

## **Prevalence of Obesity and its Relationship with Blood Pressure Pattern and Proteinuria among the Staff of Lautech Teaching Hospital. Osogbo**

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### **Abstract**

**Background:** Obesity is a predictive factor for medical disorders like raised blood pressure, diabetes, hypercholesteremia among others. The prevalence of obesity in Nigeria is said to range from 8.1% to 22.2%. This study aims to determine prevalence of overweight and obesity and its association with pre-hypertension, hypertension, proteinuria among staff of Lautech Teaching hospital responded to annual medical check-up during this years' world kidney day.

**Methodology:** Consenting volunteers across all departments/units of the hospital were invited via formal letter written to participate in the annual medical check-up to commemorate world kidney day at LTH organized by the renal unit of the hospital. Relevant data including age, sex and department of participants were documented.

Data were entered onto SPSS version 18 and descriptive analysis done to determine mean, standard deviation and percentages of continuous variables.

**Findings:** Females formed bulk 81.9% of the 343 participants.

Administrative staff were also more likely to have abnormal weight and blood pressure compared to professionals.

**Discussion:** Obesity was commoner among females and staff who were older than 35 years and this is in agreement with findings of previous researchers.

**Recommendation:** Annual medical check-up especially among staff over age 34 year should be encouraged

**Keywords:** Obesity, Blood pressure, Prevalence, Proteinuria, Lautech Staff.

### **Introduction**

Obesity is one of the predisposing factors to disease conditions such Cardiovascular diseases hence there is a need to generate data on prevalence of Obesity in our communities and provide information for individuals on their health status regarding appropriate weight for height.

Obesity is defined as excess adipose tissue. Quantity of body fat could be measured using the Body Mass Index (BMI). A fat cell is an endocrine cell and adipose tissue is an endocrine organ. As such, adipose tissue secretes a number of products, including metabolites, cytokines, lipids, and coagulation factors among others. ([www.biotech-now.org/health/2014/10](http://www.biotech-now.org/health/2014/10)).

The prevalence of obesity in Africa ranged from 3.5 % in Eritrea to about 64 % in Seychelles in 2010. The top five countries with the highest prevalence of overweight were Seychelles (64 %) followed by Mauritius (44.8%), Cameroon (43.9%), Botswana (41.6%), and South Africa (41%). Conversely, (Agyemang C, 2015) the top five countries with the lowest rates include Eritrea (3.5%), Democratic Republic of Congo (5.7%), Kenya (7.7%), Central African Republic (8.0 %), and Rwanda (8.1 %). Women in general have higher prevalence of overweight than men in all countries with the prevalence rates ranging from 3.7% in Ethiopia to 74% in Seychelles. (Agyemang C, 2015) The top five countries with the highest prevalence of overweight were Seychelles (73.8%), Lesotho (70.8%), South Africa (68.5%), Mauritania (56.8%), and Mauritius (53.5%). (Agyemang C, 2015).

In Nigeria, the prevalence of overweight individuals ranged from 20.3%–35.1%, while the prevalence of obesity ranged from 8.1%–22.2%. (Innocent I. C, 2013).

Body mass index (BMI) is a simple index of weight for height that is commonly used to classify adult with overweight and obesity. ([https://link.springer.com/10.1007/978-3-319-12125-3\\_5-1](https://link.springer.com/10.1007/978-3-319-12125-3_5-1)) It is defined as a person's weight in kilograms divided by the square of person's height in meters ( $\text{kg}/\text{m}^2$ ). A BMI of 25–29.9  $\text{kg}/\text{m}^2$  is classified as overweight and BMI of  $\geq 30$   $\text{kg}/\text{m}^2$  is classified as obesity. (<http://www.researchgate.net/publication/288991814> Obesity in Sub-Saharan Africa).

This study aims to determine the prevalence of Obesity among staff of LAUTECH Teaching Hospital (LTH) and explore relationship between obesity, blood pressure pattern and expression of protein in urine and sugar in blood.

### **Objectives of study**

1. To evaluate the general health status of Lautech Teaching Hospital staff using blood pressure, body mass index and urinary sugar and protein determination.
2. To determine relationship between body mass index and blood pressure of participants and presence of protein in urine.

