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A Pattern of Diet, Micronutrient Supplementation and Haematological Status of Pregnant Women: Finding from Ikwo District, Southeastern Nigeria

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ABSTRACT

Background: *Nutritional anaemia is one of Nigeria's major public health problems. One of the major causes of anaemia is poor diet arising from poor socioeconomic conditions and corruption.* ***Objective:*** *The objective of this study is to assess the effect of type of diet on weight and some haematologic parameters of pregnant women.* ***Methods:*** *A random sampling method was used to enlist the pregnant women prospectively and consecutively. A semi-structured questionnaire was used to solicit information on diet, social status and anthropometric details. The hospital folders of the respondents were reviewed and laboratory tests carried out by standard methods.* ***Results:*** *The investigations showed that majority of the pregnant women (56.89%) were of lower social class, poorly-educated, maintained on considerable carbohydrate and protein diet, and were in the weight bracket of 50-75 kg. 168 (95.5%) of the women were not anaemic, with Packed Cell Volume (PCV) of 0.34 ± 0.6, Haemoglobin concentration (Hb) of 11.46 ± 1.2 and Red Blood Cell (RBC) count of 3.82 ± 0.6. the anaemic women were 8 (4.5%) and had PCV of 0.28 ± 0.3, Hb of 9.33 ± 1.1, and RBC count of 3.13 ± 0.4. The differences in the haematological results between the anaemic and non-anaemic pregnant women were statistically significant, $p<0.05$, except for the red cell count.* ***Conclusion:*** *In conclusion, micronutrient supplementation and absence of under nutrition ensured the good pattern of weight gain and haematological results in most of the women. The anaemic are recommended to be investigated for other possible causal factors of anaemia.*

Keywords: Anaemia, Diet, Findings, Nigeria, Micronutrient supplementation, Pregnant women

INTRODUCTION

Sustained official corruption and attendant difficult economic times continue to be unpredictable and stressful to different classes of people in Nigeria, particularly pregnant women. Poor maternal nutrition both before and during pregnancy is an important cause of poor pregnancy outcomes [1]. This is particularly true where the pregnant women have deficiencies of iron, folate and vitamin B12 [2]. Weight grain during pregnancy is widely used as an indicator of the adequacy of nutrition during pregnancy, and has been associated with infant outcomes such as mortality, prematurity and low birth weight [3,4]. Even though no previous haematological study has been done for pregnant women in the area of this present study, elsewhere, studies have shown that while weight gain in healthy populations such as the United State averages around 12.5 kg, weight gain is only 7-8 kg in many developing countries [5].

Global estimates show that 42 percent of women of reproductive age and 52 percent of pregnant women are anaemic [6]. Maternal anaemia is associated with increased rates of maternal and infant disability and death [7], as well as with significant losses in cognitive performance, productivity and gross domestic product [8].

In this study, we assessed the impact of diet and micronutrient supplementation on maternal weight and some red blood cell-based haematological values.

MATERIALS AND METHODS

The study was conducted in the Presbyterian Rural Improvement Hospital, Ndiagu Echara, Ikwo Local Government Area, Ebonyi State, Nigeria. The population of Ikwo LGA is about 2,47270 the Infant Mortality Rate (IMR) has remained high and is estimated at 99 per 1000 live births. The Maternal Mortality Ratio (MMR) ranges between 1400 and 1500 per 100,000 population which is the highest in the country [9,10]. The common eaten food in these areas includes rice, yam, cassava, beans, maize, egusi, ogbono, orah, groundnut and vegetable soups.

The subjects were recruited into the study prospectively and consecutively in an exploratory study. All the pregnant women in the three trimesters who presented were enrolled. The study was approved by the ethics committee of the hospital. The objectives of the study were explained to the women, and oral informed consent obtained in each case. The following inclusion criteria were adopted: the pregnant women were at least 18 years or more of age, and were not suffering from any acute or chronic diseases on the day of recruitment into the study while pregnant women who are ill; have active bleeding from any site; had received any form of blood transfusion within the past 8 mon; have had major surgery or road traffic accident in the last one year; and/or women with known haemoglobinopathy were excluded from the study. Identification and recording of data (Name, age, education, socioeconomic status and gestational age among others) were done by means of a semi structured questionnaire in each case.

Blood was drawn from the anticubital vein of each respondent and dispensed into green-top Ethylenediaminetetraacetic Acid (EDTA) and white-top plain polypropylene containers respectively. The samples were transported in ice packs to the medical laboratory of Michael Okpara University of Agriculture, Umudike, for analysis. The laboratory investigations were conducted within 4 h of collection.

