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Pregnant Women and Persisting Challenge of Anaemia in Ebonyi State, South-East Nigeria

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Abstract: *A prospective survey for gestational anaemia was conducted on 307 pregnant women (11-38 weeks gestation) of the northern side of Ebonyi State. The socioeconomic and obstetric data were collected through semi-structured questionnaire. The haemoglobin levels of the subjects were assessed by Drabkin (cyanmethaemoglobin) method and used as the index of anaemia. Statistical analysis was done with computer software: "Statistical Program for Social Sciences" (SPSS for windows version 15.0). The result showed that approximately 77.4% of the women were anaemic; with majority falling within moderate and mild type of anaemia. We concluded that anaemia in pregnancy was still on the increase. Parity, occupation, level of education and living accommodation seemed to be significant predisposing risk factors to the prevalence of gestational anaemia.*

Key words: *Anaemia, Gestation, Prevalence, Abakaliki, Izzi and Nigeria.*

I. Introduction

Vulnerability to anaemia has reportedly been credited to pregnant women and children of early-school age than any other population group [1 and 2]. Anaemia during pregnancy has received much concern, probably for the cost of the mother and her child. The prevalence of the gestational anaemia is reportedly higher in developing countries, Africa having the range of 35-72% [3], with a record of up to 99% of the total maternal mortality [4]. The degree and distribution of the anaemia is multifactorial. Geographical location [5], as well asculture and belief of the people cansometimes contribute to that. Some believe that certain food should not be consumed or that some foods are traditionally ruminant in nature and cannot be part of their staple foods [6].
The present study is a prospective study on the prevalence of anaemia of gravida among the South-East Nigerian population.

II. Materials And Methods

Abakaliki and Izzi Local Government Areas both of which are within the northern part of Ebonyi State were considered for the study. Two referral hospitals – Federal Medical Center (now Federal Teaching Hospital), Abakaliki and St Vincent Hospital, Ndubia (SVHN) were respectively selected. A total of three hundred and seven (307) pregnant women attending antenatal clinic in the two hospitals were recruited for the study. St Vincent Hospital is a missionary Hospital, which in partnership with the State Government, conducts antenatal clinic free of charge for all pregnant women. In other words, even the most indigent women were availed the opportunity of free antenatal services. The selection was done by simple random method. Approval for the study was given by the health authorities of the two hospitals, as well as Ebonyi State University Abakaliki, Nigeria, under which the study was done.On the description of the study (in Igbo Language and the local Izzidialect, with the help of a translator) the women all gave their written informed consents.

At recruitment, the obstetric and demographic data of the participants were collected through a structured questionnaire. The maternal anthropometrics were also taken. The weights and heights were taken through portable weighing balance and stadiometerrespectively.Both last menstrual period (LMP) and fundal height were used for the estimation of gestational age. With the help of the health experts, 2.0 ml of non-fasting venous blood sample was collected from each participant within the morning hours and dispensed into EDTA bottle and mixed well. The haemoglobinconcentration was determined immediately using standard methods according to the description by [7].

With the aid of micropipette, 20µl of the blood sample was pipetted into test tubes containing 4 ml of Drabkin's neutral solution in triplicates. The tubes were stoppered, adequately mixed and left (protected from sunlight)for 4-5 minutes at room temperature; after which the absorbance were read in spectrophotometer at 540

nm wavelength. The values were read off from standard calibration curve, and the average taken as the patient's final haemoglobin value.

Data were analyzed using SPSS (version 15.0). One way ANOVA, students' t-test and Pearson correlation were used for statistical significance at $p<0.05$.

III. Results

Out of 307 pregnant women recruited for this study, two (2) were dropped along the line on health ground, one declined to donate her blood sample (for her reserved reason(s)) and one of the blood samples was found clotted during screening.

Table 1 showed the characteristics of the study subjects at a glance. The pregnant women were within the mean age of 27 years; gestational age of 23 weeks; with mean energy status (BMI) of 26.3 kg/m^2.

The Hb level of the pregnant women was classified according to the WHO classification of 1996 [8]. The prevalence of anaemia among the subjects was 77.9%, most of which were of moderate and mild types (figure 1).

