

Full Length Research Paper

Gender differences in factors associated with overweight and obesity among civil servants in Lagos, Nigeria

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Overweight and obesity constitute global public health problems with consequences on health and productivity of workers. This study was designed to describe the gender variation in the factors associated with overweight, obesity and hypertension among civil servants in Lagos, Nigeria. This comparative cross-sectional study was conducted in 280 civil servants recruited from seven local government areas in Lagos state using random sampling technique. A pre-tested, interviewer-administered questionnaire was used to obtain information on socio-demographic and anthropometric characteristics and blood pressure. Weight, height and waist circumference (WC) were measured using standard procedure. Data were analysed using descriptive statistics and Chi-square test at $p = 0.05$. Age was 44.8 ± 8.5 years, 68.2% were males and 80.4% were married. About 64% had tertiary education; higher in males (70.7%) than females (49.4%). The crude prevalence of overweight and obesity was 70.7%. Overweight was significantly higher in males (61.7%) than females (52.3%) while obesity was significantly higher in females (47.7%) than males (38.3%). Abdominal obesity was more common in males (31.6%) than females (23.1%). Body mass index was higher in females (28.05 ± 4.9) compared to males (27.83 ± 5.8); WC was higher in females (94.6 ± 10.0) than males (93.08 ± 12.6). Obesity was predominant among civil servants aged 51 to 60 years in both gender groups. Systolic blood pressure (BP) was higher in females (124.08 ± 19.8) than males (122.4 ± 22.8) whereas diastolic BP was higher in males (84.3 ± 13.1) than females (83.7 ± 12.1). The prevalence of hypertension was 42.9%; higher in females (44.6%) than males (42.1%). Among female civil servants, overweight and obesity were significantly associated with age, education while among males they were significantly associated with grade level. Overweight, obesity and hypertension are high among civil servants; prevalence and associated factors differ by gender. Gender-sensitive public health intervention is hereby recommended to influence health behavior of civil servants.

Key words: Overweight, obesity, civil servants.

INTRODUCTION

Overweight and obesity constitute global public health problems currently affecting over two billion people

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(Popkin et al., 2012) and impact the risk and prognosis of many diseases, including high blood pressure and cardiovascular disease (Wilson et al., 2002), high fasting plasma glucose (Lean, 2000); and diabetes mellitus, hyperlipidaemia and cancer (Olatunbosun et al., 2000). In Nigeria, the burden of overweight and obesity is increasing and estimation showed over 20 percent increase in the burden within the last fifteen years (Akarolo-Anthony et al., 2014; Adebayo et al., 2014; Chukwuonye et al., 2013; Wahab et al., 2011).

Obesity impairs mental health (Hillman et al., 2010) 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). World Health Organization Global Comparative Estimate showed higher prevalence of overweight and obesity in women than men (Ono et al., 2012). 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). A study has identified body mass index and regional fat distribution among the major determinants of increasing prevalence of hypertension among civil servants in Ibadan, Nigeria (Olatunbosun et al., 2000).

Many factors have been implicated in the increasing burden of overweight and obesity including nutrition transition following urbanization (Nour, 2010), adoption of western lifestyles and demographic transition (Levitt, 2008; Ojofeitimi et al., 2007) and increased consumption of non-alcoholic beverages (Funtikova et al., 2015). Likewise, bio-social factors influencing overweight and obesity have been identified to include age, gender, marital and socio-economic status, occupation, urban residence, dietary intake and physical activity (Olatunbosun et al., 2011; Abubakari et al., 2008; Pasquet et al., 2003).

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). Abdominal adiposity has also emerged as a strong predictor of cardio-metabolic risks (Ghandehari et al., 2009; Després et al., 2008; de Koning et al., 2007).

