

# Anthropometric Assessment of Nutritional Status of Adults in a Non-Conflict Environment of the Niger-Delta Region of Nigeria

<sup>1</sup>Ibuaku J.C, <sup>1</sup>Nwajei A.I, <sup>2</sup>Aigbokhaode A.

<sup>1</sup>Department of Family Medicine, Federal Medical Centre Asaba

<sup>2</sup>Department of Public Health, Federal Medical Centre Asaba

## Abstract.

**Background of the study:** Globally, lifestyle modification as a veritable tool of preventing various non-communicable diseases is a current topic in the medical world. Efforts to regulate nutrition and maintain optimal body shape and statistics are being widely encouraged. A study of anthropometric and nutritional status of adults in peaceful environments will be helpful in extrapolating its consequences in conflicts periods. This will enable adequate preventive measures to be established to enhance appropriate intervention.

**Objectives:** To determine the socio-demographic, waist-hip ratio and body mass index of adults in a normal population.

**Methods:** A cross-sectional survey of adults between 20 to 60 years of age was undertaken in an oil-producing non-conflict environment of Delta North senatorial district of Nigeria. The study recruited 432 eligible consented healthy adults using multistage sampling methods after ethical approvals were obtained from relevant authority and community leaders. Socio-demographic factors, blood pressure, waist-hip ratio and body mass index were determined using appropriate instruments and methods.

**Results:** The results were analyzed using Statistical Package for Social Sciences SPSS version 18. The statistical significance was set at  $p < 0.05$ . It showed the prevalence of obesity, stage 1 and stage 2 hypertension among the subjects to be 16.7%, 13.7% and 5.3% respectively.

**Conclusion:** The study concluded that there is a high prevalence of obesity and pre-hypertension even in rural communities. This calls for concern because these are "precursors" of serious cardiovascular diseases with its attendant high morbidity and mortality.

**Keywords:** Anthropometric, Nutritional Status, Non-Conflict, Niger-Delta, Nigeria.

## I. INTRODUCTION

In this 21st century, there is increasing emphasis on healthy lifestyle in the form of proper nutrition and general well-being. The affluent developed countries are battling with obesity and its complications while the less developed countries are suffering the scourge of inadequate nutrition. Proper nutrition therefore is at the fulcrum of both a healthy living and adequate maintenance of health during recovery from sickness. The evaluation of anthropometry is an essential part of nutritional assessment to determine the level of malnutrition, overweight and obesity. It also denotes the loss of muscle mass, gain of fat mass and redistribution of adipose tissue.<sup>1</sup> These are highly reliable in determining and evaluating the prognosis of both acute and chronic disease in adults and assist to guide medical intervention in the elderly.<sup>2,3,4</sup> At present, many countries of the world have conflicts such as wars, earthquakes, flood disasters etc. which have led to partial or total disruption of family life in the form of internally displaced persons (IDPs) and refugees. This has created socio-economic problems with attendant worsening health indices. A study of anthropometric and nutritional status of the adult in peaceful times will be helpful in projecting the consequences of its abnormalities in conflict periods. This will enable adequate preventive measures to be put in place in case of any disaster occurrence.

## II. SUBJECTS, MATERIALS AND METHODS

### Setting

The study was conducted in the Delta North senatorial zone which comprises nine local government areas. They are generally known as the Aniocha people and largely speak Ibo.<sup>5</sup> It is part of the Niger Delta region of Nigeria, the oil producing part of the country which has not been involved in conflict for very many years. Oil exploration is minimal in the Delta North senatorial zone and as such has not experienced conflicts. It consists of Aniocha/Oshimili, Ndokwa/Ukwuani and Ika ethnic nationalities. It also has inhabitants from other tribes of Nigeria. It has an estimated population of about 1.5 million.<sup>5</sup> The study was conducted in the town hall of the selected communities on the days of the outpatients health screening.

### Study Design

This was a cross-sectional survey which accessed the anthropometric and nutritional status of adults in a non-conflicts environment.

