

Original Article

Anaemia Preventive Practices among Pregnant Women in Central Hospital Warri, Delta State, Nigeria

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Abstract

Background: Anaemia in pregnancy is among the top threats in developing countries. Several strategies against anaemia have been adopted but it still remains a major cause of maternal and infant mortality. **Objective:** To determine the knowledge and effectiveness of anaemia preventive practices. **Methods:** This is a cross-sectional, descriptive study carried out at Central Hospital Warri in Delta State, Nigeria, among 337 pregnant women seen during the antenatal clinic between July and December of 2022. A self and interviewer administered questionnaire was used for data collection. **Results:** The study showed no association between sociodemographic factors and anaemia in pregnancy ($P>0.05$); however, a high-level adherence to the anaemia preventive practices by the participants was evident. Malaria in index pregnancy was significantly associated with anaemia. **Conclusion:** The pregnant women had a relatively fairly good understanding and usage of anaemia preventive practices, however the effectiveness of use, the occurrence of anaemia did not affect them.

Keywords: Anaemia, prevention, pregnant women, Nigeria

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Introduction

Obstetric practice in developing countries is known for its unacceptably high maternal mortality and perinatal mortality, with anaemia being a major contributory factor, anaemia has been found to be the most common complication in pregnancy and the World Health Organisation (WHO) estimates that more than 40% of the non-pregnant and 50% of pregnant women in developing countries are affected. The causes of anaemia in pregnancy are multifactorial and are largely preventable; mostly ranging from infections (malaria, Intestinal helminths, and Human immunodeficiency virus infection), hemoglobinopathies to nutritional disorders (micronutrient deficiency such as iron deficiency and folate deficiency). Cost-effective

interventions are directed towards ameliorating and preventing such untoward effects; however, there are constraints to diagnosis, treatment, and prevention in resource-poor settings of developing countries. The effective management protocol includes treatment of the underlying cause, restoration of the haemoglobin concentration to normal levels, Prevention and treatment of complications, among others. Suggested strategies aimed at preventing these focuses on the major underlying causes in developing countries. Among the above listed factors, malaria and micronutrient deficiency account for a greater percentage of the causative factor responsible for anaemia in pregnancy in the developing world.²

Malaria continues to be a scourge in the tropical

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and subtropical region of the World³ estimated to be responsible for 1.2 million deaths annually and 2.9 % of total disability-adjusted life year (DALYs) in low and middle income countries.⁴ Pregnant women in endemic region have an increase susceptibility to malaria and this is greatest in the first half of pregnancy and mostly in the primigravida women.⁵ Malaria is defined as the presence in the peripheral blood of asexual stage of plasmodium, irrespective of the species or symptoms.⁶ Most patients are relatively asymptomatic in presentation, however the main effects seen in pregnancy includes: anaemia, miscarriages and low birth weight.⁵ Malaria due to *Plasmodium falciparum* may cause severe anaemia in pregnant women, and this occurs through a number of different mechanisms that includes the removal of parasitized erythrocytes, immune destruction of parasitized red cells, impaired erythropoiesis as a result of bone marrow dysfunction.⁶ Worthy of note is that, Malaria accounts for an estimated 3-15 % of anaemia and 25 % of severe anaemia in pregnant women in endemic countries.^{7,8}

In sub-Saharan Africa, an estimated 200,000 to 500,000 pregnant women develop severe anaemia as a result of malaria⁹ with *Plasmodium falciparum*, the primary cause to date, and ultimately cause maternal death of up to about 10,000 annually in sub-Saharan Africa.⁸ Besides, helminths such as flukes, hookworm and whipworm cause chronic blood loss, and consequently iron loss.¹⁰ These parasitic infestations are known to cause chronic haemorrhage and iron deficiency, resulting in the development of anaemia.¹¹ Blood loss caused by helminthiasis put the mother, foetus and child at risk of iron deficiency, which could lead to anaemia.¹² For example, the trematode, *Schistosoma haematobium* (fluke), predisposes to a significant urinary blood loss in severe infections and infected persons may present with terminal haematuria, which continues for as long as it is not treated and then results in anaemia. *Schistosoma mansoni* eggs can rupture the intestinal lining and result in the leakage of blood, other fluids and nutrients into the lumen.¹¹ Hookworm infestation produces a high degree of long-term morbidity by causing iron deficiency anaemia. The extent to which this deficiency occurs depends on the host's iron status, the infecting parasites, and the intensity and duration of infection.¹² Blood loss is caused

