

## Prevalence of Overweight and Obesity Among Staff of a Tertiary Institution in Kumasi, Ghana

David Ben Kumah\*, Solomon Sarpong Merepa, Beatrice Adamptey, Benjamin Brifa Bempong, Dillys Aku Dede Ame-ga, Reynolds Kwame Ablordeppey, Eugene Appenteng Osaе and Ivon Walier Nuo-Ire Kuutiero

*Department of Optometry and Visual Science, Kwame Nkrumah University of Science and Technology, Kumasi, Ghana*

**\*Corresponding Author:** David Ben Kumah, Department of Optometry and Visual Science, Kwame Nkrumah University of Science and Technology, Kumasi, Ghana.

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### Abstract

The study aimed at investigating the prevalence and gender distribution of overweight and obesity among staff at the Kwame Nkrumah University of Science and Technology (KNUST). In a cross-sectional study using simple random sampling, 250 staff members of KNUST aged 25 to 60 years were selected. Height (m) and weight (kg) were measured using standard procedures and body mass index (BMI) was calculated. Overweight and obesity were determined using WHO classification. The Statistical Package for Social Scientists version 20.0 was used to analyze data. Descriptive statistics and independent sample t-test were employed. The prevalence of overweight was 34.4% and that of obesity was 6.0% among the staff of KNUST. The difference in BMI between males and females was not significant ( $p > 0.05$ ), but males were significantly taller and heavier than females ( $p < 0.05$ ). A significant number of the subjects were overweight and obese and may be at risk of associated disease conditions.

**Keywords:** Prevalence; Obesity; Overweight; Body Mass Index; Anthropometric Measurements

### Abbreviations

BMI: Body Mass Index; KNUST: Kwame Nkrumah University of Science and Technology; WHO: World Health Organization

### Introduction

Overweight and obesity have both been defined as abnormal or excessive accumulation of fat that may endanger one's health [1]. The increasingly high prevalence and the enormous contribution to both morbidity and mortality, as well as the economic implications have made issues of obesity and overweight a public health concern [2].

From the World Health Organization fact sheet report, in 2004 there were over 1.9 billion adults (18 years and over) who were overweight. Out of these, obesity was reported in over 200 million men and nearly 300 million women. About 65% of the world's populations live in countries where overweight and obesity kill more people than underweight [1]. Some reports show that obesity has increased from 4.2% in 1990 to 6.7% in 2010 worldwide and is expected to reach 9.1% in 2020 [3].

In West Africa, the prevalence of obesity has increased rapidly during the last two decades and continues to increase. A recent study of the prevalence of obesity in West Africa indicated that between 2000 and 2004, 10% of West African adults were obese [4]. In Ghana, the prevalence of obesity has risen steadily from as low as 0.9% in the 1980s to about 14% in 2003 [5] and is more common among women than men.

Some disease conditions have been associated with obesity. Left ventricular hypertrophy which may occur in the presence of systemic hypertension has also been shown to have a relation with clinically severe forms of obesity [6-8]. Hypertension, a chronic and often fatal

disease condition is about three times more likely to develop in obese individuals than normal-weight persons [9]. This relationship may be a cause-and-effect type; when weight increases, blood pressure increases and vice versa [10].

Obesity and overweight have again been associated with especially Type 2 diabetes and the resultant diabetic retinopathy and cataract (the leading cause of blindness and visual impairment) formation. Diabetic retinopathy and hypertensive retinopathy are ocular conditions that could result in blindness. The adverse effects of both overweight and obesity on the individual and the nation have made studies in this area very important for public health policies [11].

This study was therefore intended to determine the prevalence of obesity and overweight among the staff of a tertiary institution (KNUST) in order to make the public aware of the increasing rate of obesity and overweight.

## **Materials and Methods**

### **Sampling**

This was a descriptive cross sectional study involving 250 teaching and non-teaching staff of the Kwame Nkrumah University of Science and Technology, between January 2012 and February 2012. KNUST is located in the Kumasi metropolis of the Ashanti region in Ghana. Simple random sampling was employed to select subjects from every department of the institution to make the total sample size.

### **Anthropometric Measurement**

Standardized protocols were employed during the anthropometric measurements [12]. The height (m) of subjects was measured as they stood erect, bare footed with legs together against a height measuring tape fixed to a wall. The height was measured from the sole of the feet to the crown of the head. Subjects' weight in kilograms (kg) was measured without shoes using a previously standardized weighing scale. Body Mass Index (BMI) was calculated for each subject using the subject's weight and height based on the formula,  $BMI = \text{weight (kg)} / \text{height squared (m}^2)$  [13]. Subjects were classified as overweight and obese based on the WHO criteria [14].

