

Article

Magnitude and Predictors of Anaemia among Pregnant Women attending Antenatal Clinics in Dar es salaam, Tanzania.

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ABSTRACT: Background: Anaemia in pregnancy have been a cause of serious concern and burden as it contributes significantly to high maternal mortality worldwide. This study aims to explore how big the burden of anaemia in pregnant women is, how it can be reduced during antenatal clinic in order to minimize risks and complications of anaemia among pregnant women. **Method:** An analytical cross-sectional study design used, involved 560 pregnant women attending antenatal clinic at three regional referral hospitals in Dar es Salaam region, Tanzania, from January to June 2022. Those willing to participate and met inclusion criteria were included in the study. Data was collected by interview through a structured questionnaire. Analysis of data was done using SPSS v25.0, (p<0.001) considered statistical significant. **Results:** A total of 560 pregnant women were interviewed. The prevalence of anaemia in pregnancy is high about 70.9% whereby 61.2% participants had mild anaemia, 33.2% participants had moderate anaemia and 25.6% participants had severe anaemia. Significant associations were found between age, education level, marital status, Less ANC attendance (<3 visit), lack of health insurance and lack of employment among pregnant women. **Conclusion:** Prevalence of anaemia in pregnancy women is still high and its predictors highly affect its control. Hence the ministry of health in collaboration with other stakeholders should develop policies, educating community on the importance of antenatal visit for early detection and treatment of anaemia and impacting knowledge to medical personnel in management of anaemia in pregnancy and associated complications in order to decrease maternal mortality rate.

Keywords: Anaemia; Antenatal; Dar es Salaam; hospital; pregnant; prevalence

INTRODUCTION

Anaemia in pregnancy remains serious concern and burden in pregnant women and the number of women affected is still high. It contributes significantly to high maternal mortality and poor birth outcome worldwide ^[1,2]. The level of haemoglobin vary by age, sex, altitude, smoking, and pregnancy status^[1].

Anaemia is the commonest haematological disorder that may occur in pregnancy, the others being Rhesus iso-immunization and blood coagulation disorders^[3-5]. Anaemia in pregnancy is an important public health problem worldwide, WHO estimates that more than half of pregnant women in the world have a haemoglobin level indicative of anaemia (<11.0g/dl), the prevalence may however be as high as 56 or 61% in developing countries^[3].

Anaemia in pregnancy is a common problem in most developing countries and major cause of morbidity and mortality especially in malaria endemic areas. It is

frequently severe and contributes significantly to maternal mortality and reproductive health morbidity^[6].

Anaemia in pregnancy it deserves more attention than it is currently receiving^[7]. Published rates of prevalence of anaemia for developing countries range from 35% to 56% for Africa, 37% to 75% for Asia and 37% to 52% for Latin America, this is in sharp contrast to industrialized countries where anaemia in pregnancy occurs in less than 20% of women^[8]. Exact population prevalence figures are usually not available for developing countries. Nevertheless it is clear to those in clinical practice and research that anaemia in pregnancy is a public health problem and under-reported^[9]. Each year worldwide more than 500 000 women die from pregnancy related causes, the vast majority 99% in developing countries^[9].

The incidence of anaemia in pregnancy ranges widely from 40% to 80% in tropics compared to 10% to 20% in the developed countries and is responsible for 20% of maternal deaths in the third world countries^[10]. Women often become anaemic during pregnancy because the demand for iron and other vitamins is increased due to physiological burden of pregnancy^[11]. The inability to meet the required level for these substances either as a result of dietary deficiencies or infection gives rise to anaemia^[12,13].

Globally, the most common cause of anaemia is iron deficiency, which is responsible for about half of anaemia cases in pregnancy, and it is estimated that in developed countries 38% of pregnant women have iron depletion^[14].

Antenatal care is a key strategy to improve maternal and infant health^[7]. However, survey data from sub-Saharan Africa indicate that women often only initiate ANC after the first trimester particularly adolescent pregnant women, therefore they do not fully benefit from its preventive and curative services^[15]. In Tanzania, 97% of pregnant women attend antenatal care and 70% do so at least four times and do not achieve the recommended number of ANC visits^[16].