### **Research methodology**

#### **Research design**

A cross sectional study involving members of staff of Lautech teaching hospital, Osogbo who came out voluntarily to participate in the free medical screening organized by the Nephrology team of the Nephrology department of the hospital to mark the world kidney day on the 8<sup>th</sup> of March 2018.

Three hundred and forty-six people participated. The free medical screening included Blood Pressure measurement in mmHg, Weight in kg, height in cm, BMI in  $\text{kg}/\text{m}^2$ , urinalysis for sugar, protein determination and pH of the urine of participants. Socio demographic data documented included age, sex, department where staff worked.

#### **Research population**

Population consist of three hundred and forty-three participants who are all members of staff of Lautech Teaching Hospital, Osogbo. They came from different departments/units of the hospital.

#### **Research setting**

The study site is Ladoke Akintola University of Technology Teaching hospital, Osogbo. Osogbo is the state capital of Osun state. It has two local governments- Olorunda and Osogbo local governments. The town lies on Latitude 7<sup>0</sup> and 46<sup>0</sup> north, and Longitude 4<sup>0</sup> and 34<sup>0</sup> east. The total land area is 47  $\text{km}^2$ .

According to the 2006 population and housing commission census, the city has a population of 156,694 people. (<https://wikivividly.com/wiki/Osogbo>) Osogbo shares boundaries with towns such as Ife and Ilesa in the east, Iwo, Ede and Ilobu in the west, Ikire in the south and Ikirun and Iragbiji in the north. It is accessible from any part of the state from which patients are referred to this hospital.

Ladoke Akintola University of Technology Teaching hospital is a tertiary health facility and it offers specialized and general healthcare to the people of Osogbo and its environs. It is a referral center for other hospitals in the state and neighboring states in south-west Nigeria.

The hospital has total of three hundred and forty-one beds and is accredited for both undergraduates and postgraduates medical training.

#### **Research sampling and sampling technique**

A non- random consecutive sampling of all volunteers who consented to the study was done.

## Method of data collection

All volunteers who consented had their sociodemographic data entered into a proforma sheet including sex, age, department/unit of the hospital, designation. The height of each participant was determined using a stadiometer and weight determined using weighing scale. The blood pressure was measured using mercury sphygmomanometer in sitting position using the left arm. Participants were provided with universal bottle with which they made urine available for glucose, protein and pH tests using urine multi-test strips.

## Method of data analysis

Data were entered into statistical package for social sciences version SPSS 18.0 with which descriptive analysis was done yielding frequency tables, mean, median, modes and standard deviation for continuous variables. Participants with body mass index (in  $\text{kg}/\text{M}^2$ ) of less than 18 were grouped as underweight, between 18 and 24.9 as normal weight, those with BMI 25 to 29.9 as overweight and those with BMI of 30-34.9 as obese while 35 or more as morbid obesity. (Elizabeth Quinn, 2018 [https://www.verywellfit.com/Fitness > Beginners](https://www.verywellfit.com/Fitness-%20Beginners).) Those whose blood pressure is less than 90/60mmHG are said to have low blood pressure, while those with systolic BP between 90-120 and diastolic BP between 60-80 mmHG are said to have ideal blood pressure. Those with systolic BP between 120 – 140 and diastolic BP between 80-90mmHG are said to have pre-high blood pressure and systolic BP 140 or more, diastolic BP of 90 or more are considered as having high blood pressure ([www.bloodpressureuk.org](http://www.bloodpressureuk.org)). Bivariate analysis was done using cross tabulation to determine if there was association between overweight and or obesity and development of hypertension or presence of glycosuria or proteinuria. Chi-square was used for categorical variables and a p-value of less than 0.05 was taken as significant.

In this study staff of LTH were grouped into four departmental groupings as follows:

**Group 1:** Grouped as secretarial staff and office workers- Accounts, Records, NHIS, Library, Civil Service, Legal, Marketing, Public Relations, Social Works, Telephone Exchange, MIS, Security, IGR, Store, Amenity, CMD'S, CMAC'S, Dental, NANNM Office, Staff Centric, CSSD.