Though many studies have reported the prevalence of overweight and obesity in Nigeria, there is little information on gender variation in associated factors. Moreover, an earlier study has identified the need to define the major causal factors for the rising prevalence of hypertension among urban Africans (Olatunbosun et al., 2000). The knowledge of these factors will strengthen the present efforts to halt the rising trend of overweight

and obesity and associated consequences. This study was therefore designed to describe the gender variation in the factors associated with overweight, general and abdominal obesity and hypertension among civil servants in seven local government areas of Lagos State, Nigeria.

METHODOLOGY

Ethics

The study was approved by the University of Ibadan/University College Hospital, Ibadan Ethics Committee and Lagos State Ministry of Health, Alausa, Ikeja. Informed consent was obtained from each participant.

Sampling and respondents

This descriptive cross-sectional study was conducted in seven of the 20 Local Government Areas (LGAs) in Lagos state selected using random sampling technique. From the selected LGAs, one-third of the Local Council Development Authority and ten ministries, parastatals and institutions (MPIs) were selected using simple random sampling technique. A total of 280 civil servants were recruited from these MPIs, and individuals with recent history of illness, bone deformities on medication affecting body lipid profile were exempted from the study. The civil servants in the study were majorly administrative staff in different career levels.

Data collection and analysis

A semi-structured, pre-tested, interviewer-administered questionnaire was used to obtain information on socio-demographic characteristics. Anthropometric and blood pressure measurements were done. Weight was measured using a spring platform bathroom scale (Hana Mechanical: Model BR9011), and height was measured using a calibrated stadiometer. Body mass index was derived by dividing weight (kg) by height (m) squared and classified as underweight (<18.5), normal range (18.5 to 24.9), overweight (25.0 to 29.9) and obese (≥ 30.0) (WHO, 2000).

Waist and hip circumferences were measured to the nearest 0.5 cm using a non-stretch metric tape. Waist circumference was measured at the level of the umbilicus and hip circumference at the most prominent part of the buttocks. Abdominal obesity was defined as waist circumference (WC) value > 102 cm and > 88 cm for men and women, respectively (Lean et al., 1995). Waist to hip ratio was classified abnormal at > 0.95 and > 0.80 for men and women, respectively.

The blood pressure was measured in the left arm in the sitting position by taking the average of two measurements using a standard mercury-in-glass sphygmomanometer at an interval of 30 min. The systolic blood pressure was recorded at phase I Korotkoff sounds while the diastolic blood pressure was recorded at phase V Korotkoff sounds. Respondents were considered hypertensive at systolic/diastolic blood pressure $\geq 140/90$ mmHg (World Health Organisation-International Society of Hypertension, 1993). Data were analysed using Statistical Package for Social Sciences Version 15.0 (SPSS 15.0). Descriptive statistics and Chi-square test were used at 5% level of significance. Results are presented as mean \pm SD or as frequency (percent) of status or category. Comparison of means for continuous variables in the two groups (males versus females) were done using a Chi-square test.

Table 1. Socio-demographic characteristics of the civil servants.

Characteristics	Total n (%)	Sex		P value
		Male n (%)	Female n (%)	
Age in years				
21-30	22 (7.9)	18 (9.4)	4 (4.5)	>0.05
31-40	61 (21.8)	37 (19.4)	24 (27.0)	
41-50	115 (41.1)	74 (38.7)	41 (46.1)	
51-60	82 (29.3)	62 (32.4)	20 (22.4)	
Mean (SD)	44.8±8.5	44.9±8.8	44.6±8.0	
Marital status				
Single	37 (13.2)	25 (13.1)	12 (13.5)	>0.05
Married	225 (80.4)	159 (83.2%)	66 (74.2)	
Separated/Divorced	10 (3.6)	5 (2.6)	5 (5.6)	
Widow/Widower	8 (2.8)	2 (1.0)	6 (6.7)	
Religion				
Christianity	239 (85.4)	161 (84.3)	78 (87.6)	>0.05
Islam	39 (13.9)	28 (14.7)	11 (12.4)	
Traditional	1 (0.35)	1 (0.5)	0 (0.0)	
Others	1 (0.35)	1(0.5)	0 (0.0)	
Educational qualification				
Primary	29 (10.4)	13 (6.8)	16 (18.0)	<0.05
Secondary	72 (25.7)	43 (22.5)	29 (32.6)	
Tertiary (Post Secondary)	179 (63.9)	135 (70.7)	44 (49.4)	
Grade levels				
1-5 (Lower income level)	46 (16.4)	22 (11.5)	24 (27.0)	0.49
6-10 (Middle income level)	170 (60.7)	117 (61.3)	53 (59.5)	
≥11 (Upper income level)	64 (22.9)	52 (27.2)	12 (13.5)	