Anaemia ranges from mild, moderate to severe and the WHO pegs the haemoglobin level for each of these types of anaemia in pregnancy at 10.0-10.9g/dl (mild anaemia), 7-9g/dl (moderate anaemia) and <7g/dl (severe anaemia). But the pregnant woman in second trimester is said to be anaemic when haemoglobin level is less than 10.5g/dl^[17]. Prevalence of anaemia can be as high as 42% in developing countries with a high incidence and severity occurring among primigravidae living in malaria endemic areas^[18].

In Tanzania the most causes of anaemia in pregnant women are nutritional deficiencies, malaria, parasitic infestation, too short child spacing, poor diet (malnutrition), and chronic infection^[12,19]. Women often become anaemic during pregnancy because the demand for iron and other vitamins such as folic acid and vitamin B12 is increased due to physiological burden of pregnancy^[2,19].

Anaemia due to malaria in pregnancy is one of the major causes of maternal morbidity worldwide, and leads to poor birth outcomes^[20,21]. Maternal mortality in Tanzania from Demographic and health survey is estimated to be 556 deaths/100,000 live births^[22].

In pregnancy, anaemia has a significant impact on the health of the foetus as well as that of the mother whereas 20% of maternal deaths in Africa have been attributed to anaemia^[23]. Fetus is at risk of preterm deliveries, low birth weights, morbidity and perinatal mortality due to the impairment of oxygen delivery to placenta and foetus^[24].

The disparity between high antenatal care attendance, high prevalence of anaemia in pregnancy, high maternal mortality raise questions about the quality of care provided and particularly the management of anaemia in pregnancy at antenatal clinics^[21].

The management and control of anaemia in pregnancy is enhanced by the availability of local prevalence statistics, which is however not adequately provided

in Tanzania. Therefore, this study aim to determine the prevalence and predictors of anaemia in pregnant woman attending antenatal clinics that can be used to reduce health problem pertaining to anaemia and changing the way used in treating and preventing anaemia.

MATERIALS AND METHODS

Study setting

The study was conducted at Antenatal clinics found in three regional referral hospitals namely Amana, Mwananyamala and Temeke regional referral hospital in Dar es Salaam city, Tanzania. Dar es salaam found at eastern part of Tanzania is the most populous city in Tanzania, important economic centre and largest city in East Africa and the fifth most populous in Africa and the fastest growing cities in the world with population over 6.4 million people by 2020 [25]. Dar es Salaam has five districts: Kinondoni in the north, Ilala in the centre; Ubungo and temeke in the south; and kigamboni in the eastern. Amana RRH which is found in Ilala, Mwananyamala RRH which is found in Kinondoni and Temeke RRH found in Temeke.

Study population.

All pregnant women who did not have sickle cell disease attending ANC's located in three regional referral hospitals (Amana, Mwananyamala and Temeke) in Dar es Salaam region from January to June 2022 and willingly to take part in the study after consent.

Study design.

An analytical cross-sectional study with quantitative approach was carried out in three regional referral hospitals (Amana, Mwananyamala and Temeke) in Dar es Salaam region, Tanzania. With aim of determining predictors and magnitude of anaemia in pregnancy in Dar es salaam, Tanzania.

Sample size and sampling procedure

The estimated sample size was calculated by using single population proportion formula with the assumption of 50% proportion, 95% confidence interval and 5% margin of error. Given that the source population was less than 10,000 correction formula was used and 5% non-response was added, making the final sample size 560. Simple random sampling technique was used and all participants with inclusive criteria have a chance to be selected. Numbers of respondents from antenatal clinics located in Dar es Salaam regional level hospitals were selected basing on their clinic identity card/RCH card on their scheduled clinic visits.

Recruitment of participants

In this study were including all pregnant women attending at ANC clinic, mentally and physically fit and willing to participate after consent and all pregnant women who were not attending ANC clinic, physically unwell women during data collection and those who refuse to participate after consent were excluded from the Study. (See **figure 1**)

Data collection tool and procedure

A standardized structured questionnaire was used to collect data. The questionnaire comprises of both open and closed ended questions and was translated in Swahili. The respondents filled the questionnaires and confidentiality was preserved.

