Pattern and Factors Associated with Body Mass index among selected salary earners in Ado-Ekiti, Nigeria

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ABSTRACT

Background: *Overweight and obesity is the major risk factor fueling increased prevalence of chronic diseases among Nigerians. Salary earners play a significant role in a nation's economy; obesity prevalence among them could adversely affect the nation economy.*

Objective: *To assess the prevalence of overweight and obesity and associated factors among salary earners in Ado-Ekiti, Ekiti State, Nigeria.*

Methods: *A cross-sectional study involving 400 workers from both government and private establishments in Ado-Ekiti. A self-administered pre-tested questionnaire was used to collect information on socio-demographic characteristics and physical activity of the workers. Body Mass Index (BMI) was calculated from measured weight and height and categorised as underweight (BMI<18.5), normal (BMI=18.5-24.99), overweight (BMI=25.00-29.99) and obesity (BMI≥30). The data collected were analysed using Statistical Package for Social Science (SPSS) and Chi-square test was used to established association of variables at 5% levels of significance.*

Results: *The mean age of the respondents was 40.38 ± 0.25years with 58.5% of ages ≤40years; 57% females and 89% married. Two-third (65.5%) of the respondents engaged in vigorous physical activity. The prevalence of overweight and obesity was 36.3% and 28.8% respectively. There was significant association between overweight/obesity and age (p=0.003), gender (p=0.000), marital status (p=0.003), occupation type (p=0.000) and job cadre (p=0.000).*

Conclusion: High prevalence of overweight and obesity among the workers was revealed. Nutrition education in the workplace is recommended

Keywords: Overweight, Obesity, Physical activity, Workers

• Introduction

Globally, 1.9 billion people were overweight while 650 million people were obese in the year 2018 (1). Overweight and obesity are the fifth leading risk of global death and their complications accounted for at least 2.8 million deaths in adult each year (1). Overweight and obesity can be described as the imbalance between energy intake and expenditure such that excess energy is stored in fat cells (2). Furthermore, poor eating habits, consumption of energy dense food, high level of sugar, and saturated fats combined with physical inactivity have increased prevalence of overweight and obesity in many parts of the world (3).

In Nigeria, there is an increasing prevalence of overweight and obesity. For instance, between 24% and 45.0% market workers were overweight and obese in Nigeria (4, 5, 6). Similarly, 63% overweight and obesity was found among university employees (7) and 63% among civil servants in Abeokuta, Ogun State (8). Overweight and obesity is the major risk factor fueling increased prevalence of type 2 diabetes mellitus among Nigerians (9). As far back as 2014, WHO stated that chronic diseases accounted for 24% of all deaths in Nigeria with cardiovascular disease accounting for 7% of it (10).

Meanwhile, technological advancement has simplified life and work bringing about a reduction in physical activity levels of workers. The result of a reduction in energy expenditure may have implications for overweight and obesity if individuals are exposed to such conditions over a long period. A nation's workforce is particularly prone to obesity as a result of sedentary behaviour as well as poor dietary practices (11). Giving the significant role played by salary earners in the economy of a nation, an increase in obesity prevalence among them could affect their cardio-metabolic health negatively, reduce productivity and ultimately affect the health and the economy of the nation adversely 12). Obese employees have been reported to have the most short-term disability days, costs and least productivity compared with those with lower BMI categories (13).

A study among medical health workers in South Africa found that 73.5% were overweight/obese (14). In Nigeria and the United States of America, high prevalence of overweight and obesity among workers such as bankers and nurses have been observed (15). In Nigeria, for instance, prevalence of overweight and obesity among nurses in Akwa Ibom State was found to be 62.2% whereas in the USA it was 54%. Such high prevalence may suggest that our healthcare professionals are at an increased risk for various non-communicable diseases (NCDs) (15). Prospective studies have reported increased risk of obesity related NCDs among obese health workers (16). Obese workers have also been shown to retire earlier than non-obese workers (17), as its presence can create functional disabilities or cause other health problems. Thus, it is imperative to investigate the prevalence and potential determinants of overweight and obesity among salary earners in Ado-Ekiti, Nigeria.