### Sample Size Determination

The formula  $n = z^2pq/d^2$  for calculating sample size for population greater than 10,000 was used to sample 432 eligible subjects.

**Sampling Technique**

The study recruited all male and female adults within the ages of 20 to 60 years who were present on each of the Federal Government sponsored free medical screening sessions of the “saving one million lives” programme mounted in the communities. The study adopted a multi-stage probability sampling method. The names of the nine local government areas were written on pieces of papers, folded and placed in a basket. One of the research assistants was requested to pick one piece of folded paper from the basket. The procedure was repeated until six local government areas were selected. In each of the six local government areas selected, all the names of the communities were written on pieces of folded paper and also placed in a basket. Another research assistant picked one paper from the basket. This was done for each of the six LGAs until one community was selected per LGA. In each of the selected communities all the adults between the ages of 20 to 60 years who met the eligibility criteria were selected.

**Inclusion Criteria**

1. Participants who had not been admitted to hospital in the last one month.
2. Participants who had been living in the communities at least for five years.
3. Participants who had not been diagnosed of heart or kidney disease with attendant fluid retention.

**Exclusion Criteria**

1. Participants who had been previously diagnosed for HIV, malnutrition or any type of cancer

**Data Collection**

The data was collected between the months of November 2016 to January 2017. Each participant selected was given a code number. They were interviewed on employment status, age, gender and marital status. The age was obtained from personal recall or reference to special events such as marriage, age of children or age during Nigerian civil war etc. The left arm sitting blood pressure was measured after the participant had rested for at least 30 minutes. The blood pressure was measured with Accoson mercury sphygmomanometer (made in England model CE 0197 MDF) to the nearest 0.1 mmHg. The height and weight were measured with a Stadiometer (made in England model RDZ120). The participants stood erect while he/she was asked to look at a horizontal object in front of him/her. A pencil was used to depress the hair and mark the height on the Stadiometer to the nearest 0.1 centimetre. The weight was measured when the subject stood erect on the Stadiometer without holding any object in the hand and after removing all objects in the pocket. The waist was measured with a stretch-resistant tape at the midpoint between the lowest palpable rib and the iliac crest, while the hip was measured with the same tape at the widest portion of the buttocks. Both measurements were made behind a screen in order to maintain privacy. A Waist-Hip ratio above 0.90 for male and 0.85 for female were taken as abnormal. Reference for Body Mass Index was taken as < 18.5kg/m<sup>2</sup> as underweight, 18.5 to 24.9kg/m<sup>2</sup> as normal, 25-29.9kg/m<sup>2</sup> as overweight while >30kg/m<sup>2</sup> was taken as obese. At the end

of each day, all the measuring instruments were re-standardized and all necessary adjustments were made.

**Statistical Analysis**

The data obtained from the interview, anthropometric measurements and the blood pressure were cross-checked and labeled serially. It was coded and inputted into the computer and analyzed with Statistical Package for Social Sciences (SPSS) version 18. Socio-demographic characteristics of the subjects was described with descriptive statistics. Chi-square statistics was used to assess associations between categorical variables. Statistical significance was set at p<0.05

**Ethical Consideration**

Ethical approval was obtained from Research and Ethics committee of Federal Medical Centre, Asaba, Delta State. Approval was obtained from the community leaders of each of the communities sampled and also individual consent was obtained from each of the participants before they were enrolled into the study. Every participant was given the opportunity to opt-in or out of the study at any point without losing any benefit. The study was at no cost to the participants. Each participant was interviewed and examined privately and the result was recorded in a computer protected with a password known only by the researchers.

**Study Justification**

The purpose of the study was to ascertain the nutritional status of adult population in Delta North senatorial zone during a peaceful, non-conflict period. It is important to note however that the environment is prone to both natural and man-made disasters and conflicts such as seasonal flooding and boundary disputes, oil spillage etc. Any lesson learnt will be of immense value in preventing, intervening and mitigating the effects of malnutrition in such periods of disaster and conflict, not only in the Niger Delta region but other surrounding regions.