Data processing and analysis.

The data collected, analysed, coded and entered into statistical package for social sciences (SPSS) version 25. The SPSS package was employed to determine frequency and percentage of the respondents, Chi square (χ^2) test was used to show the association between variables, a significance level ($p < 0.001$) were used to compare and conclude for statistical significance of the association and finally guide researcher to draw graphs and tabulation.

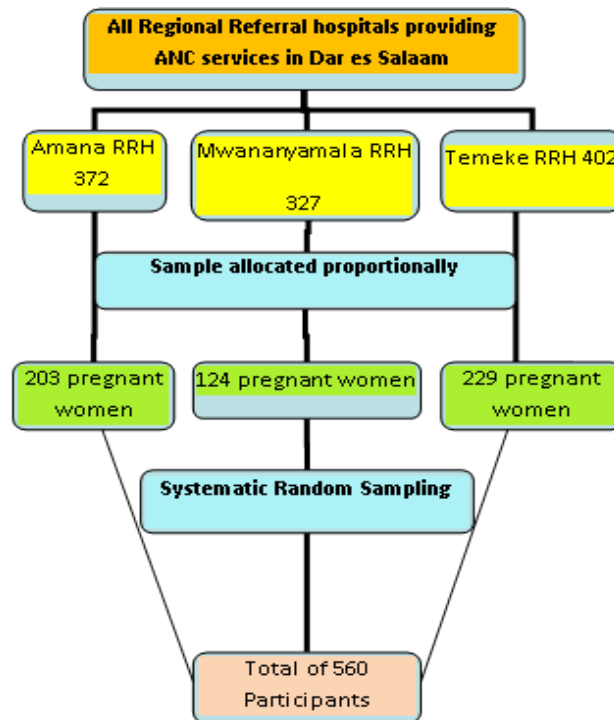


Fig 1: Sampling procedure in Regional referral hospitals providing ANC service in Dar es Salaam.

RESULTS.

Socio-demographic characteristics of study population.

A total of five hundred and sixty (560) women attending antenatal clinic at Amana, Mwananyamala and Temeke RCH clinics in Dar es Salaam were enrolled in the study. Majority about 219(39.1%) respondents were in the age group of 21 to 30 years. Majority of respondent had formal education 85.7% and primary level of education was higher about 222(39.6%) compared to others. Majority of respondents about 373(66.6%) were married and 372(66.4%) were unemployed.

Moreover, about 288 (51.4%) pregnant women booked at first trimester (GA of 1-13weeks), about 278 (49.6%) respondents were multigravida having one to four children, and most of respondents 206 (36.8%) had spaced their child by 2 years. The information on socio-demographic data summarized in **Table 1**.

Table 1: Socio-demographic characteristics of study population (N=560).

	Frequency (N)	Percent (%)
Age		
15-20	132	23.6
21-30	219	39.1
30-40	187	33.5
>41	22	3.4

Education level		
Primary school	222	39.6
Secondary school	155	27.7
University/college	103	18.4
None	80	14.3
Marital status		
Married	373	66.6
Not married	120	21.4
Divorced/separated	61	10.9
Widowed	6	1.1
Employment		
Employed	188	33.6
Unemployed	372	66.4
First ANC Attendance		
1-3	288	51.4
4-6	242	43.2
7-9	30	5.4
Parity		
Primigravidae	97	17.3
1-4	278	49.6
>5	185	33.1
Pregnancy interval		
First pregnancy	98	17.5
1	140	25
2	206	36.8
>2	116	20.7

Overall prevalence and severity of anaemia among pregnant women attending antenatal clinic

Women attending their antenatal clinic at Amana, Mwananyamala and Temeke RCH were asked to choose the ANC booking haemoglobin level as written on their antenatal cards. Based on haemoglobin level, the overall prevalence of anaemia among the studied sample was 70.9% (397/560). See **table 2**.

Table 2: Overall prevalence of anaemia among antenatal women of study population.

