia was microcytic hypochromic, with the least being microcytic normochromic (Figure 1). There were no cases of microcytic hyper chromic anaemia, normocytic hyper chromic anaemia, macrocytic normochromic anaemia or macrocytic hyper chromic anaemia.

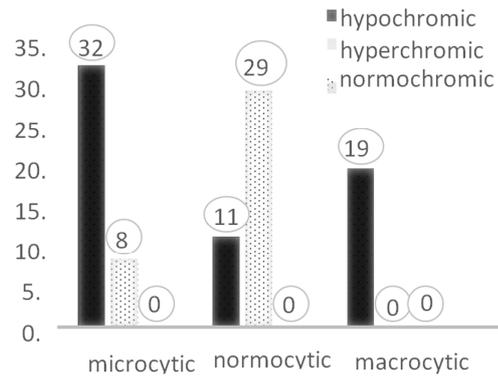


Figure 1. Percentage rate of the different types of anaemia in pregnant women who attended the ante-natal clinic housed under Mabvuku Polyclinic, between June and August 2017.

3.3. Severity of the Anaemia in Pregnancy

A relatively high prevalence is seen in the moderate (Hb 7-9.9 g/dl), and mild (Hb 10-10.9g/dl) anaemia categories, severe anaemia had a relatively low prevalence of 3.6% (Figure 2).

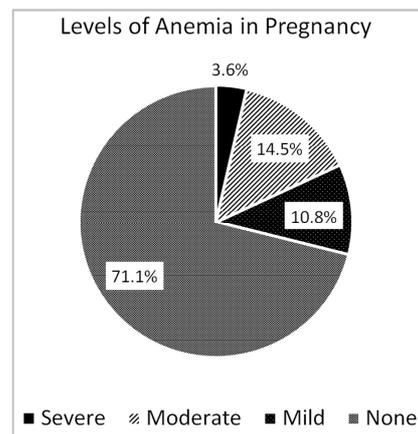


Figure 2. Distribution of anaemia severity in pregnant women who attended the ante-natal clinic housed under Mabvuku polyclinic between June and August 2017.

Table 1. Distribution of anaemia across the three age groups of pregnant women who attended Mabvuku Polyclinic, June to August 2017.

	Anaemic (Hb>11.0g/dL)		No Anaemia (Hb<11.0g/dL)		Total	p-value
	No.	%	No.	%		
15 – 20 years	17	28.6	42	71.4	59	0.856
21 – 30years	31	27.4	82	61.7	113	
31 – 49 years	24	31.4	53	68.6	77	

3.4. Distribution of Anaemia Among the Different Age Groups and Parity

The age group which showed a higher percentage rate of anaemia was that of women aged 31 – 49 years, with the 21 – 30 years age group having the lowest prevalence (Table 1). However, the differences were not statistically significant ($\chi^2 = 0.311$, $df = 2$, $p = 0.856$, $N = 249$).

Distribution of anaemia between primigravid and multigravid pregnant women who attended Mabvuku

Polyclinic, June to August 2017, showed that women of multigravidity had a greater prevalence of anaemia than women of primigravida. However there was no statistical significance noted ($\chi^2 = 1.088$, $df = 1$, $p = 0.297$, $N = 249$).

4. Discussion

4.1. Prevalence Rate of Anaemia in Women Who Visited Mabvuku Polyclinic

The prevalence of anaemia as seen in this study was 28.9%

which is approximately one third of the pregnant women. This indicates that anaemia during pregnancy was a major problem in Mabvuku. This prevalence was lower than that recorded by Stevens [3] when he studied Zimbabwe as a whole, as well results from the study done by Haider [7], which showed a prevalence of 34.2% and 29.4% respectively. A study by Alzharani [8] showed the prevalence of anaemia as 26.8%. The frequency rate of anaemia within the Mabvuku Polyclinic population dropped by 5.3% when comparing to the study done by Stevens [3] in Zimbabwe, factors which could have contributed to this drop in statistics are increased availability of vitamin supplements, improved dietary habits, increase in available knowledge of anaemia in pregnancy.

4.2. Distribution of Anaemia Among Different Age Groups and Gravida

This study showed that the age group with the greatest anaemia frequency rate was 31- 49 years age group. The studies done previously did not find a proportional relationship between age and frequency of anaemia. Studies done by Earland [9] and Idowu [10] had contradicting results. This change in age group with the greatest frequency can be due to hormonal changes in teenagers whose bodies are still adjusting to puberty, excessive alcohol consumption, which affects the folate absorption, signs and symptoms of menopause, acute bleeding i.e. from schistosomiasis which tends to be found frequenting the teenagers. Looking at the statistical analysis done by Bushra [11], the p-value correlates with the one calculated in this research, where no association was found between anaemia and age.