The age of the women as well as their gestational age did not show any significant ($p>0.05$) effect on either the mean [Hb] or the prevalence of anaemia (table 2).The parity of the pregnant women showed significant relationship with the mean [Hb] and the prevalence of anaemia (table 2). The primigravida and grandmultiparous (>3) women showed significantly lower mean [Hb] than other women ($p<0.05$), whereas prevalence of anaemia was significantly higher among the participants with parity of 3 and above ($p<0.01$).

The occupation of the participants showed a significant effect on their mean [Hb] and the prevalence of anaemia (table 3). The women who were more actively engaged (artisans and farmers) showed significantly lower mean [Hb] ($p<0.05$) and higher prevalence of anaemia ($p<0.05$) than the less active women (house wives, civil servants and students).

The result showed a significant relationship between the educational level and the mean [Hb], as well as the prevalence of anaemia of the pregnant women (table 3). Those who were less formal educationally trained (no formal education and primary education) were significantly of lower mean [Hb] ($p<0.01$) and higher proportion of anaemia ($p<0.001$) than those who acquired post-primary education.

There was a significant influence of the living accommodation of the participants on their mean [Hb] and the prevalence of anaemia (table 3). The subjects living in single room and bungalow showed significantly lower mean [Hb] ($p<0.01$) and higher prevalence of anaemia ($p<0.001$) than those residing in flat.

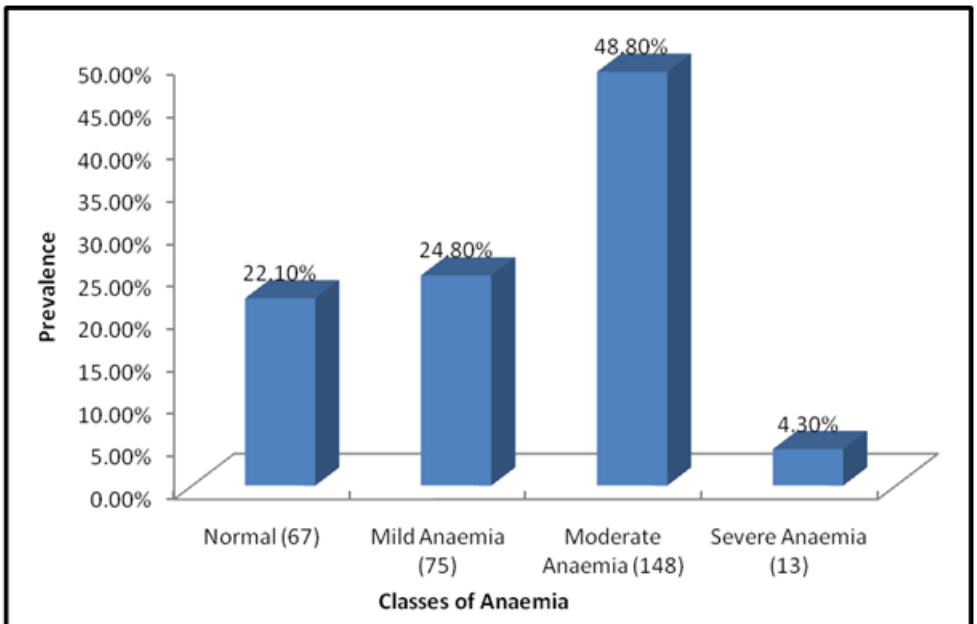

Figure 1: Anaemia Classification

In figure 1 above, the numbers on top bars were the prevalence of the respective class of anaemia; while those in brackets along the x-axis were the population sizes (number examined) in each case.

[Hb]>11 g/dl – normal; [Hb] 10-11 g/dl – mild anaemia; [Hb] 8-10 g/dl – moderate anaemia; [Hb]<8 g/dl – severe anaemia (WHO/UNICEF/UN, 1996).