	Frequency	Percent %
Anaemia	397	70.9
Non-anaemic	163	29.1
Total	560	100

Out of the 397 anaemic women, 243 (61.2%) had mild anaemia, 132(33.2%) had moderate anaemia and 22 (5.6%) had severe anaemia. The information related to prevalence and severity of anaemia are summarized in **figure 2**

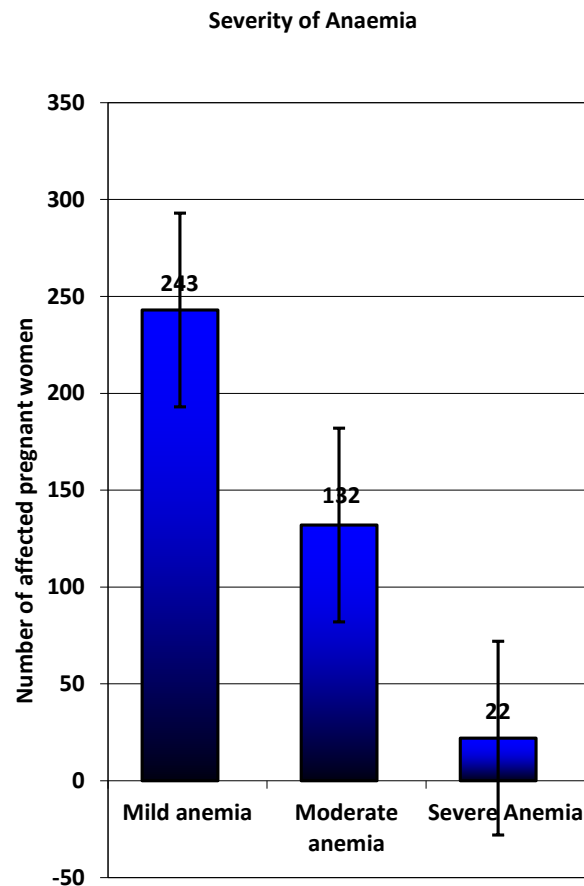


Figure 2: Showing severity of anaemia (n=560).

Anaemia in relation to socio-demographic characteristics of women attended ANC

Anaemia was found to be more prevalent in women aged between 21-30years at 38.0% as compared to other age group and least prevalence among pregnant women above 40 years ($p < 0.001$) therefore, statistical analysis of age being a factor in predicting anaemia in pregnancy.

Level of education seem to predict anaemia among pregnant women, whereby those who had attained primary education seem to have higher percentage of anaemia (42.9%) compared to others. The relationship between education level being a factor in predicting anaemia in pregnancy ($p < 0.001$). Anaemia found to be more prevalent among women who were married (61.4%) compared to those women who were unmarried, divorced/separated or widowed ($p = 0.022$). There is no statistical association between marital status and anaemia in pregnancy.

Furthermore, anaemia found to be more prevalent to unemployed pregnant women about 77.2% compared to those who were employed ($p < 0.001$) and having health insurance, about 65.6% who don't have health insurance ($p < 0.001$) found to be statistical significant. Thus, there is statistical significant between level of employment and anaemia in pregnancy (**Table 3**).

Table 3: Prevalence of anaemia in relation to socio-demographic characteristics of women (N=560).

	Frequency(N)	Percent (%)	P value
Age			
15-20	170	30.4	
21-30	213	38.0	

30-40	153	27.3	< 0.001
>41	24	4.3	
Education level			
Primary school	240	42.9	< 0.001
Secondary school	155	27.7	
University/college	67	11.9	
None	98	17.5	
Marital status			
Married	344	61.4	0.022
Not married	144	25.7	
Divorced/separated	67	12.0	
Widowed	5	0.9	
ANC Attendance			
1-3	288	51.4	<0.001
4-6	242	43.2	
7-9	30	5.4	
Health insurance			
Yes	194	34.6	<0.001
No	366	65.5	
Employment			
Employed	127	22.7	< 0.001
Unemployed	433	77.3	

DISCUSSION

The study findings reported a high overall prevalence of 70.9% with anaemia among pregnant women attending antenatal clinics, out of the anaemic women, 61.2% had mild anaemia, 33.2% had moderate anaemia and 5.6% had severe anaemia this is almost similarity with the study done in Nigeria in which prevalence was 76.5% of the pregnancy women where by 57.8% had moderate anaemia, 40.3% had mild anaemia and 1.9% were severely anaemic^[26].

