

ORIGINAL ARTICLE

Prevalence and Factors Associated with Overweight and Obesity among Staff of Multinational Companies in Rivers State, Nigeria

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ABSTRACT

Background: There are rising public health concerns due to diseases associated with increasing trends of overweight and obesity with significant adverse health, psychological and socioeconomic consequences. The objective of this study was to determine the prevalence and factors associated with overweight and obesity among the staff of multinational companies in Rivers State, Nigeria.

Methods: A cross-sectional and analytical study was conducted among the staff of two multinational companies. A multi-stage sampling technique was employed to recruit 296 respondents from the companies. Respondents' information was obtained using a semi-structured questionnaire, their weight and height were measured using standard procedures and Body Mass Index (BMI) was determined using WHO classification.

Results: Male respondents were 59.5% and 40.5% were female. The prevalence of overweight and obesity was 43.6% and 15.2%, respectively. Many (58.1%) of the respondents were physically inactive and those who sometimes - always engaged in exercise were less likely to be obese. Overweight and obesity were found to be significantly related to female sex ($p<0.05$), increasing age ($p<0.001$), currently married ($p<0.001$), high level of education ($p<0.05$), and increased monthly income ($p<0.001$).

Conclusion: High prevalence of overweight and obesity was observed among the respondents. Therefore, top management of companies especially in the study area should implement regular, and workstation interventions to address rising BMI among their staff, and awareness promoting a healthy lifestyle, physical activity, and avoiding risky behaviors should be implemented.

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Introduction

There are rising public health concerns due to diseases associated with being overweight and obese with significant and adverse health, psychological and socioeconomic consequences, both immediate and long-term (1). Overweight and obesity have become a global pandemic with disastrous consequences for human health among both children and adults (2). Obesity is defined as a chronic disease of energy imbalance in which there is excess or abnormal fat accumulation in the adipose tissue of the body such that the health of the individual is impaired (3, 4).

Obesity is a complex multifactorial disease due to the interplay of numerous and interconnected factors. These include; genetic, human, and environmental factors with prolonged energy imbalance resulting in excess fat deposits in the body (5). It has been reported that elevated body mass index (BMI) increases the likelihood of diabetes, coronary heart disease, hypertension, stroke, and certain types of cancer (4). The Prognosis of diabetes and cardiovascular diseases (CVDs) are exacerbated by being overweight or obese, which significantly contributes to multiple morbidities and high mortality rates in many countries around the world (6).

Deaths from non-communicable diseases (NCDs) are growing faster in Africa compared to other continents of the world due to the global epidemic of harmful use of alcohol, unhealthy diet, smoking, and physical inactivity with an explosion in obesity and high blood pressure rates (7). It was reported in a study that analyzed data from different thirteen African countries that obese Africans were two to eight times as likely to be hypertensive compared to those with normal BMI (8). Hence elevated body mass is an important modifiable risk factor for public health interventions in Nigeria (8). In 2008 alone, it was reported that more than 1.4 billion adults were overweight globally. Of this figure, more than 200 million men and nearly 300 million women were obese (9, 10). It is projected that by 2030, the global prevalence of overweight and obesity will rise to 2.16 billion and 1.12 billion, respectively (11). In Nigeria, the reported prevalence of overweight among adults ranged from 20.3% to 35.1%, while the prevalence of obesity ranged from 4.6% to 22.2% (12). Several studies have assessed the prevalence of overweight and obesity and its associated factors in diverse population groups with varying findings linking cultural, societal, environmental, social, behavioral, psychological, metabolic, and genetic factors to obesity (13-15).

Types of work characterized by long working

hours with workers having little or no time for rest and leisure, highly sedentary jobs, poor dietary patterns, and poor health behavior may result in such workers being largely unaware of their health status as it pertains to occult diseases; and if these conditions were permitted to go on without a targeted and control intervention, adverse health, psychological, emotional, and socioeconomic penalties may be paid. Consequently, this study was carried out to determine the prevalence and factors associated with overweight and obesity among the staff of multinational companies in Rivers State, Nigeria. This study is significant because it will serve as baseline information among the study population and can as well be of value in implementing cost-effective workplace interventions aimed at improving the nutritional and health status of workers and the community members

Materials and Methods

The study was cross-sectional and analytical in design. The study was conducted in Port Harcourt, the capital city of Rivers State, Nigeria. The study was conducted in two multinational companies, one in Obio Akpor Local Government Area and the other in Port Harcourt City Local Government Area, both in Port Harcourt, Rivers State, Nigeria. Men and women working in multinational companies were enrolled in the study. This population was purposively chosen to gather the information that will contribute to knowledge in overweight and obesity studies in a similar population.

Company workers who understood the purpose of the study after explaining to them, who were not sick, not pregnant, and willing to participate were recruited for the study. Conversely, any staff of the companies who did not meet the inclusion criteria either by being sick and/or pregnant was excluded from the study. Since the population of the staff (permanent, contract and ad-hoc) in the companies was known, the minimum sample size for a given population was determined using $n = \frac{N}{1 + Ne^2}$ (Yaro Yamen formula).