p - probability value of Pearson's Chi-square test

RESULTS

Socio-demographic characteristics of the civil servants

Two hundred and eighty respondents participated in the study including 191 males (68.2%) and 89 females (31.8%). The socio-demographic characteristics of the civil servants are shown in Table 1. The mean age of the civil servants was 44.8 ± 8.5 years and about seventy percent were aged 41 years and above. The mean age (years) of male (44.9 ± 8.8) was not significantly different from that of the female civil servants (44.6 ± 8.0). Most of the respondents were married (80.4%) and were Christians (85.4%). There were more married males (83.2%) than females (74.2%) and the proportion of Christian respondents was higher among females (87.6%) than males (84.3%). There were more separated/divorced as well as widows/widowers among

female than male respondents. About 64 percent of the civil servants had tertiary education and this was higher in males (70.7%) compared to females (49.4%). Majority (60.7%) were in the middle income level and there were more males (27.2%) than females (13.5%) in the upper income level. There were no significant gender differences in marital status, religion and grade levels of the civil servants ($p > 0.05$).

Prevalence of overweight and obesity

Of the 280 civil servants that participated in this study, 198 (70.7%) were overweight and obese and these respondents were used for further analysis. Seventy six respondents (27.1%) who had normal BMI (18.5 to 24.9 kg/m²) and six respondents (2.1%) who were underweight (< 18.5 kg/m²) were exempted from further analysis (Figure 1).

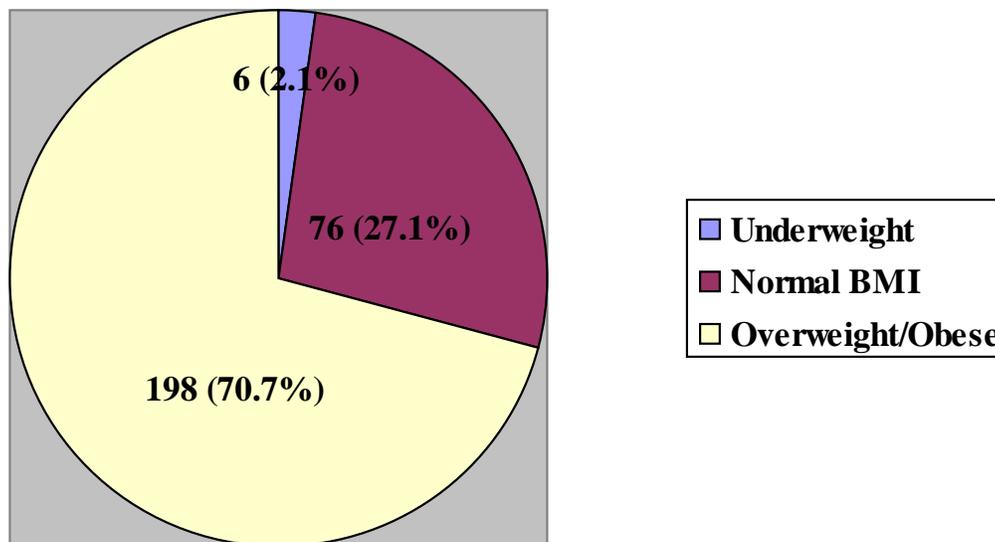


Figure 1. Body mass index of the respondents.

Table 2. Anthropometric and clinical characteristics of the civil servants.