Women of multigravida state appeared to have a higher prevalence, however it is not considered to have a statistical significance, because the p-value calculated was greater than 0.05. The lack of statistical significance in this study agrees with studies done by Ramesh [12] and Okube [13].

4.3. Severity of Anaemia Among the Anaemic Pregnant Women Who Visited Mabvuku Polyclinic

The general trend seen in previous studies done showed the trend of occurrence of the severity as mild followed by moderate anaemia and severe anaemia having the least prevalence. Studies done by Farah [14] and Rohilla M [15], also agree with the above mentioned trend. However, as seen in this study (Figure 2), the most common type of anaemia is moderate anaemia (14.6%), mild anaemia (10.8%) and severe anaemia (3.6%), of all the anaemic pregnant women. Given the fact, the researcher is unaware of whether the anaemia started before the pregnancy or during the gestational period, as well as in which trimester is the pregnant woman, having their routine blood tests done. The anaemia could have been developing from the first trimester and the women only came for routine blood testing when the disease has been developing for a while. Therefore leaving the anaemia untreated will lead to further progression of the disease, increasing the chances of the researcher to find more severe

pregnancies.

4.4. Percentage Rate of the Different Types of Anaemia in Pregnant Women Who Visited Mabvuku Polyclinic

While staying in line with the WHO report [1] that says the most common cause of anaemia in pregnancy is nutritional, for example iron deficiency, vitamin B12 and folate deficiency. The type of anaemia with the most frequent percentage rate was microcytic hypochromic anaemia (32.1%). Though no iron estimation studies/ferritin profile tests were done, it is assumed that it is iron deficiency anaemia is the most common microcytic hypochromic anaemia. These findings are similar to those found in the study done by Seshadri [16].

Normocytic normochromic (29.1%) anaemia was found to be the second most prevalent type of anaemia. This type of anaemia is generally caused by acute infections that is, schistosomiasis, as well as other causes of acute bleeding. The third most frequent anaemia was macrocytic hypochromic anaemia (18.1%). This type of anaemia is usually a megaloblastic nutritional anaemia caused by folate deficiency and vitamin B12 deficiency, another contributing factor for this type of anaemia is alcoholism.

5. Conclusion

This study shows that anaemia in pregnancy is still a significant problem, showing that one in three women attending the ante-natal clinic housed under Mabvuku Polyclinic to be anaemic. The most common type of anaemia was microcytic hypochromic anaemia (32.1%). The highest percentage rate of anaemia was found in women aged 31- 49 years and multigravida but the differences were not statistically significant. It was concluded that there was a high overall prevalence of anaemia in pregnancy affecting nearly one in every three expectant mothers. Targeted preventive measures are recommended for all expectant mothers such as prophylactic iron and vitamin supplementation.

5.1. Implications of Study

This study is the first step in closing the statistical gap by availing crucial information about the anaemia as a condition within the Mabvuku population. It has helped create a clear picture of the anaemia in Mabvuku among the pregnant women and enables the easy targeting of the groups of women who are most affected by the condition, for example the women between 31 and 40 along with the multigravida women. Thus ensuring that the predictively most affected women are given prophylaxis.

5.2. Recommendations

There is a need for improvement of analytical ability of the detection of anaemia by the health care providers and health workers. Policies need to be put in place that help the investigation, screening and management of anaemia in

pregnant women. Routine vitamin supplementations should be given as a prophylactic measure in all pregnant women.

On a national scale, anaemia awareness educational clinics should be done to increase knowledge of anaemia, the causes, the signs and symptoms along with the complications associated with anaemia. Health education talks on nutrition needs for a pregnant woman and the growing foetus should be carried out for example nutritional educational sessions should be held for the community through multimedia, schools, health visitors and other health providers. Consideration should be made on the fortification of foods with iron to curb nutritional anaemia.

5.3. Limitation

This is a cross sectional study therefore only measures the prevalence and not the incidence of the anaemia. The timing of the snapshot is not guaranteed to be a true representative of the population.

Iron deficiency anaemia was concluded to be the most common anaemia in pregnant women, however the laboratory located at Beatrice Road Infectious Disease Hospital (BRIDH) does not do the ferritin test, which is the determinant of whether it is iron deficiency anaemia or not, hence this is a limitation to the research.

The ante-natal clinic housed under Mabvuku polyclinic only collects blood for full blood count within the second trimester of pregnancy therefore it was not possible to exclude the women who had anaemia before the pregnancy because they can only be identified within the first trimester of pregnancy.

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