The outcome of this study will contribute to the existing data on overweight and obesity and give information to educate salary earners on the risks associated with overweight and obesity. In addition, it will give information to establishments and help them to put in place preventive measures against overweight and obesity among their workers.

MATERIALS AND METHODS

Study Design and target population

This study was a descriptive cross-sectional survey involving salary earners in Ekiti State University, Ado-Ekiti, Federal Polytechnic Ado-Ekiti, Ekiti State University Teaching Hospital, Bankers in Ado-Ekiti and teachers in Ado-Ekiti.

Study Area

Ado Ekiti is a city in southwest Nigeria and the state capital of Ekiti State. It is the most populated city in Ekiti with a population of 308,621 at the 2006 census with an estimated population of 424,340 by 2012. The people of Ado-Ekiti are mainly of the Ekiti sub-ethnic group of the Yoruba. It covers an area of 293 km^2 with a latitude of 7.612426 W and a longitude of 5.237109 S.

Sample size and sampling technique

Sample size was determined using the formula:

$$n = \frac{z^2 \times p \times q}{d^2},$$

•

where n is the sample desirable, z is the confidence level at 95% with a standard value of 1.96, d is the desired precision of error at 5%, p is the national prevalence of overweight in adults in Nigeria (20.3%) (18) and q is $1-p$ which is equal to 0.797. The calculated sample size was 248. To cover up for contingency, the sample size was increased to 400.

A multistage random sampling technique was employed in selecting the participants for this study. In the first stage, institutions that housed the professionals were randomly selected. These include Ekiti State University, Federal polytechnic Ado-Ekiti, Ekiti State University Teaching Hospital, Five banks, two secondary schools and two primary schools. The second stage involved selection of professionals in proportion to their population. Overall, 168 civil servants, 51 healthcare professionals, 57 bankers and 124 teachers were sampled.

Method of Data Collection

A pre-tested questionnaire was used to collect information on socio-demographic

characteristics such as age, gender, marital status, occupation type, etc and physical activity of the workers.

Anthropometric measurements of weight and height were done using standard procedures (19). The weight was measured using an Ohaus SD 200 digital weighing scale. The height of study participants was taken using a portable wall-mounted Seca GmbH and Co.KG. 2,171,821,009 stadiometer. The Body Mass Index (BMI) was calculated by dividing the measured weight in kilograms by the height in meters squared. The BMI was categorised as underweight (BMI<18.5), normal (BMI=18.5-24.99), overweight (BMI=25.00-29.99) and obesity (BMI ≥ 30).

Ethical Consideration
Ethical approval was obtained from Afe Babalola University Health Research and Ethics Committee (ABHREC). Consent of the respondents was also obtained. The respondents were informed of the voluntary nature of the instrument.

Data Analysis
Data collected were analysed using Statistical Package for Social Sciences (SPSS) version 24. Descriptive statistics such as mean and standard deviation, frequencies and percentages were determined. Chi-square was used in testing for association among the variables.

RESULTS
Socio-demographic characteristics of the respondents
There were four hundred respondents for this study with 31.0% teachers, 14.3% Bankers, 12.8% Medical professionals and 42.0% civil servants (Table 1). The mean age of respondents was 40.38 ± 0.25years with 58.5% of ages ≤40years while1 41.5% were ≥40years old. Female respondents (57%) were more than male respondents (43.0%). Also, majority (89.0%) of the respondents were married and 95.8% of them had tertiary level of education, 4.2% had post-secondary education.

Physical Activity level of the respondents
Table 2 reveals the respondents' physical activity level. Two third (65.5%) of the respondents' total population carried out vigorous physical activities with majority (64.4%) engaged for just less than 1 hour per day. Furthermore, up to 59.5% of the respondents engaged in walking as a form of physical activity, while only 7.4% did engaged in running. Half (50.9%) of the respondents engaged in physical activities for 3-4 hours per week while only 24.5% engaged in

physical activity in the gymnasium.