Variables	Mean (SD)		Total	P value
	Male	Female		
Weight (kg)	76.06±15.3	78.18±13.0	76.73±14.6	P<0.05
Height (m)	1.67±0.1	1.65±0.2	1.66±0.2	P<0.05
Body mass index (kgm ⁻²)	27.83±5.6	28.05±4.9	27.9±5.9	P<0.05
Waist circumference (cm)	93.08±12.6	94.6±10.0	93.6±11.8	P<0.05
Waist/height ratio	0.56±0.1	0.57±0.1	0.57±0.1	P<0.05
Waist-Hip ratio	0.89±0.1	0.90±0.1	0.89±0.1	P<0.05
Mean Blood Pressure (BP)				
Systolic BP	122.4±22.8	124.08±19.8	122.59±23.0	P<0.05
Diastolic BP	84.3±13.1	83.7±12.1	84.12±12.9	P<0.05

p- probability value of Pearson's Chi-square test

Anthropometric and clinical characteristics of participants

The anthropometric and clinical characteristics of the civil servants are as shown in Tables 2 and 3. The mean weight of the civil servants was 76.73 ± 14.6 kg with the females being heavier (78.18 ± 13.0 kg) than their male counterparts (76.06 ± 15.3 kg). Males had greater height (1.67 ± 0.1 m) than females (1.65 ± 0.2) with an overall mean of 1.66 ± 0.2 m. The mean body mass index was 27.9 ± 5.9 kgm⁻², higher in females (28.05 ± 4.9 kgm⁻²) compared to males (27.83 ± 5.6 kgm⁻²). Similarly, the females had larger waist circumference (94.6 ± 10.0 cm) than the males (93.08 ± 12.6 cm). The mean waist-hip ratio for males was 0.89 ± 0.1 and females was 0.90 ± 0.1 . Likewise, the waist-height ratio was higher in females

(0.57 ± 0.1) than male (0.56 ± 0.1) respondents. The mean systolic blood pressure was 122.59 ± 23.0 mmHg, higher in females (124.08 ± 19.8 mmHg) than males (122.4 ± 22.8 mmHg) whereas diastolic blood pressure was higher in males (84.3 ± 13.1 mmHg) than 84.12 ± 12.9 in females (83.7 ± 12.1 mmHg). Overweight was significantly higher in males (61.7%) than in females (52.3%) while obesity was significantly higher in females (47.7%) than males (38.3%). Abdominal obesity was more common in males (31.6%) than females (23.1%), however both abnormal waist-hip and waist-height ratios were higher in females than in males ($p > 0.05$). The prevalence of hypertension as indicated by systolic and diastolic blood pressure was 42.9% and was significantly higher in females (44.6%) than their male counterparts (42.1%).

Table 3. Anthropometric and clinical characteristics of the civil servants contd.

Variables	Sex			χ^2 (p-value)
	Male n (%)	Female n (%)	Total n (%)	
Overweight and obesity distribution (Kgm⁻²)				
Overweight (25.0 – 29.9)	82 (61.7)	34 (52.3)	116 (58.6)	0.04
Obesity (≥ 30.0)	51 (38.3)	31 (47.7)	82 (41.4)	
Waist circumference				
Normal (Males: 94-102 cm; Females: 80-88 cm)	91 (68.4)	50 (76.9)	141 (71.2)	0.15
Abdominal overweight (Males: >102 cm; Females: >88 cm)	42 (31.6)	15 (23.1)	57 (28.8)	
Waist-Hip ratio				
Normal (≤ 0.85 for males, 0.95 for females)	92 (69.2)	12 (18.5)	104 (52.5)	0.06
Abnormal (> 0.85 for males, 0.95 for females)	41 (30.8)	53 (81.5)	94 (47.5)	
Waist-Height ratio				
Normal (≤ 0.5 for males, 0.45 for females)	31 (23.0)	13 (20.0)	44 (22.2)	
Abnormal (> 0.5 for males, 0.45 for females)	102 (77.0)	52 (80.0)	154 (77.8)	
Blood pressure category				
Normal	66 (49.6)	33 (50.8)	99 (50.0)	0.00
Hypertension	56 (42.1)	29 (44.6)	85 (42.9)	
Hypotension	11 (8.3)	3 (4.6)	14 (7.1)	

p- probability value of Pearson's Chi-square test.

