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Incidence of overweight and obesity among female working class: Case study in Federal Polytechnic, Idah, Nigeria

Abu J D, Aroh C M
Department of Food Science and Technology, Federal Polytechnic, Idah, Kogi State, Nigeria

Abstract
This study investigated the incidence of obesity among the female working class in Federal Polytechnic, Idah. Cross-sectional survey and random sampling of one hundred and ninety-three respondents selected between the ages of 20–60 years were used. Structured questionnaire was also used to collect socio demographic data of the respondents. The anthropometric measurements were carried out and analysis conducted using standard methods. Results showed that the body mass index, waist circumference and body fat percentage varied from 27.55-29.41kg/m^2, 88.69-99.44cm, and 25.62-30.01% respectively with 36.26% being overweight, 37.82% obese, 73.06% abdominal obese and 44.04% having unhealthy body fat. The food intake of the respondents was found to be dominated by starchy foods. A possible deduction from this study is that obesity was significantly associated with age (31-50years).

Keywords: Obesity, overweight female, working class, respondents

Introduction
World Health Organization Global Comparative Estimate showed higher prevalence of overweight and obesity in women than men (Ono *et al.*, 2012) [13]. Studies have also shown varying prevalence among different work groups, and civil servants are particularly considered at risk following their phobia for exercise, sedentary lifestyle and high frequency of consumption of energy dense foods (Oyerinde and Owojaiye, 2008) [14].
Obesity and overweight are already becoming a major health problem in Nigerian female adults, especially among civil servants (Anyadioha, 2009). Obesity impairs mental health (Hillman *et al.*, 2010) [8] which could affect productivity, places large burden on health system and leads to fall in productivity following absenteeism, decreased productivity of employees while at work, disability, and premature mortality (Hammond and Levine, 2010; Ricci and Chee, 2005; Fontaine *et al.*, 2010) [5, 7, 15].
Traditionally, body mass index is considered a convenient, acceptable, accurate, and low-cost measurement for assessing overweight and obesity, however, its combination with waist circumference (WC) has been shown to be the accurate and practical measure of abdominal adiposity (Booth *et al.*, 2000) [2]. Abdominal adiposity has also emerged as a strong predictor of cardio-metabolic risks (Ghandehari *et al.*, 2009; Despr´es *et al.*, 2008; de Koning *et al.*, 2007) [6]. Obesity can also be measured using the skin fold thickness. In this method, researchers use a special caliper to measure the thickness of a “pinch” of skin and the fat beneath it in specific areas of the body (the trunk, the thighs, front and back of the upper arm, and under the shoulder blade). Equations are used to predict body fat percentage based on these measurements.
The prevalence and co- morbidities associated with obesity and overweight disorders are well documented in developed countries. However, the same cannot be said of developing countries. It is important to have good understanding of the problems and distribution of the disorders in our immediate environment. Consequently, it is worthwhile to assess the incidence of obesity and overweight among the female working class in Federal Polytechnic, Idah since no previous study had been conducted.

Methodology
The study area is Federal Polytechnic Idah, Kogi state, Nigeria. It is a federal tertiary institution situated in North-Central zone of Nigeria. A random sampling technique was used to select one hundred and ninety-three (193) female workers between the ages of 20 - 60 years. Data collection was done using structured questionnaires and anthropometric measurements.
The weights of the respondents were measured to the nearest 0.1kg using a Harson Emperor's weighing scale on which each respondent stood barefooted with hands resting on her sides while heights were measured to the nearest 0.1 cm using a height measuring device against which the respondent stood erect with necessary precaution. The body mass index (BMI) was calculated by dividing the respective weights of respondents by the square of their heights. Body weight categories were defined using standard methods WHO (2000).
Waist circumference was measured to the nearest 0.5 cm using a non-stretch metric tape. Abdominal obesity was defined as waist circumference (WC) value > 88 cm for women (Lean *et al.*, 1995) [9]. The skin fold thickness was measured to the nearest 0.01mm using a Skyndex digital body fat caliper on the right-hand side of the upper arm. Analysis of the data was performed using descriptive statistics, such as percentage, frequency, mean and standard deviation. Least significant difference was used to determine the significant difference among variables

Results and Discussion
A total of one hundred and ninety-three female working class participated in the study. They were between the ages of twenty to sixty years. The respondents surveyed were made of 10.36 percent single, 88.6 percent married and 1.04 widowed. The educational level of respondents ranged from

Primary education (1.55%) to Master degree (6.74%). Most (46.63%) of the respondents had a Higher National Diploma (HND). Sixty nine percent of the respondents did not divulge their income level while the respondents that divulged their income level are mostly low-income earners (17.62%). One hundred and thirty-one (67.88%) respondents are senior staff and sixty-two (32.12%) respondents are junior staff.

Table 1 shows the percentage of the respondents and the mean values of the Body Mass Index, Waist Circumference and Body Fat Percentage for the different age distribution. The mean Body Mass Index for the different age distribution ranges from 27.55 kg/m^2 for 20 - 30 years to 29.41 kg/m^2 for 51 - 60 years. The mean Waist Circumference varied from 88.69 cm for 20 - 30 years to 99.44 cm for 51 - 60 years while the mean Body Fat Percentage varied from 25.62% for 20 - 30 years to 30.01% for 51 - 60 years.