### **Data Analysis**

The data collected was analyzed by using the Statistical Package for Social Scientists (SPSS) software (version 20.0, Chicago, USA). The anthropometric parameters were examined using descriptive statistics. Gender differences in anthropometric parameters were tested using the independent t-test. P values less than 0.05 were considered as significant.

### **Ethical Consideration**

All participants signed informed consent forms before they were included in the study. Approval to perform the study was also sought from the various departmental authorities. All study protocol conformed to the Declaration of Helsinki.

## **Results and Discussion**

Two hundred and fifty subjects, made up of teaching and non-teaching staff, were enumerated for the study. This number comprised 234 males (93.6%) and 16 females (6.4%). The study involved subjects between ages 24 and 61 years. The age range for males was 25 - 59 years while that of the females was 28 - 52 years. The mean ( $\pm$ SD) age for the study subjects was  $42.67 \pm 10.09$  years and the mean ( $\pm$ SD) BMI of the study subjects was  $24.62 \pm 4.08$  kg/m<sup>2</sup>. A summary of the distribution of the anthropometric measurements among gender is shown in Table 1. The difference in BMI between males and females was not significant ( $p > 0.05$ ) but males were significantly taller and heavier than females ( $p < 0.05$ ).

Parameters	Males		Females	
	Mean $\pm$ SD	95%CI	Mean $\pm$ SD	95%CI
Weight	71.49 $\pm$ 11.27	70.02, 73.25	70.31 $\pm$ 15.52	66.26, 74.35
Height	1.71 $\pm$ 0.06	1.70, 1.71	1.66 $\pm$ 0.00	1.64, 1.68
BMI	24.67 $\pm$ 3.17	23.88, 24.99	25.00 $\pm$ 4.97	24.12, 26.53

**Table 1:** Gender Distribution of Anthropometric measurements.

BMI: body mass index. CI: confidence interval

The mean BMI recorded in this study was within the expected normal range of BMI as recommended by the World Health Organization. The range of BMI recorded for the studied subjects was from 17.85 kg/m<sup>2</sup> to 38.93 kg/m<sup>2</sup>. Results from this research show that, 8 (3.2%), of the subjects were underweight, 141 (56.4%) were within normal range of BMI, 86 (34.4%) were overweight and 15 (6%) were obese based on WHO classification. According to the WHO, an adult BMI of 30 kg/m<sup>2</sup> or greater is considered as obese and a BMI between 25kg/m<sup>2</sup> and 30kg/m<sup>2</sup> is regarded as overweight.

Obesity and overweight were more prevalent in males than in females and also less prevalent in the younger age groups than the older age groups. The prevalence of obesity recorded in this study is less than that reported in a similar study done in a Nigerian tertiary institution which was 9.1% [15]. The discrepancy in these results could be due to the difference in the sample sizes and target population (inclusion of students). Our sample size was 250 while theirs were 471 but with similar age ranges. Again, the obesity prevalence (6%) recorded in our study is higher than the 4.2% reported in a study done in Jos Nigeria [16]. It was however lower than the obesity prevalence recorded in studies conducted in Nepal, Australia and the United States of America [16-18]. These differences in results could be attributed to the differences in races in the various studies since some races may be more predisposed (biological or lifestyle) to being overweight and obese than others [19,20].

The design of our study did not allow for understanding reasons for the distribution of obesity and overweight among the genders. However, other studies state culture as the reason why females may be more overweight or obese than their male counterparts [21]. One study showed that obese females regard weight gain as a sign of wealth and joy. Many others also believe that being obese provided the required energy in their sports and accorded them the needed respect [22].

Furthermore, this is demonstrated by undocumented accounts from some areas in Ghana, where increase in weight is regarded as the result of eating quality and healthy food.

Table 2 above sums up the prevalence rates of normal weight, underweight, overweight and obesity according to gender of the university's staff.

Gender	Prevalence rate (%)				
	Under weight	Normal weight	Overweight	Obesity	Total
Male	2.8	52.8	33.2	4.7	93.5
Female	0.4	3.7	1.2	1.2	6.5
Total	3.2	56.5	34.4	5.9	100

**Table 2:** Prevalence of underweight, normal weight, overweight, and obesity according to gender.

It is worth noting that this study relied only on anthropometric measurements to determine whether or not the University staff members fell in any of the following groups: normal weight, underweight, overweight or obese. This study did not consider the socioeconomic

status and lifestyle of the study subjects. However, these are considered in other studies. For example, one study found a significant correlation between smoking and overweight and obesity [21], and other studies show positive associations between some psychosocial factors like loneliness and social isolation [22].