**Group 2:** They are the professionals within the hospital- Nursing, Medical, Hematology, Community Medicine, Pharmacy, Renal, Radiology, Infant Welfare Clinic, Anesthesia, Engineering, Histopathology, Pediatrics, IHVN, Works, Laboratory, Drug Unit, Microbiology, Theatre, Biomedical (comprised Nurses, Doctors, Pharmacists, Laboratory scientists, Engineers).

**Group 3:** they work in food related area of the hospital- Catering, Kitchen, Dietetics.

**Group 4:** They are individual that did not indicate their departments.

## Limitation of study

The staff evaluated were volunteers and method of sampling was more of convenience sampling which may not be true reflection of prevalence of Obesity/Overweight among the staff since it is possible for the normal weight to have higher tendency to be less motivated compared to overweight or obese staff who may be more willing to know their state of health.

## Ethical consideration

Voluntary and verbal consent were given by the participants.

## Result

A total of three hundred and forty-three staff participated in the screening exercise of which females were 281(81.9%) while the males were 62 (18.1%). Two thirds of the study participants were in their fourth & fifth decades with mean age being  $42.29 \pm 7.587$  years. Minimum age was 18years and maximum age 62years. Over half of the participants were professionals from Nursing, Medical, Pharmacy, Engineering, Laboratory units.

Majority of participants (53.8%) weighed between 61kg to 80kg. The minimum weight was 40.0kg while the maximum weight was 125.0kg with a mean weight of  $69.197 \pm 13.6832$  kg. The minimum of height of the participants was 1.39m, maximum height was 1.87m with a mean of  $1.6176 \pm 0.77$ m. Four fifth (83.5%) were within height range 1.50 to 1.69metres.

Body mass distribution of the participants. Only 40% (137) had normal weight for height while a quarter (25.7%) was either obese or morbidly obese. The minimum BMI was  $12.90 \text{ kg/m}^2$  and maximum BMI was  $44.30 \text{ kg/m}^2$  with mean BMI being  $26.4268 \pm 5.11 \text{ kg/m}^2$ .

Over four fifth of participants had normal blood pressure with only 5% having high blood pressure. Less than 2% had abnormal sugar, protein and PH in their urine. The minimum pH was 5.0 and maximum pH of 8.5 while mean pH was  $6.542 \pm 0.7887$ .

Females in this study had a higher prevalence of overweight 95(34.1%) as against 12 (19.4%) among male participants. The female participants also had higher differential obese and morbidly obese groups compared to male counterparts. The male participants in this study had normal BMI of 74.2% which is at least double of the percentage of women (32.6%) participants that had normal weight.

Females were also found to have a higher prevalence of Pre-High Blood Pressure- 28(90.32%), against 3(9.67%) for male and High Blood Pressure—among the females- 11(61.11%), males- 7(38.8%). The trend which puts females at higher risk of having abnormal (low or high) blood pressure is found to be statistically significant  $P = 0.027$

The descriptive statistics displaying the mean and standard deviation of continuous variables in the study.

The correlation between the variables. At 0.05 level of significance, it was observed that the age of the subjects has significant effect on the blood pressure ( $r = 0.012$ ) and also on the BMI (with a correlation co-efficient,  $r$ , of 0.043), i.e. a change in the age of a staff will have a significant effect on the blood pressure as well the BMI of the respondents. The sex of participants has significant effect on weight, females being at higher risk of being overweight, obese and morbidly obese  $P= 0.000$ . Blood pressure abnormality is also significantly associated with weight ( $P= 0.024$ ) and BMI ( $P= 0.018$ ). The higher the weight and BMI the higher the chances of developing raised blood pressure.

This study showed that job status (department/unit of staff) did not significantly affect prevalence of obesity, blood pressure and weight distribution pattern though the administrative staff in group 1 tended to have higher pre-high blood pressure, higher blood pressure, overweight and obesity compared to group 2 which is the professional group but the difference is not statistically significant.