Body mass Index of Respondents
Table 3 reveals the Body mass Index of the respondents. Over one third (36.3%) of the respondents were overweight, 32.3% of the respondents had normal weight, 2.8% were underweight while 28.8% were obese. Overall, 35% of the respondents had BMI ≤25 while 65% had BMI ≥25 (Figure 1).

Association between socio-demographic factors and body mass index
The association between socio-demographic factors and body mass index of the respondents is shown in Table 4. The results revealed that there was significant association (P>0.05) between socio-demographic factors such as age, gender, occupation, education, marital status and job cadre with body mass index of the respondents. Thus, female respondents (73.25%) had significantly higher BMI than males (54.07%). Obesity was significantly higher among married (70.22%) than single (11.54%) and divorced (38.89%). However, family size had no statistically significant (P>0.05) association with body mass index of the respondents (p-value =0.519).

Discussion
This study involved a total of 400 salary earners consisting of teachers, civil servants, bankers and healthcare workers in Ado Ekiti, Nigeria. The mean age of the respondents was 40years. This implies that the respondents were middle age adults.

The physical activity pattern of the participants in this study indicates that about two thirds of the respondents carried out vigorous physical activity for less than one hour a day and half of them engaged in walking three to four days in a week. These results are lower than that of Kyriazis et al (20) in comparison where 46% administrative staff of Greek hospital engaged in walking exercise more than 6hours in a week. They are however higher than 9% of civil servants found to be involved in physical activity in Eastern Nigeria (21) and 78% of South African University staff that carried out physical activity less than two and half hours in a week (22). Engaging in vigorous physical activity had been found to reduce overweight and obesity among bankers in Ghana (23) and University employees in Iran (24), and Sultan Qaboos University staff (25). The World Health Organization (WHO) has recommended moderate to vigorous physical activity practice daily in order to reduce sedentary lifestyles (10).

A shocking proportion of overweight and obesity among the workers was observed with nearly two

Table 1: Socio-demographic and work characteristics of the respondents

Characteristics	Frequency (N=400)	Percentage
Age (years)		
<40	234	58.5
≥40	166	41.5
Mean 40.38±1.25		
Gender		
Male	172	43.0
Female	228	57.0
Marital status		
Single	26	6.5
Married	356	89.0
Separate/widow	18	4.5
Ethnicity		
Yoruba	345	86.2
Igbo	53	13.3
Others	2	0.5
Religion		
Islam	39	9.8
Christianity	361	90.2
Level of education		
Post-secondary	17	4.3
Tertiary	383	95.7
Occupation		
Teachers	124	31.0
Bankers	57	14.2
Medical professionals	51	12.8
Civil servants	168	42.0
Junior (GL<8)	96	24.0
Senior (GL≥8)	304	76.0

thirds of the workers being overweight and obese. This high prevalence of overweight and obesity is similar to the findings of Abubakar et al (26) among healthcare workers in Ghana. However, it is higher compare to nurses in England with 25% obesity (27) and bankers in Iran with 59% obesity (28). It is equally higher than the prevalence among the civil servants (63%), healthcare workers (49%) and College teachers (57%) in Nigeria (8, 29, 30). The reported overweight and obesity prevalence of 69% among working adults in Tanzania is higher than the results of the current study (31). The high prevalence of overweight and obesity among the workers in the current study could be attributed to less physical activity and the sedentary nature of their work. This explanation is in line with the findings of Akinnubi and Ajayi-Vincent (29) on University workers in Nigeria. Overweight and obesity had been associated with hypertension among University workers in Nigeria (30). Obesity was found to be the most common risk factor of coronary heart disease among the staff members of Qassim University, Saudi Arabia (32).