primarily by coagulase released by the parasite and it is responsible for continuous blood loss in the stool.¹³ For example, *Ancylostoma duodenale* is estimated to cause up to 0.25 ml of blood loss per worm per day.⁸ A hookworm burden of 40–160 worms (depending on the iron status of the host) is associated with iron deficiency anemia.¹⁴ Several studies in developing countries observed that 51% of anaemic children were iron deficient and if hookworm infection could be reduced by as much as 25%, it would reduce iron deficiency anaemia by 35 % and severe anaemia by 7%.^{15,16} The nematode, *Trichuris trichiura* (whipworm) causes anaemia if the worm burden is heavy¹⁵ and colonic lesions are associated with bleeding or there is a chronic reduction in food and micro-nutrient intake caused by anorexia-inducing effects of tumour necrosis factor- α released in response to the infection.¹⁷⁻¹⁹

Anaemia in pregnancy constitute a serious public health problem and is a major cause of maternal morbidity and mortality in developing countries especially in malaria endemic regions, affecting approximately 50% of the pregnant women.

Preventive measures such as the use of malaria prophylaxis, insecticide treated net and haematinics have been introduced and widely advocated by the World Health Organization (WHO). Despite this, anaemia in pregnancy remains a common occurrence in developing countries resulting in maternal and foetal morbidity and mortality, low birth weight and miscarriages.²⁰⁻²⁴

Prevention of anaemia during pregnancy using insecticide treated nets, malaria prophylaxis and haematinic is no doubt one of the major interventions aimed at reducing maternal morbidity and mortality rates and thus achieving the fifth and sixth Millennium Development Goals. This study therefore seeks to determine the level of awareness and the effective use of these measures in this region. The objectives are to determine the socio-demographic characteristic of the study population, to assess the knowledge of pregnant women towards anaemia preventive practices, assess the adherence of the study population to anaemia preventive practices and determine the factors associated with anaemia in the study population.

Methods

The study was conducted in Central Hospital, Warri, Delta State, Nigeria. Warri is a major

oil city in Delta state, with a population of over 300,000 people according to the national population figures for 2006. The people of Warri are mainly the Urhobos, Itsekiris and Ijaws, but other ethnic groups also live within the city. Warri is predominantly Christian, as is most of Southern Nigeria, with minority being African traditional worshippers and Muslims. The city is known nationwide for its unique pidgin English.

This study is a descriptive cross-sectional study, carried out among 337 pregnant women attending antenatal clinic in Central Hospital Warri, a systematic random technique was used to select the participants for the study, qualitative data was collected using a semi- structured interviewer and self-administered questionnaire. The questionnaires were pretested and verified for errors.

The collected data were analysed using statistical package for the social sciences (SPSS) version 16.0 and results were displayed in tables. The proportion of women with anaemia was compared against the sociodemographic characteristic, economic, obstetric variables using Chi-square tests. Multivariate logistics regression was employed for variables associated with anaemia. A p-value ≤ 0.05 was considered significant in all statistical analysis.

Results

A total of 337 pregnant women aged between less than 20-50 years, with mean age 29 ± 8.54 years; this typically represents the age group that will attend antenatal clinic, with a greater proportion of the correspondents being between 21-30 years, 198(58.8%) and the least proportion being in 41-50 years age group, i.e., 5(1.5%).