Table 1: The Maternal Characteristics

Parameter	Range	Mean (s.d)	No Examined
Age (years)	15-40	27.32 (5.18)	304
Gestational Age (weeks)	11-38	22.99 (4.48)	305
Weight (kg)	40-109	64.80 (12.65)	305
Height (m)	1.3-1.8	1.57 (0.09)	305
BMI (kg/m^2)	17.3-42.6	26.31 (3.91)	305
Hb (g/dl)	6.3-13.3	10.05 (1.33)	303

S.D: Standard Deviation

Table 2: Effects of Age, Gestational Age and Parity on Gestational Anaemia

Factors		N	Mean±s.d (g/dl)	% Anaemia
Age (years)	<20	16	9.30±1.46	87.5
	20-24	70	9.80±1.49	77.1
	25-29	112	10.24±1.27	75.9
	30-34	74	10.17±1.19	77.0
	35-39	24	10.18±1.07	87.5
	>39	6	9.87±1.87	66.7
	Total	303	10.06±1.33	77.8
Ges.Age (weeks)	<12	2	9.20±0.71	100
	12-17	28	10.26±1.30	82.1
	18-23	128	10.08±1.39	75.8
	24-29	125	10.00±1.35	76.8
	30-35	14	9.89±0.72	100
	>35	6	10.32±1.06	66.7
	Total	303	10.05±1.33	77.9
Parity	Nullipara	100	9.78±1.47 [a]	79.0 [b]
	Primipara	61	10.48±1.36 [a]	65.6 [b]
	2	42	10.21±1.32 [a]	71.4 [b]
	3	29	10.13±0.67 [a]	96.6 [b]
	>3	71	9.95±1.22 [a]	83.1 [b]
	Total	303	10.05±1.33 [a]	77.9 [b]

In table 2, Values with superscripts "a" and "b" were significant at $p<0.05$ (ANOVA used) and $p<0.01$ (Pearson's X^2 used) respectively.**N**: population size (number examined).

Table 3: Effects of Maternal Occupation, Educational Level and Living Accommodation on the Incidence of Gestational Anaemia

Factors		N	Mean±s.d (g/dl)$^+$	% Anaemia*
Occup.	H/W	49	10.42±1.34 [a]	69.4 [£]
	C/S	76	10.31±1.32 [a]	72.4 [£]
	Artisans	92	9.74±1.27 [a]	84.8 [£]
	Students	33	10.05±1.55 [a]	66.7 [£]
	Farming	53	9.90±1.17 [a]	88.7 [£]
	Total	303	10.05±1.33 [a]	77.9 [£]
Edulev.	None	51	9.67±1.13 [b]	94.1 [§]
	Pri.	74	9.83±1.25 [b]	87.8 [§]
	Sec.	105	10.27±1.35 [b]	68.6 [§]
	Tertiary	70	10.29±1.39 [b]	68.6 [§]

	Total	300	10.07 ± 1.32 [b]	77.7 [§]
Livacc.	S/room	121	10.09 ± 1.31 [b]	76.9 [§]
	Flat	72	10.45 ± 1.44 [b]	62.5 [§]
	Bungalow	106	9.75 ± 1.21 [b]	89.6 [§]
	Duplex	1		100 [§]
	Total	300	10.05 ± 1.33 [b]	78.0 [§]

Table 3:- H/W: House wife; **C/S:** Civil servants; **Occup:** Occupation; **Edulev:** Educational level; **Livacc:** Living accommodation; **S/room**: single room; **Pri:** primary; **Sec:** secondary.
* % Anaemia: values with superscripts £ and § were significant at $p<0.05$ and $p<0.001$ respectively (Pearson's X^2 used.).
+ Values with superscripts 'a' and 'b' were significant at $p<0.05$ and $p<0.01$ respectively (ANOVA used).

IV. Discussion

From the finding of this study, it showed that prevalence of anaemia continues to increase among Nigerian pregnant women in spite of the intervention programmes from the government. The overall prevalence of the gestational anaemia was 77.9%, indicating that the prevalence was increasing from the previous report [9], on the same population (72.2%), which was, even though lower than, comparable to the finding of the present study. Our speculation on this finding was based on the earlier report of [10], that malaria parasitaemia was endemic in Abakaliki, complicated by late registration for antenatal care by pregnant women. Malaria parasitaemia is one common cause of anaemia [11], particularly in tropical countries like ours, and late registration for antenatal services would restrict the women from early and adequate health care, necessary for their gestation. In addition, the people of our study area still held to the culture which forbad women from eating meat from certain animals especially when they are pregnant, believing that the kids would mimic some characteristics of such animals in their latter stage of life after birth. Meat from such animals could form major source of iron for their healthy gestation since iron deficiency is noted to be the primary cause of anaemia [12 and 13]. These could possibly contributeto the relatively high prevalence of anaemia in the present study irrespective of the efforts of the government on various intervention programmes (like free ante natal services, immunization and distribution of insecticide treated nets, etc.).