Findings of this study are almost similar to those of various studies done previously in sub-Saharan Africa which reported prevalence rates of anaemia among pregnant mothers ranging from 33% to 75%^[2,27].

Furthermore, the results from this study were slightly similar to that conducted at Unguja islands in which the overall prevalence of anaemia among pregnant women was 80.8% whereby 68.64% of respondents had mild anaemia, 11.24% had moderate anaemia and 0.89% had severe anaemia^[28].

Other regions in Tanzania shown a low prevalence of anaemia compared to this study findings, in Morogoro and Kilimanjaro region the identified prevalence were 44.9% and 47.4% respectively. The differences could be the sample size of our study compared to these studies, also these variations could be due to dietary differences between these communities^[29,30].

Study finding shows that anaemia is more prevalent with age in pregnant women, whereby the age group of 21-30 years seem to have high risk of anaemia which is comparable to the study done at 2013 in Ethiopia that showed close significance^[31].

The level of education among pregnant women and anaemia, in these study findings shows the significant relationship. Education level seems to be a factor in predicting anaemia in pregnancy. Mothers who had attained primary education had higher percentage of anaemia compared to those who had secondary school. Also those with primary education seem to have less visit to ANC and this similar to the study done 2015 in Dhaka city^[32].

Anaemia in pregnancy in this study finding was not affected by marital status, despite the prevalence was high among married women compared to those women who were unmarried, divorced/separated or widowed. This is different comparable to this study done 2012 in Nigeria whereby anaemia in pregnancy was affected by marital status^[33].

Furthermore, having health insurance and level of employment found to be predicting factor of anaemia in pregnancy, whereas those who were unemployed they failed in term of achieving dietary needs and have more risk compared to those who were employed, as compared to the study done in Ethiopia^[32].

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Limitations of the study.

The challenges to researcher faced during this study were, Financial challenges due to limited financial budget; respondent reluctance to provide information during the study due to fear and suspiciousness; Limited time to conduct the study and illicit all the problems pertaining to the anaemia in pregnant women.

CONCLUSION

There is high prevalence of anaemia among pregnant women attending antenatal clinic at Amana, Mwananyamala and Temeke regional referral hospitals despite of having speciality. Anaemia in pregnancy is predominantly associated with younger age, married, unemployment and lower level of education.

RECOMMENDATION

Based on the results of this research the ministry of health in collaboration with other relevant health partners should develop policies on health education to the community on the importance of ANC visit as it will help in early detection of anaemia. The need for CME to medical personnel to raise awareness and increase skills in management of anaemia in pregnancy and other associated complications in order to decrease maternal mortality rate. Community should be educated on importance of delivery in a health facility which is potentially protective against anaemia. Further the research suggests that all health facility centres where pregnancy mother visit for ANC must provide free check of haemoglobin levels for early identification of problem. Finally, more researches should be done in determining prevalence, severity and factors associated with anaemia in pregnancy so as to prevent further maternal and foetal complications as well as reducing mortality rate.

Abbreviations

ANC: antenatal care; CDC: Center of Disease Control and Prevention; CME: Continuous medical education; Hgb: haemoglobin; MOI: medical officer in-charge; RCH: Reproductive child health; RMO: Regional medical officer; RRH: Regional referral Hospital; SPSS: statistical product and service solution; SOPs: standard operating procedures; WHO: World Health Organization.

Ethics consideration and consent

Ethical approval was sought from CREC. And permission from RMO Dar es salaam region, permission from MOI of Amana RRH, Mwananyamala RRH and Temeke RRH. Written consents were collected from the study participants, confidentiality and anonymously assurance of voluntary participation and right to withdraw from the study.

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Authors' contributions:

SPM designed the study, data collection, analysed data and drafted manuscript; PLK, GL and JSN participated in the design of the study, data collection and revision of the manuscript; all authors read and approved the final manuscript.

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The data sets used and/or analysed during the current study are available from the corresponding author on reasonable request.

Consent for publication:

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Competing interests:

The authors declare no competing interests.

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