This table shows age distribution, marital status, educational level, socio-economic status, parity and trimester of booking, majority of the respondents were in their 20's (58.8%), married 318 (94.4%), had tertiary level of education 167(49.6%), skilled workers 146(43.3%), multipara 201(59.6%), and booked in third trimester 158 (47%) (Table 1). This table highlights the awareness of anaemia in pregnancy and anaemia preventive practices among the respondents, majority of the respondents have heard of anemia in pregnancy, their source was the hospital, knew the actual meaning of anaemia and its complications. Most of them were also aware of intermittent prophylaxis therapy with antimalarial, insecticide treated net

Table 1: Sociodemographic characteristic of the study population (n=337)

Characteristic	Frequency	Percentage
Age group (years)		
<20	7	2.1
21-30	198	58.8
31-40	127	37.6
41-50	5	1.5
Marital Status		
Single	19	5.6
Married	318	94.4
Educational Status		
Nil formal	7	2.1
Primary	14	4.2
Secondary	149	44.2
Tertiary	167	49.5
Working status		
Professional	47	13.9
Skilled worker	146	43.3
Semi-skilled	113	33.5
Unskilled	15	4.5
Parity		
Primipara	129	38.3
Multipara	201	59.6
Grand multipara	7	2.1
Pregnancy trimester		
First	152	45
Second	27	8
Third	158	47

and haematinics as preventive modalities (Table 2).

Table 3 shows that 318(94.36%) of the respondent own ITN and 147(43.62%) of them use it daily, 115(36.16%) take theirs occasionally and 56(17.61%) don't take use the ITN, 19(5.64%) of these pregnant women don't have ITN. 236(70.03%) took their haematinics daily, 92(27.30%) take theirs occasionally and 9(2.67%) of the respondents did not take their haematinics at all. 255(75.67%) of the participants have received anti-malarial prophylaxis and 82(24.33%) have not. The table above, shows that the majority of the women with anemia in pregnancy were in their twenties 11(55%), had tertiary level of education 11(55%), married 20(100%), skilled 8(40%), multi-Para 14(70%), did not have food taboos 19(95%), used their nets daily 7(35%) and never used it 7(35%), took their haematinics daily 12(60%), had malaria in index pregnancy 17(85%), did not receive anti-malaria prophylaxis in index pregnancy 18(90%).

Table 2: Awareness about anaemia in pregnancy and the anaemia preventive practices (n=337)

Variables	Frequency	Percentage
Aware of anaemia in pregnancy		
Yes	210	62.3
No	127	37.7
Know the actual meaning of anaemia in pregnancy		
Yes	238	70.6
No	99	29.4
Complications of anaemia in pregnancy known**		
Susceptibility to infection	97	28.8
Heart failure	92	27.3
Postpartum haemorrhage	99	29.4
Miscarriage	106	31.5
Birth anomalies	2	0.6
Small baby	104	30.9
Source of information		
Hospital	156	46.3
Relatives/friends	144	42.7
Massmedia	37	11.0
Aware of intermittent preventive therapy with antimalarial		
Yes	285	84.6
No	52	15.4
Aware of insecticide treated nets (ITN) as an anaemia preventive practice		
Yes	318	94.4
No	19	5.6
Aware of the use of haematinics in preventing anaemia		
Yes	305	90.5
No	32	9.5

**Some respondents indicated multiple responses

Table 3: Adherence to anaemia preventive practices (n=337)

Variables	Frequency	Percentage
Ownership of ITN		
Yes	318	94.36
No	19	5.64
Frequency of ITN usage		
Daily	147	46.22
Occasionally	115	36.16
Never	56	17.62
Frequency of taking haematinics		
Daily	236	70.03
Occasionally	92	27.30
Never	9	2.67
Received anti-malaria prophylaxis		
Yes	255	75.67
No	82	24.33

Table 4: Prevalence of anemia and factors associated with anemia in pregnancy (n=337)