Determination of Packed Cell Volume (PCV), Haemoglobin concentration (Hb), red cell count and blood film reading were done according to standard methods [11]. Anaemia was assessed according to World Health Organization (WHO) criteria [12]. A haemoglobin concentration of less than 110 g/l in a pregnant woman was considered an indication of anaemia. Student t-test was used to compare the haematological results of the anaemic and non-anaemic pregnant women. Significance in the differences in results was inferred at, $p<0.05$.

RESULTS AND DISCUSSION

A total of 176 pregnant women aged between 18 and 50 years were enrolled in the study. Twelve (6.8%) were in the age group of 18-19 years, whereas majority belonged to the 20-29 and 30-39 age groups. 120 (68.2%) were in the 3rd trimester of pregnancy and 48 (28.6%) were in the second trimester. The rest were in the first trimester. Majority of the women attended primary school and belonged to the lower middle classes. Only 4 (2.3%) had University education (Tables 1 and 2).

Table 1: Age distribution by trimester of the pregnant women

Age group (Years)	Trimester		
	First n (%)	Second n (%)	Third n (%)
18-19	–	8 (4.5)	4 (2.3)
20-29	8 (4.5)	32 (18.2)	84 (47.7)
30-39	–	8 (4.5)	28 (15.9)
40-49	–	–	–
50+	–	–	4 (2.3)
Subtotal	8 (4.5)	48 (28.6)	120 (68.2)
Grand total		176	

Table 2: Distribution of the pregnant women by training and academic qualification

Qualification obtained	Number
University degree	4 (2.3)
Diploma	16 (9.0)
WASC*	52 (29.5)
FSLC**	100 (56.8)
Illiterate	4 (2.3)

*West African School Certificate (Secondary); **First School Leaving Certificate (Primary)

We found out that majority of the women, 95.5% had their weight between 50-75 kg, whereas 8 (4.5%) had their weight between 35-49 kg. Generally, the women had small frames. Many of the women, 86.4% were on regular, unspecified quantity of carbohydrate and protein (meat/fish) meal. Fewer numbers took dairy products and fruits, all the women confessed to taking micronutrient supplements. However, the extent of compliance to the intake of the micronutrient supplements could not be assessed except on information volunteered by the women (Tables 3 and 4).

Table 3: Dietary and micronutrient supplementation pattern of the pregnant women

Usual die	Number of women (%)
Carbohydrate	152 (86.4)
Protein (Meat/Fish)	152 (86.4)
Diary	44 (25.0)
Fruits	12 (6.8)
Supplements	176 (100)

Table 4: Overall distribution of the pregnant women by weight

Weight group (kg)	Number n (%)
0-35	–
35-49	8 (4.5)
50-75	168 (95.5)
Total	176 (100)

Eight (4.5%) of the women were adjudged to be anaemic and had lower levels of packed cell volume, haemoglobin concentration and red cell count. The differences in the results between the anaemic and non-anaemic group, except for red cell count, were statistically significant, $p<0.05$ (Table 5).

Table 5: Some red cell-based haematological results of the pregnant women

Group	Haematological Parameters		
	PCV (L/L)	Hb (g/dl)	RBC ($X10^{12}$/l)
All (n=176)	0.33 ± 0.2	11.36 ± 1.2	3.79 ± 0.5
Anaemic (n=8)	0.28 ± 0.3	9.33 ± 1.1	3.13 ± 0.4
Non-Anaemic (n=168)	0.34 ± 0.3	11.46 ± 1.2	3.82 ± 0.6
P-value	P<0.05	P<0.05	P>0.05

This is the first study describing the results of the type of diet and micronutrient supplementation in pregnant women in Southeastern Nigeria, particularly in Ikwo Local Government Area. In this study, majority of the pregnant women were on substantial protein and carbohydrate diet and micronutrient supplementation. Over 90% of the women were adjudged not to have anaemia even as majority fell into the body weight range of 50-75 kg. This finding represents evidence of the positive effect of diet and micronutrient supplementation intervention on maternal weight gain, haematological parameters and changes in aspects of anthropometry during pregnancy. This is consistent with a previous report [13]. Although the body weight of the women were not indicated at booking, their overall weight of the women were not indicated at booking, their overall weight balance is similar to those reported in populations from developing countries [3,14,15].

By the results of this study, 168 (95.5%) of the women were not anaemic. This is a sharp contrast to a previous report where prevalence of anaemia ranged from 33-89% among pregnant women in a developing country [16]. For the studied pregnant women that are anaemic, it is unlikely that all anaemia resulted from dietary and micronutrient deficiencies. Other factors such as malaria, heavy loads of some helminthes, inflammatory and infectious diseases are also likely causes.

We therefore suggest that pregnant women in the study area be encouraged to maintain a healthy diet while government sustains the official micronutrient supply programme for pregnant women. Overall, a successful strategy to combat anaemia therefore should address all of the other causal factors of anaemia after their elucidation.

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