## Discussion of results

The prevalence of obesity of 25.7% in this study is slightly higher than upper limit of 22.2% quoted for Nigerian population but lower to figure quoted in America. Our sampling may be skewed towards obese staff because of sampling method compared to the participants in Innocent study (Innocent I. C, 2013).The prevalence of obesity in 2013- 2014 was 35 percent among men and 40 percent among women, and between 2005 and 2014, there was an increase in prevalence among women, but not men, according to an American study. (Cynthia L, 2014), This is in agreement with the findings in this study which shows significance in the level of females being at higher risk of being overweight, obese and morbidly obese  $P= 0.000$ . A study showed that men in urban areas tended to have higher proportion of obesity compared to men in rural areas but showed that overall obesity is more prevalent among females. (M Alqarni SS, 2016). In another study, obesity is common among adult Nigerians residing in Lagos. However, its prevalence is higher in females and increases with age (Bello B. T, 2016) which is also in line with the findings in this study which reveals that a change in the age of a staff will have a significant effect on the blood pressure as well the BMI of the respondents i.e. the higher the age, the higher the chances of being overweight and developing high blood Pressure. In another study, obesity increased with age and this finding is consistent with reports in the literature. (Cameron AJ,2003, Bakari AG ,2007, Puepet FH, 2002, Adedoyin RA,2009].

The rate of overweight and obesity is higher among women than among men and in urban areas compared to rural areas (Agyemang C, 2015) is also in consistence with this study in which Group 2 which are the professionals are found to have the highest prevalence in Overweight -57 (53.27%), Obese-42 (50%) and Morbidly Obese - 4 (100%) this however is not statistically significant but should be of note.

In this study, women were more obese than men and this is in agreement with studies in the literature (Flegal KM,2008, Bakari AG ,2007, Puepet FH, 2002, Adedoyin RA,2009).

Obesity has been recognized as most important risk factor for developing hypertension. (Narkiewicz K.2006, Aneja A2004, Lee SH,2005, Diaz M.2002) which is in keeping with the result of this study where the correlation result of blood Pressure against the weight is significant 0.021.

The administrative staff compared to professional staff was heavier and had higher tendency to have pre-hypertension and hypertension and obesity compared to professionals. This might be because the professionals are likely to have better knowledge of good nutrition and thus feed nutritiously better than administrative staff group.

## **Recommendation**

It is important to carry out basic investigations on annual basis particularly for staff from 35years and above for early detection of disease condition and commence early intervention as prevalence of obesity and pre-hypertension and hypertension is higher at this age group.

Further study should be carried to show if the income of individual has any influence on the body weight.

Group 1 who are essentially hospital administrative staff should engage in more physical exercise and eat balance diet, eat less of junk food and eat more of fruits and vegetables.

Focus and emphasis should be on healthy diet which should include more fruits and vegetables, increase physical activity and exercises, weight reduction plans should be made for people that their BMI is above 24.9 kg/m<sup>2</sup>.

All individual with pre high Blood pressure and high blood pressure should be advised to get a digital sphygmomanometer for continuous monitoring at home; this will enable the patient to report early to the hospital if any abnormality is detected.

Our government should encourage more farmers to grow fruits and vegetables and provide loan to willing farmers so that we have more fruits and vegetables at affordable prices.