Older age above 40years, female gender, occupation, marriage and senior job cadre were found to be associated with high prevalence of overweight and obesity in the current study. These outcomes correlate with the findings of Ojo et al. (8) on Nigerian civil servants and Iranian Bankers (27) whereby higher prevalence of overweight and obesity was recorded in older ages. These are similar to the results on university staff in Ghana and India and confirm the findings among Nigerians with more females than males and senior staff than junior staff being overweight and obese (33, 34, 35). These results equally agree with the findings of Nazarah and Ramezankhari (24) on Iranian University employees, healthcare workers in North-Central, Nigeria (36), market women in Southwest, Nigeria (4) and working adults in Tanzania (31) where married individuals

were more overweight and obese.

However, these results are in contrast to the findings of Ajayi *et al*. (37) and Afam-Anene (38) who both reported prevalence of obesity among younger ages. They equally run contrary to the findings on civil servants in Eastern Nigeria and Pakistanis whereby males were more overweight and obese than females (21, 39).

Females with high BMI had been found to have higher body fat percentages than males (40) and this is a risk factor for non-communicable diseases. They found overweight and obese females displaying unfavourable plasma lipids and low level of physical activity. The increased rate of obesity with age had been attributed to hormonal changes and decreased physical

Table 2: Physical Activities level of the respondents

	Frequency(N=400)	Percentage
Description of variables		
Carry out rigorous physical activities		
Yes	262	65.5
No	138	34.5
Hours of rigorous physical activities per day		
Less than 1 hour	232	64.4
1-2 hours	94	26.1
3 hours or more	34	9.4
Kind of vigorous physical activities engaged in		
Walking	216	59.5
Running	27	7.4
Sports	70	19.3
Farming	50	13.8
Number of days of vigorous physical activity per week		
1-2 days		
3-4 days	162	41.0
5-7 days	201	50.9
	32	8.1
Engage in physical activities in the gymnasium		
Yes	98	24.5
No	302	75.5
Number of hours spent per week		
Less than 1 hour	24	24.5
1-2 hours	45	45.9
3 hours or more	29	29.6

Table 3: Body mass Index of respondents

	Frequency	Percentage
Body Mass Index		
Under weight (<18.5)	11	2.8
Normal weight (18.5-24.9)	129	32.3
Overweight (25.0-29.9)	145	36.3
Obesity (≥ 30)	115	28.8

activity and metabolism that accompany aging (41). The significant increase in obesity among females might be related to gender differences in metabolism and hormonal balance (42) and females are increasingly susceptible to weight gain because they are less likely to engage in regular sporting activities and culturally they are constrained to taking care of domestic chores.

Marriage may come with much physical, psychosocial and financial support from partner and relations, which may facilitate comfort and a tendency for decreased physical activity or energy
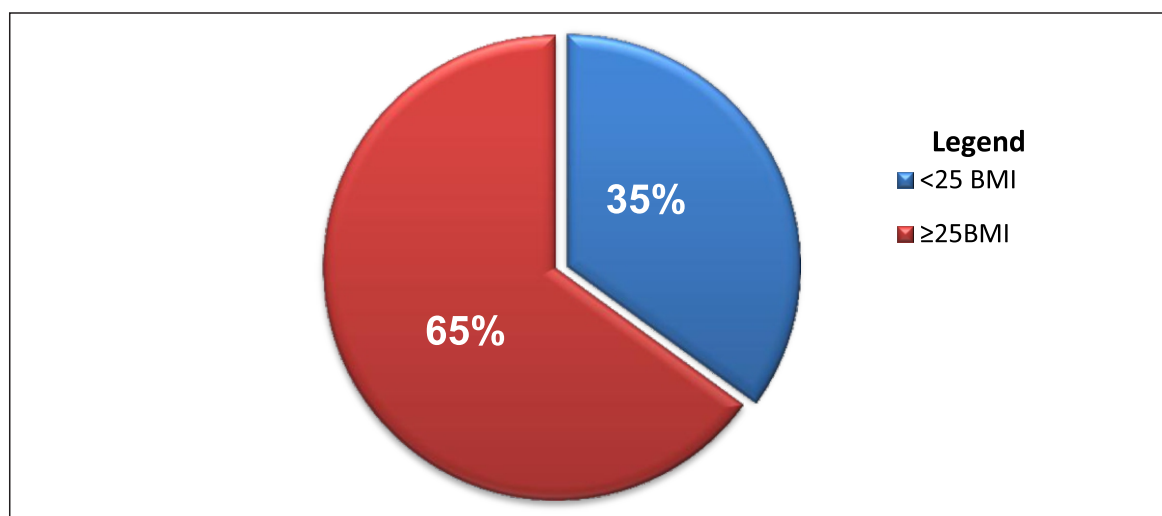