Although certain limitations could not allow us to consider the socioeconomic status, marital status, smoking, behavioral patterns, dietary factor and loneliness and how these may contribute to their different weight statuses, it is still prudent from other studies [21,23] to say that these factors may contribute to our results in this study.

## Conclusion

The study showed that the prevalence of overweight (34.4%) was high among the staff of the University. Therefore, it is necessary to institute quality and efficient health programs to increase the awareness of the negative effects of overweight and obesity. When this is properly done, the possible complications that are linked to overweight and obesity may be reduced.

## Conflict of Interests

The authors declare that there is no conflict of interests concerning the publication of this paper.

## Bibliography

1. "Obesity and Overweight". *World Health Organization* (2014).
2. RJ Kuczmanski, *et al.* "Increasing prevalence of overweight among US adults: The National Health and Nutrition Examination Surveys 1960 to 1991". *Journal of the American Medical Association* 272.3 (1994): 205-211.
3. M De Onis, *et al.* "Global prevalence and trends of overweight and obesity among preschool children". *The American Journal of Clinical Nutrition* 92.5 (2010): 1257-1264.
4. AR Abubakari, *et al.* "Prevalence and time trends in obesity among adult West African populations: a meta-analysis". *Obesity Reviews* 9.4 (2008): 297-311.
5. A G Amoah. "Sociodemographic variations in obesity among Ghanaian adults". *Public Health Nutrition* 6.8 (2003): 751-757.
6. FH Messerli, *et al.* "Overweight and sudden death: increased ventricular ectopy in cardiopathy of obesity". *Archives of Internal Medicine* 147.10 (1987): 1725-1728.
7. MA Alpert and MW Hashimi. "Obesity and the heart". *The American Journal of the Medical Sciences* 306.2 (1993): 117-123.
8. J Duflo, *et al.* "Sudden death as a result of heart disease in morbid obesity". *American Heart Journal* 130.2 (1995): 306-313.
9. ITB Van. "Health implications of overweight and obesity in the United States". *American Journal of Internal Medicine* 103 (1985): 983-988.
10. WB Kannel, *et al.* "The relation of adiposity to blood pressure and development of hypertension: the Framingham study". *Annals of Internal Medicine* 67.1 (1967): 48-59.
11. S Kastelan, *et al.* "Body Mass Index: A Risk Factor for Retinopathy in Type 2 Diabetic Patients". *Mediators of Inflammation* (2013).
12. T Lohman, *et al.* "Anthropometric Standardization Reference Manual". *Human Kinetics Books, Champaign, Ill, USA* (1988).

13. AD Quetelet. "Physique De 'LHomme, quoted by pengelly CDR. Body mass index and abdominal girth in the diagnosis of obesity". *Proceedings of the Royal College of Physicians of Edinburgh* 24 (1994): 174-180.
14. "Obesity: preventing and managing the global epidemic". *Geneva: World Health Organisation* (2000).
15. UP Mwuese and OI Chinyere. "Prevalence of Obesity amongst Staff and Students of a Tertiary Institution in Nigeria". *IOSR Journal of Dental and Medical Sciences* 10.4 (2013): 24-28.
16. FH Puepet., *et al.* "Prevalence of overweight and obesity among urban Nigeria adults in Jos". *Highland Medical Research Journal* 1.1 (2002): 13-16.
17. Nyaruhucha CNM., *et al.* "Prevalence and awareness of obesity among people of different age groups in educational institutions in Morogoro, Tanzania". *East African Medical Journal* 80.2 (2003): 68-72.
18. AK Vaidya., *et al.* "Association of obesity and physical activity in adult males in Dhahran, Nepal". *Kathmandu University Medical Journal* 4.2 (2006): 192-197.
19. Kaiser Family Foundation analysis of the Centers for Disease Control and Prevention (CDC)'s Behavioral Risk Factor Surveillance System (BRFSS) 2013-2015 Survey Results.
20. S Caprio., *et al.* "Influence of Race, Ethnicity, and Culture on Childhood Obesity: Implications for Prevention and Treatment: A consensus statement of Shaping America's Health and the Obesity Society". *Diabetes Care* 31.11 (2008): 2211-2221.
21. K Peltzer and S Pengpid. "Overweight and obesity and associated factors among school- aged adolescents in Ghana and Uganda". *International Journal of Environmental Research and Public Health* 8.10 (2011): 3859-3870.
22. T Puoane., *et al.* "Perception about body image and sizes among black African girls living in Cape Town". *Ethnicity and Disease* 20.1 (2010): 29-34.
23. H Mohammed and F Vuvor. "Prevalence of childhood overweight/obesity in basic school in Accra". *Ghana Medical Journal* 46.3 (2012): 124-127.

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