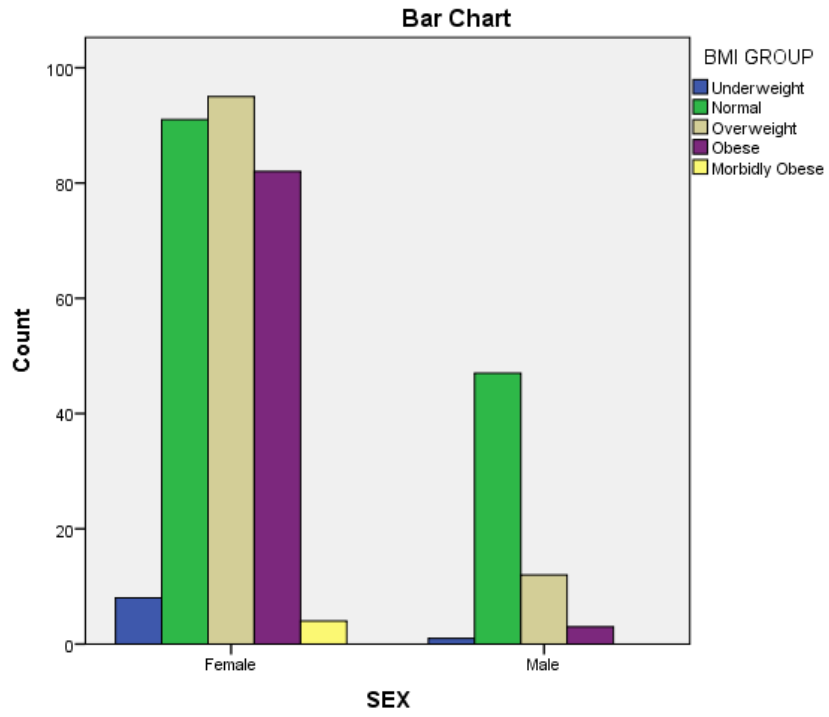
Women should discipline their appetite more especially when cooking for the family.

Nigeria government should assist the ministry of health to improve health education from national level to the grass root teaching on how to eat wisely and teach the ideal weight and importance of maintaining ideal weight should be thought in the media and social media.

## **Conclusion**

Age and body mass index are predictive factors for health indices. All staff above age 35 and with BMI in the obese range should check state of health especially blood pressure and urinary protein at least quarterly to detect onset of hypertension or proteinuria.

**Figures and table**



**Table 2.** Correlation table

		DEPARTMEN T	BLOOD PRESSUR E	WEIGHT	HEIGHT	BODY MASS INDEX	pH	AGE
DEPARTMENT	Pearson Correlation	1	.021	-.058	.171**	-.131*	.000	-.017
	Sig. (2-tailed)		.695	.289	.002	.016	.999	.749
	N	338	338	338	337	336	337	338
BLOOD PRESSURE	Pearson Correlation	.021	1	.123*	-.063	.129*	.066	.199**
	Sig. (2-tailed)	.695		.024	.250	.018	.228	.000
	N	338	340	340	339	338	339	340
WEIGHT	Pearson Correlation	-.058	.123*	1	.227**	.783**	.001	.108*
	Sig. (2-tailed)	.289	.024		.000	.000	.978	.047
	N	338	340	340	339	338	339	340
HEIGHT	Pearson Correlation	.171**	-.063	.227**	1	-.192**	-.062	.055
	Sig. (2-tailed)	.002	.250	.000		.000	.259	.316
	N	337	339	339	339	338	338	339
BODY MASS INDEX	Pearson Correlation	-.131*	.129*	.783**	-.192**	1	.053	.074
	Sig. (2-tailed)	.016	.018	.000	.000		.328	.174
	N	336	338	338	338	338	337	338
pH	Pearson Correlation	.000	.066	.001	-.062	.053	1	.038
	Sig. (2-tailed)	.999	.228	.978	.259	.328		.491
	N	337	339	339	338	337	339	339
AGE	Pearson Correlation	-.017	.199**	.108*	.055	.074	.038	1
	Sig. (2-tailed)	.749	.000	.047	.316	.174	.491	
	N	338	340	340	339	338	339	340

\*\* . Correlation is significant at the 0.01 level (2-tailed).

\*Correlation is significant at the 0.05 level (2-tailed).

The above table shows the correlation between the variables. At 0.05 level of significance, it was observed that the age of the subjects has significant effect on the weight ( $r = 0.012$ ) and also on the BMI (with a correlation co-efficient,  $r$ , of 0.043), i.e., a change in the age of a staff will have a significant effect on the blood pressure as well the BMI of the respondents.

The table also shows that the weight has a significant relationship with the blood pressure (with a correlation co-efficient,  $r$ , of 0.012).

The correlation between the weight and the protein level showed a correlation co-efficient ( $r$ ) of 0.13. This implies that protein has a significant effect on the weight since protein aids cell growth.

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