Gender and body mass index

The gender variation in body mass index by age, education and grade level of the civil servants is as presented in Table 4. Age-standardized for BMI showed that overweight was six times higher among male civil servants aged 41 to 50 years than those aged 51 to 60 years while among females, overweight was seven times higher among civil servants aged 41 to 50 years compared to those aged 31 to 40 years. Obesity was predominant among civil servants aged 51 to 60 years in both gender groups. Likewise, overweight and obesity were higher among civil servants with tertiary education compared to other groups in both gender groups. The burden of overweight and obesity increase with increasing level of education in both male and female civil servants. Conversely, the burden of overweight and obesity was highest among female middle grade level civil servants while obesity was also highest among male middle level civil servants. Among females, overweight and obesity were significantly associated with age, education while among males they were significantly associated with grade level.

Gender and blood pressure

The gender distribution of blood pressure by age, weight

and waist-hip ratio is presented in Table 5. Age-standardized distribution of blood pressure showed that hypertension was more prevalent among male civil servants aged 51 to 60 years compared to other age groups. Among females, hypertension solely occurred among respondents aged 41 to 60 years. Hypertension was highest among civil servants in 76 to 95 kg weight group in both male and female groups. Among females, civil servants with abnormal waist hip ratio had higher incidence of hypertension compared to other age groups.

DISCUSSION

The distribution of respondents in this study conforms with the demographic pattern expected in a civil service setting. There was no significant statistical difference in all the socio-demographic variables except the level of education of the respondents. The higher proportion of married respondents, observed level of education and grade levels were consistent with distribution described from studies among civil servants in Kaduna, Nigeria (Oladimeji et al., 2014). The high level of overweight and obesity in the present study is consistent with reports from various population sub-groups in Nigeria as described by Akarolo-Anthony et al. (2014), of a government worksite in Abuja, Nigeria and Banwat et al. (2015) in Jos. Wahab et al. (2011) also reported a similar

Table 4. Gender, overweight, obesity by age, education and grade level.

Variable	Male		P value	Female		P value
	Overweight	Obese		Overweight	Obese	
Age						
21-30	0 (0.0)	0 (0.0)	0.32	0 (0.0)	0 (0.0)	0.00
31-40	0 (0.0)	0 (0.0)		4 (6.2)	0 (0.0)	
41-50	71 (53.4)	0 (0.0)		30 (46.2)	11 (16.9)	
51-60	11 (8.3)	51 (38.4)		0 (0.0)	18 (30.8)	
Education						
Primary	6 (4.5)	6 (4.5)	0.32	7 (10.8)	5 (7.7)	0.05
Secondary	15 (11.3)	14 (10.5)		9 (13.8)	11 (16.9)	
Tertiary	61 (45.9)	31 (23.3)		18 (27.7)	15 (23.1)	
Grade level						
Low (1-5)	6 (4.5)	5 (3.8)	0.00	14 (21.5)	9 (13.8)	0.06
Middle (6-10)	38 (28.6)	40 (30.1)		18 (27.7)	15 (23.1)	
Upper (≥11)	38 (28.6)	6 (4.5)		2 (3.1)	7 (10.8)	

Table 5. Gender, blood pressure category by age, weight and waist-hip ratio.