The anthropometric results in Table 2 showed that none of the respondents were underweight. The respondents that had normal weight (18.5 - 24.99 kg/m^2) according to BMI classification were 25.91%. The incidence of obesity and overweight were 37.82% and 36.27% respectively. Obesity and overweight were at their peaks between the ages of 31 - 50 years. Majority (73.06%) of the respondents had abdominal obesity while 26.94% of the respondents had a normal waist circumference. Also 55.96% and 44.04% of the respondents had healthy and unhealthy body fat percentages respectively.

Table 1: Anthropometric characteristics of the respondents as a function of age groups.

Age (years)	Percentage	Mean Total Body Mass Index (kg/ m^2)	Mean Total Waist Circumference (cm)	Mean Total Body Fat Percentage (%)
20 – 30	19.69	27.55^a	88.69^a	25.62^a
31 – 40	30.05	28.48^b	95.14^b	26.22^a
41 – 50	31.09	29.54^c	98.78^c	29.87^b
51 – 60	19.17	29.41^c	99.44^c	30.01^b
Standard error		0.46	2.47	1.18
$LSD_{0.05}$		0 67	1.54	1.06

Means with different subscripts in a column are significantly different ($p \leq 0.05$) from each other.

Table 2: Classification of body mass index, waist circumference and body fat percentage of respondents as function of age groups.

Variables	Age (years)					
	20 – 30	31 – 40	41 – 50	51 - 60	Total	%
Body mass index (kg/m^2)						
<18.5 (underweight)	0	0	0	0	0	0
18.5 - 24.99 (Normal weight)	13	17	12	8	50	25.91
25.0 - 29.99 (Overweight)	12	19	23	16	70	36.27
>30 (Obesity)	13	22	25	13	73	37.82
Waist circumference (cm)						
Normal (80 - 88)	23	13	9	7	52	26.94
Abdominal obesity (>88)	15	45	51	30	141	73.06
Body fat percentage (%)						
Healthy body fat (19 - 31)	26	37	29	16	108	55.96
Unhealthy body fat (>31)	12	21	31	21	85	44.04

The age range of the subjects surveyed in this study represents the normal working age and the active work force of the society. It is also the range at which excessive fat deposition begins to accumulate in humans, especially female because of the reduced energy demand for growth processes (Oyerinde and Owojaiye, 2008) [14]. The mean Body mass index, waist circumference and body fat percentage within the age groups showed the prevalence of obesity and overweight and are in tandem with an earlier study which reported that the prevalence of higher than normal BMI in women (Nkwoka *et al.*, 2014) [12]. This result could be explained by the sedentary lifestyle among most civil servants, especially in the urban areas where most manual work are now mechanized; resulting in adults constantly having a positive energy balance. The income levels of the subjects which were found to be low could also explain high prevalence of obesity, and overweight in females. People spend mostly on cheap and bulky carbohydrate and fatty food rather than on less energy dense and costly fruits, vegetables and foods of animal sources, at low level of income. The high prevalence of obesity and overweight can also be attributed to the high socio-economic activities and peculiar socio-cultural lifestyle as the study population is made up of civil servants only which are high economic yielding occupations with less physical exertion. This agrees with the report of McLaren (2007) [10], who stated that in the developing world, women, men, and children from high social classes are seen to have greater rates of obesity, which is felt to be due to the effects of globalization. It was also observed in this study that obesity increased with age, similar to an earlier report by Siminialayi *et al.* (2008) [16], but peaked amongst respondents between the ages of 31 and 50 years.

In this study abdominal obesity in respondents was at its peak between 41-50 years of age and this finding agrees with earlier observation (Amole *et al.*, 2011) [1]. Also, proportion of the respondents (55.96%) had a healthy body fat percentage using the skin fold measurement whereas 44.04% of the respondents had an unhealthy body fat percentage. This may be attributed to the control measures some of the respondents had taken in order to keep fit or at worst remain how they are.

The nutritional habits results of the respondents was based on their diets which showed that majority of the respondents eat starchy food and this may occur three times in a day. The high consumption of starchy food may be attributed to

the low income most of the respondents earn because these foods are not expensive to acquire, they are very cheap, but non - starchy foods are expensive to acquire. This was corroborated by Amole *et al*. (2011) [1] who reported that consumption of high-energy diets is one of the major contributing factors to the development of obesity. This assertion was further highlighted by our findings that 59.59% of the respondents eat mainly carbohydrate rich diet. This may have contributed to the high prevalence of obesity observed in this study since carbohydrate-rich diets have been implicated in weight gain and obesity (National Control for Health Statistics, 2008) [11].

Furthermore, this study showed that 63.73% of the respondents eat every morning and 36.27% of the respondents do not eat every morning and this could be because most of the respondents hurry to work or eat heavy food at night. Reports showed that physical activity levels are a major influence on obesity and its determinants (Butland *et al*., 2007). The exercise habits were fair but not enough to meet the requirement by the body as 90 percent indicated that they usually participate in the exercise of walking, running and dancing though not done regularly.

Conclusion

This study revealed high incidence of obesity among the female working class in Federal Polytechnic, Idah. Majority (36.27%) of the respondents were obese, abdominally obese (73.04%) and had an unhealthy body fat percentage (44.04%) between the ages of 31 - 50 years. The average body mass index and waist circumference of all the age groups were 28.75kg/m^2 and 95.51cm respectively, which were above the World Health Organization standard for normal weight while the average body fat percentage (27.93%) of all the age groups was within the healthy body fat percentage.Therefore, the female working class of Federal Polytechnic Idah could be at high risk of developing obesity related health diseases which may lead to premature mortality if the menace is not curbed.

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