Variables	Anaemia		Total
	Yes	No	
Age group (in years)			
<20	0	7	7
21-30	11	187	198
31-40	8	119	127
41-50	1	4	5
Total	20 (5.93%)	317 (94.07%)	337 (100%)
	X ² = 3.12 df=3 P= 0.536		
Educational status			
<20	0	7	7
21-30	11	187	198
31-40	8	119	127
41-50	1	4	5
Total	20 (5.93%)	317 (94.07%)	337 (100%)
	X ² = 5.097 df=3 P= 0.165		
Marital status			
Single	0	20	20
Married	20	297	317
Total	20 (5.93%)	317 (94.07%)	337 (100%)
	X ² = 1.200 df=1 P= 0.273		
Employment status			
Unemployed	1	15	16
Unskilled labourer	1	21	22
Semiskilled worker	10	137	147
Skilled professional	8	144	152
Total	20 (5.93%)	317 (94.07%)	337 (100%)
	X ² = 1.057 df=1 P= 0.316		
Parity			
Primipara	6	123	129
Multipara	14	187	201
Grandmultipara	0	7	7
Total	20 (5.93%)	317 (94.07%)	337 (100%)
	X ² = 1.205 df=2 P= 0.548		
Food taboo			
Yes	1	38	39
No	19	279	298
Total	20 (5.93%)	317 (94.07%)	337 (100%)
	X ² = 0.950 df=1 P= 0.330		
Frequency of ITN usage			
Daily	7	140	147
Occasionally	6	109	115
Never	7	68	75
Total	20 (5.93%)	317 (94.07%)	337 (100%)
	X ² = 1.935 df=3 P= 0.586		
Haematinics			

Variables	Anaemia		Total
	Yes	No	
Daily	12	224	236
Occasionally	6	86	92
Never	2	7	9
Total	20 (5.93%)	317 (94.07%)	337 (100%)
$X^2= 6.233$ $df=3$			$P= 0.101$
Malaria in index pregnancy			
Yes	20	186	206
No	3	128	131
Total	23 (6.82%)	314 (93.18%)	337 (100%)
$X^2= 4.157$ $df=1$			$P= 0.04$
Received anti- malarial prophylaxis			
Yes	18	237	255
No	19	63	82
Total	37 (10.98%)	300 (89.02%)	337 (100%)
$X^2= 1.402$ $df=1$			$P= 0.236$

Discussion

In our study, a total of 337 respondents were used, the study population were women of reproductive age between ≤ 20 -50 years, this typically represents the age group that will attend antenatal clinic, with a greater proportion of the correspondents being between age 21-30 years, 198 (58.8%) and the least proportion being in 41-50 years age group, i.e., 5(1.5%).

Majority of the participants 318(94.4%) are married, this is attributable to their socially accepted relationship which makes them more likely and easier to attend antenatal clinic than the others, and a higher percentage of the respondents 167(49.5%) have tertiary level of education, this is a reflection of awareness that comes with a high level of formal education. A greater percentage of the study population were skilled workers 146(43.3%), multipara 201(59.6%) and 158(47%) in their third trimester attended antenatal clinic.

Furthermore, the awareness level of the respondents in general was appreciable as 210 (62.3%) of the studied population have heard of anemia with a greater proportion getting this awareness from the hospitals 156(46.3%), 144(42.7%) from friends while the others from the mass media 37(11%), This is not surprising as it reflects or justifies the level of their educational status, as educated mothers are more likely to seek antenatal care in the right health facilities. This is comparable to the study done in Malawi on 229 mothers where

96.6% of the women were aware of anaemia¹⁹, and also a similar to findings of the study done in Libya which showed 100% awareness amongst the 60 participants²⁵. However, the awareness level on the meaning of anaemia was even among the respondents as 238 (70.6%) knew the meaning while others 99(29.4%) did not know the actual meaning. This could also be ascribed to their level of education and their information source such as hospitals. This is corroborated by the findings of the study carried out in Ghana where all the respondents 28(100%) were able to define anaemia to the best of their understanding as lay persons²⁶.