Lower prevalence has been detected from other parts of the South-Eastern Nigeria: 40.4% in Enugu [14], 68.8% in Owerri [15] and 44.7% detected in Lagos, South-West Nigeria [16], as well as other parts of the world: 42.3% in Malaysia [17] and 51.4% in Iran [18].

Even though the prevalence of anaemia in the present study was above the 1992 WHO record for Africa (35-72%), the result is still comparable to earlier reports of 76.5% in South-West Nigeria [19] and 77% in Bangladesh [20]. However, the present study recorded lower prevalence than 80% recorded for Tanzania (Enwonwu*et al*, 2004); 87% recorded for India and 96.5% detected by Gautam *et al*, (2000), [21], in the same locality.

Detection of severe type of anaemia in this study showed the level of vulnerability of our study population to anaemia. Severe anaemia, though relatively low in this study (4.3%) was not detected in the recent studies within and outside the South-East Nigeria [22, 23 and 24]. Its detection in this study may not be so surprising following the parasitaemia and low approach to antenatal clinics of the people as already noted above.

In the overall population surveyed, there was generally low mean Hb level and high prevalence of anaemia detected in all the age groups. But this study did not show any significant effect of age on the rate of anaemia. However, high prevalence ofanaemia at <20 years supported the earlier findings on similar studies [25 and 26].

Non-dependence of anaemia prevalence on age in the present study does not agree with the claims of some similar studies on the women of South-Eastern Nigeria [27] who claim that maternal age was a predisposing risk factor to gestational anaemia, but agrees with the findings of Dim and Onah (2007), [14], and Idowu *et al* (2005), [19], who rather reported different views.

The gestational age also showed no significant influence on the mean Hb level and prevalence of anaemia ($p>0.05$). The relationship did not follow a definite pattern, but those at the last stages of first (<12 weeks) and third (30-35 weeks) trimesters showed overall lower mean [Hb] and higher prevalence of anaemia than those in 2nd trimester, which did not support the already established influence of haemodilution, characteristic of 2nd trimester [19]. High prevalence of anaemia at 3rd trimester in the present study, though not statistically significant, however supports the 1992 claim of WHO that prevalence of anaemia at this trimester supersedes that of the preceding trimesters.

Our study showed that parity was a significant risk factor to the prevalence of anaemia. The multiparous and grandmultiparous (>3) women were significantly more anaemic than the primigravida and

primiparous women ($p<0.01$). The reason for this finding was possibly due to the maternal Fe depletion associated with parity multiplicity [9]. This finding was at variance with the reports of earlier similar works [19], but agrees with that of [10].

The women who engaged in farming and artisans (artisans here included those in small-scale business) have lower mean [Hb] and higher incidence of anaemia than the less active women ($p<0.05$). Reason for the higher prevalence of anaemia identified among these high activity women in this study was not quite clear, but might be attributed to the stresses associated with those arduous jobs, which the women more often than not, spend long hours on, in spite of their condition.

Those who never acquired formal education and the less educated (primary education) indicated significantly lower mean [Hb] ($p<0.01$) and higher rate of anaemia ($p<0.001$) than the more educated ones. It is obvious that the women who are more enlightened would be more likely informed about the best control practices and preventive measures to anaemia. This might give reason for the disparity in the present study.

Similarly, this study detected significantly ($p<0.01$) lower mean [Hb] on the participants living in single room and bungalow. Prevalence of anaemia was also significantly ($p<0.001$) higher on the same group. Living accommodation can be litmus for poverty level of a given population. And poverty is a serious risk factor to anaemia [28].

Occupation, level of education and living accommodation were factors for possible evaluation of socio-economic status. The high prevalence of anaemia identified in the present study among the less educationally advantaged women, farmers and artisans, as well as those of low-income accommodations can be explained from the point that socio-economically weaker groups are more vulnerable to anaemia [29], owing to their consequent low accessibility to good nourishing food, early antenatal care and hygiene.

We therefore conclude that anaemiawas still prevalent in our surveyed population, with parity, occupation, educational level and living accommodation as possible predisposing risk factors.

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