**III. RESULTS**

TABLE 1. Socio-demographic characteristics of respondents.

Variables	Frequency (n=432)	Percent
<b>Age groups (years)</b>		
20 – 29	45	10.4
30 – 39	60	13.9
40 – 49	78	18.1
50 – 59	152	35.1
≥60	97	22.5
<b>Mean age of respondents 48.5 ± 12.0 years</b>		
<b>Sex</b>		
Male	200	46.3
Female	232	53.7
<b>Occupation</b>		
Unemployed	268	62.0
Employed	34	7.9
Self Employed	114	26.4
Students	16	3.7

From the table 1 above majority of the subjects were aged 50 to 59 152(35.1%) with female preponderance 232(53.7%). There were more unemployed participants in the study 268 (62.0%) than those employed while about a quarter 114(26.4%) was self- employed.

TABLE 2. Blood Pressure, BMI and Waist-hip ratio of respondents.

Variables	Frequency	Percent
<b>Stages of Blood Pressure</b>		
Normal	246	56.9
Pre Hypertension	104	24.1
Stage 1	59	13.7
Stage 2	23	5.3
<b>BMI(Body Mass Index)</b>		
Underweight	56	13.0
Normal Weight	223	51.6
Over Weight	81	18.8
Obese	72	16.7
<b>Waist Hip Ratio</b>		
<b>Male</b>		
0.00 – 0.9	133	66.5
≥0.91	67	33.5
<b>Female</b>		
0.00 – 0.85	118	50.9
>0.85	114	49.1

About half of the participants were of normal weight 223(51.6%). More than half 246 (56.95%) of the sampled population had normal blood pressure with a good number of them 104(24.1%) being pre-hypertensive. However, the prevalence of stage 1 and 2 hypertension were 13.9% and 5.3% respectively.

Prevalence of Obesity, stage 1 and 2 hypertension among the respondents is 72(16.7%), 59(13.7%) and 23(5.3%) respectively.

In both the males 133 (66.5%) and females 118 (50.9%) respondents, over half of them had normal waist hip ratio for sex.

A greater proportion 26(44.1%) and 16(69.6%) of the respondents in the age group of 50-59 years and 60 years of age had stage 1 and stage 2 hypertension, this relationship between blood pressure and age was statistically significant  $p < 0.001$ .

TABLE 3. Relationship between Respondents Blood Pressure and Socio-demographics.

Blood Pressure	Age Group of Respondents in Years				
	20 - 29 Freq (%)	30-39 Freq (%)	40-49 Freq (%)	50-59 Freq (%)	≥60 Freq (%)
Normal	34 (13.8)	37(15.0)	57 (23.2)	84(34.2)	34(13.8)
Pre Hypertension	8 (7.7)	22 (21.2)	15 (14.4)	38(36.5)	21(20.2)
Stage 1	3(5.1)	1 (1.7)	5 (8.5)	24(40.6)	26(44.1)
Stage 2	0(0.0)	0 (0.0)	1(4.3)	6(26.1)	16(69.6)
$\chi^2 75.5 \text{ p} < 0.001^*$					
	BMI (Body Mass Index of Respondents)				
	Underweight	Normal Weight	Over Weight	Obese	
Normal	32(13.0)	128(52.0)	48(19.5)	38(15.5)	
Pre Hypertension	12(11.5)	51(49.0)	19(18.3)	22(21.2)	
Stage 1	10(17.0)	29(49.2)	11(18.6)	9(15.2)	
Stage 2	2(8.7)	15(65.3)	3(13.0)	3(13.0)	
$\chi^2 4.46 \text{ p} = 0.878$					
	Sex of Respondents				
	Male Freq (%)	Female Freq (%)			
Normal	118(48.0)	128(52.0)			
Pre Hypertension	49(47.1)	55(52.9)			
Stage 1	23(39.0)	36(61.0)			
Stage 2	10(43.5)	13(56.5)			
$\chi^2 1.64 \text{ p} = 0.650$					

\*Statistically significant

TABLE 4. Association between Sex, hypertension and waist hip ratio of respondents.