In addition, the awareness of intermittent preventive therapy with anti-malarial, haematinics, and insecticide treated nets were 285 (84.6%), 305(90.5%), 318(94.4%) respectively, while 52(15.4%), 32(9.5%), 19(5.6%) respectively were not aware. This high level of awareness can be ascribed to their high level of education and source of information. This is in consonance with the study done in Tanzanian women which showed majority (90.1%) were aware that sulfadoxine- pyrimethamine was the drug for intermittent preventive treatment and 77.2% held the perception that it had health benefits². However, a contrast was seen in studies, where poor knowledge amongst parturients of the ability of insecticide treated nets to prevent anaemia was recorded.²²⁻²⁴

On the ownership and usage of anaemia preventive practices, our study showed that despite 318 (94.36%) of the participants owning insecticide treated nets, adherence rate varied from 147 (46.23%) using theirs daily, 115(36.20%) used theirs occasionally while 56(17.6%) never used their insecticide treated nets. However, 19(5.64%) of this participant did not own insecticide treated nets. This result is similar to that observed in other studies, where ownership of insecticide treated nets was about 71% with compliance rate as low as 56.3%.²⁷ This may be because of discomfort experienced with use of insecticide treated nets.

As has been observed from this study, when asked about the frequency of taking hematinics, 236(70.03%) of the study population took their medication daily, 92 (27.30%) took their medication occasionally, 9(2.67%) never took their medication while 255(75.67%) of the participants received antimalarial prophylaxis and 82(24.33%) did not. This correlates with their good source of

information as the right information from reliable sources, helps in the formation of good attitude towards what is being talked about. Similar findings of 40% of the respondents not receiving antimalarial prophylaxis and 61.7% compliance were found in response to haematinics in previous studies.²⁸⁻³⁰

On the prevalence of anaemia and associated socio demographic factors, this study showed a marginally higher prevalence among pregnant subjects in the 21-30 years age group, with no statistically significant association between the age of the respondents and the occurrence of anaemia since $p=0.536$. Studies done in Tanzania showed that the prevalence of severe anaemia was significantly higher in women below 20 years of age (6.1%) as compared with women 30 years and older (3.6%) ($p<0.001$).² The prevalence of anaemia was significantly higher among highly educated subjects (tertiary) as compared to less educated subjects although there was also no statistical relationship between the educational status of these respondents and anaemia ($p=0.165$), this is due to the higher number of highly educated pregnant women who sought antenatal care, this contrasts a study at Thailand by which showed that there is a significant relationship between educational status and anemia in pregnancy³⁰.

A high proportion of the respondents who had anemia in pregnancy were skilled and this study has not suggested any significant association between occupation and anemia in pregnancy ($P=0.950$). With regards to parity and anemia, there was no statistically significant association ($p=0.548$); however, anemia was more among multigravida. This study is inconsistent with previous reports which indicates that the multiparous women are a high-risk obstetric patient.³⁰ Same levels of insignificant statistical association to food taboo,

frequency of use of insecticide treated nets and use of hematinic with anemia was seen ($p>0.05$).

Of note, this study elucidated a statistically significant association between having malaria in index pregnancy and anemia ($p=0.04$), which is attributed to malaria being an important contributor causal factor of anemia in pregnancy. There is no statistically significant association between those who received antimalarial and anemia in pregnancy($p=0.536$). A similar study showed no statistically significant association with intermittent preventive treatment with antimalarial in Gambian multigravida ($p=0.16$).²⁸

Conclusion

The study showed that no association exist between the sociodemographic factors and despite the high level of adherence to the anaemia preventive practices no association was observed. However, malaria in index pregnancy was significantly associated with anaemia. This study also showed that most of the respondents heard about anaemia in pregnancy, its complications and anaemia preventive measures, with a greater percent of them having heard it from the hospital. Respondents largely showed high adherence to the anaemia preventive practices by usage the insecticide treated nets, anti-malarial prophylaxis and haematinics.

Conflict of interest: None declared.

Ethical clearance: The study was approved by the Ethical Review Committee of Central Hospital Warri, Delta State, Nigeria.

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Authors' contribution: All the authors were equally involved in concept and design of the study, data collection, analysis, manuscript preparation, revision and finalization.

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