Variable	Male n (%)			Female n (%)		
	Normal	Hypertension	Hypotension	Normal	Hypertension	Hypotension
Age (years)						
21-30	2 (1.5)	0 (0.0)	10 (7.5)	0 (0.0)	0 (0.0)	3 (4.6)
31-40	26 (19.5)	0 (0.0)	0 (0.0)	17 (26.2)	0 (0.0)	0 (0.0)
41-50	38 (28.6)	13 (9.8)	0 (0.0)	16 (24.6)	14 (21.5)	0 (0.0)
51-60	0 (0.0)	42 (31.6)	0 (0.0)	0 (0.0)	13 (20.0)	0 (0.0)
61-70	0 (0.0)	1 (0.8)	1 (0.8)	0 (0.0)	2 (3.0)	0 (0.0)
Weight						
36-55	0 (0.0)	0 (0.0)	0 (0.0)	1 (1.5)	1 (1.5)	0 (0.0)
56-75	0 (0.0)	0 (0.0)	9 (6.8)	15 (23.1)	11 (16.9)	1 (1.5)
76-95	60 (45.1)	43 (32.3)	2 (1.5)	14 (21.5)	16 (24.6)	2 (3.1)
96-115	6 (4.6)	11 (8.3)	0 (0.0)	3 (4.6)	1 (1.5)	0 (0.0)
116-135	0 (0.0)	2 (1.5)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Waist-hip ratio						
Normal	42 (31.6)	44 (33.1)	6 (4.5)	6 (9.2)	6 (9.2)	0 (0.0)
Abnormal	24 (18.0)	12 (9.0)	5 (3.8)	27 (41.5)	23 (35.4)	3 (4.6)

prevalence among adult Nigerians in Katsina state. The observed prevalence in this study is however very high compared to a prevalence reported by Adebayo et al. (2014) among adults in Ife North area of Osun state. The wide difference could be attributed to the difference in population groups used in this study, since many studies had reported higher prevalence of overweight and obesity in urban than rural areas of Nigeria.

Finding in this study showed that general and abdominal overweight was higher in males than females while general obesity and abnormal waist-hip and waist-

height ratios were higher in females. Earlier studies have also shown higher incidence of obesity among females than males (Adebayo et al., 2014; Fadupin et al., 2014; Banwat et al., 2012; Wahab et al., 2011). The recurring higher prevalence of obesity among women have been linked to gradual weight gain with successive pregnancies, perception of weight gain as evidence of socio-economic class, fattening practices and sedentary lifestyle (Akarolo-Anthony et al., 2014; Holdsworth et al., 2004; Brink, 1989). The high incidence of abdominal obesity is worrisome following the reported links with liver

fat accumulation and associated metabolic syndrome (Jakobsen et al., 2007; Haap et al., 2011), which could increase the existing burden on the Nigerian health system. Overweight increased with age from 41-50 years and obesity increases from 51 to 60 years and decline as age increases. This suggests that the burden of over-nutrition peaks at the latter end of the respondents' civil service career which could seriously hamper productivity. Studies have shown that overweight and obesity can reduce productivity at work following absenteeism, decreased efficiency and premature mortality (Hammond and Levine, 2010; Fontaine, Redden and Wang, 2010).

This study also shows that the incidence of overweight was highest among civil servants with tertiary education and the burden of obesity increases with educational level. This result is consistent with other studies which have shown that obesity was more marked among urban and highly-educated people who are more likely to have sedentary lifestyle and access to ample processed foods (Akarolo-Anthony et al., 2014). Factors that were significantly associated with higher prevalence of overweight and obesity in this study were age and education among females and grade level among male civil servants. This finding is consistent with the findings that higher education among women and higher occupational level were associated with increased obesity prevalence (Akarolo-Anthony et al., 2014; Martorell et al., 2000).

This study also showed higher prevalence of hypertension in female than male civil servants. Though the observed prevalence of hypertension in this study is higher than reported among civil servants in Kaduna, Nigeria, similar gender differences in the prevalence of hypertension were reported (Oladimeji et al., 2014). The findings in this study call for the need to promote work place health interventions to promote good lifestyle encompassing health, dietary habits, healthy snacking and increased physical activity among civil servants.

Conclusion

Overweight, obesity and hypertension are high among civil servants and prevalence while associated factors differ by gender. Gender-sensitive public health intervention is hereby recommended to influence the health behavior of civil servants.

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Conflict of interest

Authors have none to declare.

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