Figure 1: Body mass index of the Respondents

Table 4: Association between socio-demographic factors and body mass index

Variables	BMI			X²	p-value
	<25.0 Freq. (%)	≥ 25.0 Freq. (%)	Total Freq.		
Age					
<40	168 (71.79)	66 (28.21)	234	16.211	0.003*
41-60	72 (45.0)	87(54.72)	159		
>61	2(28.57)	5(71.43)	7		
Gender					
Male	79(45.93)	93 (54.07)	172	14.851	0.000*
Female	61(26.75)	167(73.25)	228		
Occupation					
Teachers	124 (100.0)	0 (0.00)	124		
Bankers	0 (0.00)	57 (100.0)	57	344.472	0.000*
Medical professionals	13(25.49)	38 (74.51)	51		
Civil servants	3 (1.79)	165 (98.21)	168		
Education					
Post-secondary	11 (91.67)	6 (8.33)	17	19.923	0.000*
Tertiary	129 (33.68)	254 (66.32)	383		
Marital Status					
Single	23 (88.46)	3(11.54)	26	11.709	0.003*
Married	106 (29.78)	250(70.22)	356		
Divorced	11 (61.11)	7 (38.89)	18		
Job Cadre					
Junior	12 (12.5)	84 (87.5)	96	28.109	0.000*
Senior	128 (42.11)	176 (57.89)	304		
Family					
Monogamy	119 (34.39)	227(65.61)	346	0.415	0.519
Polygamy	21 (38.89)	33(61.11)	54		
*Significant at 0.05					

expenditure together with other lifestyle changes that may be associated with weight gain. For most marriages also, fecundity or number of children is expected to increase, which culturally comes with lessening of physical activity and increased food intake on the part of the female spouse. Benkeser *et al* (43) in their study on women in Accra established that giving birth to 2 or more children was a higher risk for obesity and being unmarried and living in a rural environment rather had a protective effect.

A plausible explanation to high prevalence of overweight and obesity among senior cadre workers comes from the consideration that workers may tend to acquire an increased sedentary routine and expend less energy as they assume senior or supervisory positions in the service. This can increase the risk for becoming overweight and obese. Overweight and obesity coupled with low level of physical activity may predispose individuals to cardiovascular diseases. It has been reported that some obese health workers found it difficult to interact physically with their clients, as their size limits their mobility and their ability to handle patients (44). Overweight and obesity in older ages are associated with chronic diseases such as diabetes, hypertension and coronary heart disease. Overweight and obesity in women have been implicated in complications in pregnancy including caesarean section delivery and high birth weight babies (45).

CONCLUSION AND RECOMMENDATIONS
The study reveals high prevalence of overweight and obesity among the workers in the study area. It was found that older age, female gender, being married and senior job cadre were associated with overweight and obesity. The results of this study suggest that workers in the study area deserve urgent attention to prevent future burden of obesity related diseases and death. Nutrition education intervention in workplace is recommended so as to create awareness among workers on the health risk of overweight and obesity.

Study Limitation
The study involved only the salary earners and those that ran their own businesses were not included.

Competing interest
There is no competing interest

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