Frequency (n=432)

Variable	Waist hip ratio Frequency (n=200)		Total Freq. %
	Normal Freq. %	Abnormal Freq. %	
<b>Male Blood pressure</b>			
Normal	77 (65.3)	41(34.7)	118 (100.0)
Pre-hypertension	35 (71.4)	14 (28.6)	49 (100.0)
Stage 1	16 (69.6)	07 (30.4)	23 (100.0)
Stage 2	05 (50.0)	05 (50.0)	10 (100.0)
$\chi^2 1.936 \text{ p} = 0.586$			
<b>Female Blood pressure</b>			
		Waist hip ratio Frequency (n = 232)	
	Normal	Abnormal	
Normal	61(47.7)	67 (52.3)	128 (100.0)
Pre-hypertension	31 (56.4)	24 (43.6)	55 (100.0)
Stage 1	21 (58.3)	15 (41.7)	36 (100.0)
Stage 2	05 (38.5)	08 (61.5)	13 (100.0)
$\chi^2 2.796 \text{ p} = 0.422$			

Greater proportions of both male and female respondents with both normal and abnormal blood pressures had normal

waist hip ratio, this relationship between sex, blood pressure and waist hip ratio was not statistically significant.  $p = 0.586$  and  $0.422$  for both male and female respectively.

#### IV. DISCUSSION

The study showed that about half of the respondents have normal weight. The BMI across different countries and socio demographic areas were taken to be between 18.5 to 24.9kg/m<sup>2</sup>. It is a well-established fact that under nutrition especially in women of child bearing age may predisposed to pregnancy complications such as anaemia, intra-uterine growth retardation, intra-uterine foetal death as well as low birth weight babies. The current study found that a good proportion (13.0%) of the subjects were underweight. This correlates with similar studies in Cameroun and Ghana where underweight in adults were noted to be 6% and 48% respectively.<sup>6</sup> However, other studies in Lake Victoria basin of East Africa found under-nutrition and underweight to be 26.4%.<sup>7</sup> The different

findings in different regions and countries may be due to different types of food and diets consumed by these regions as well as the poverty/affluence prevalent in the regions. It may also be attributed to the level of physical activities of the inhabitants and subjects.<sup>8,9</sup> The index study area is an agrarian community where the inhabitants engage in non-mechanized farming which involves high level of physical activity which may be an equivalence of mild to moderate exercise. Overweight and obesity had been related to increased risk of cardiovascular diseases such as myocardial infarction, cardiac arrest, sudden death etc. However, urban/rural disparity had been demonstrated in the prevalence of overweight and obesity with some prevalence as high as 37% in urban centres when compared to 17% in rural area of the same region with same cultures and race in some Asian countries.<sup>10</sup> While in Nigeria, the prevalence varied from 20.3% to 35.1%<sup>11,12-14</sup> This study found the prevalence of overweight and obesity to be 18.8% and 16.7% respectively. The difference may be due to the fact that the urban dwellers are richer than the rural ones and the urban inhabitants may be prone to more sedentary lifestyle than the rural once because of the office work which may keep them seated for long hours.

Studies have shown that there is a significant relationship between age and blood pressure.<sup>15,16,17</sup> The prevalence of hypertension is on the increase. The estimation of prehypertension in a given population will help to reduce the risk of cardiovascular disease. This is important in designing preventive programmes against hypertension. This study showed that the prevalence of stage 1 and stage 2 hypertension increases as the age increases. The overall prevalence of prehypertension in this study is 24.1% with the highest prevalence in the age 50-59 years old 38(36.5%).

#### V. CONCLUSION

The study concluded that there is a high prevalence of overweight, obesity and pre-hypertension even in rural communities. This calls for concern because these are “precursors” to cardiovascular diseases with attendant high morbidity and mortality. Hence interventions which will focus on health education and lifestyle modification should target patients equally both from the rural and urban settings.

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