Where, n =minimum sample size, N =Number of the study population which is 751 and e =desired precision/error which is 5% (0.05). Addition was made to care for the non-responses and incomplete responses. So a total of 310 staff members were recruited for the study and a multi-stage sampling technique was employed. First, the two multinational companies were selected out of the multinational companies in the study area by balloting, each company was then stratified according to gender so that the appropriate proportion of each gender will

be represented. After that, respondents were selected by a simple random sampling technique from each stratum. The purpose and benefits of the research were carefully explained to the management and staff and written informed consent was obtained from the management and each respondent. The respondents were assured of the confidentiality of the information obtained and were informed of their right to freely withdraw from the study at any time.

Four trained research assistants including two recruited intern nurses used a pretested semi-structured questionnaire to collect information on the socio-demographic and lifestyle characteristics of the respondents. Respondents' height was measured using a stadiometer with the backs of their head, their bottoms, and heels in contact with the tall block of the stadiometer, and both hands hanging loosely on both sides with their eyes looking straight ahead and their weight was determined with a well-calibrated bathroom weighing scale, while wearing light clothing and without footwear and both hands hanging loosely on both sides with eyes looking

straight ahead. Body mass index [BMI=weight (kg)/height (m)²] was investigated and classified according to WHO classification as underweight (BMI<18.5), normal weight (BMI=18.5-24.9), overweight (BMI=25.0-29.9) and obese (BMI≥30). Data were cross-checked and verified for accuracy. Statistical package for social sciences (SPSS software, version 20.0, Chicago, IL, USA) was employed to analyze the data and descriptive statistics such as mean, standard deviation, and percentages were determined. Correlation and logistic regression were also carried out and the level of significance was set at $p<0.05$ at 95% confidence interval.

Results

In this study, male respondents were 59.5% and 40.5% were female. The ages of 38.2% of the respondents were between 31 and 40 years and 8.8% were between 51 years and above. Many (64.9%) were married and 30.4% were single. Many (69.6%) asserted to have attained a tertiary level of education, and 29.1% declared to have attained

Table 1: Socio-demographic characteristics of the staff of multinational companies in Rivers State.

Variable	Frequency	Percentage
Gender		
Male	176	59.5
Female	120	40.5
Age (years)		
18-30	50	16.9
31-40	113	38.2
41-50	107	36.1
51 and above	26	8.8
Marital Status		
Single	90	30.4
Married	192	64.9
Separated/Divorced	8	2.7
Widow/Widower	6	2.0
Educational Status		
Primary	4	1.4
Secondary	86	29.1
Tertiary	206	69.6
Category of workers		
Director/GM	2	0.7
Manager	26	8.8
Supervisor	60	20.3
Senior staff/Foremen	100	33.8
Junior staff	108	36.5
Monthly income (Naira)		
Less than 30,000	2	0.7
30,000-60,000	54	18.2
61,000-100,000	56	18.9
101-300,000	142	48.0
301,000-500,000	34	11.5
501,000 and above	8	2.7
Total	296	100

secondary level of education. Some (36.5%) of the companies' personnel were junior staff and 8.8% were managers (Table 1). Almost half (48.0%) were earning between 101,000-300,000 Naira (235-695 US dollars) according to the September 30th, 2022 official exchange rate.

The life style and feeding habits of the research participants were presented in Table 2 indicating that 78 (26.4%) of them had two meals per day, while the majority (73.6%) had 3 meals per day.

Some (26.4%) ate snacks 2-3 times per week and 4.1% took snacks daily. Of the 296 respondents, 48.0% consumed alcohol, while 52.0% did not take alcoholic beverages and 0.7%, 12.2%, 23.3%, and 11.8% always, often, sometimes, and rarely took alcoholic beverages, respectively. More than half (56.8%) claimed to be engaged in physical body exercises. However, when respondents were asked about the frequency of the exercise in the past month, 2.7%, 6.1%, 33.1%, 34.8%, and 23.3% claimed to

Table 2: Life style and feeding habits of the respondents.

Variable	Frequency	Percentage
Number of meal eaten per day		
Two	78	26.4
Three	218	73.6
Do You eat snacks		
Yes	129	43.6
No	167	56.4
Type of Snack		
Plantain chips	8	2.7
Roasted plantain and yam	18	6.1
Fruits	32	10.8
Biscuits	26	8.8
Sausages/pie	45	15.2
None	167	56.4
Frequency of snacks consumption/week		
Once per week	2	0.7
2-3 times per week	78	26.4
4-5 times per week	36	12.2
Everyday	12	4.1
None	168	56.8
If respondents do take alcohol		
Yes	142	48.0
No	154	52.0
Frequency of alcoholic beverages consumption		
Always	2	0.7
Often	36	12.2
Sometimes	69	23.3
Rarely	35	11.8
None	154	52.0
Engaged in any physical exercise		
Yes	168	56.8
No	128	43.2
Frequency of engaging in physical exercise in the last one month		
Always	8	2.7
Often	18	6.1
Sometimes	98	33.1
Rarely	103	34.8
Never	69	23.3
Reasons for not doing exercise		
Busy	152	51.4
Do not see need	56	18.9
Laziness	12	4.1
No response	76	25.7
Total	296	100

always, often, sometimes, rarely, and never engaged in physical body exercises, respectively. Some were busy or lacked time to exercise, 18.9% did not see the need and few were admitted not doing exercise to just being lazy.

The prevalence of underweight, normal weight, overweight, and obesity among the respondents was 0.0%, 41.2%, 43.6%, and 15.2%, respectively (Table 3). The mean BMI±Standard deviation was 26.33±3.99 Kg/m², the lowest was 19.75 Kg/m² and the maximum BMI value was 37.83 Kg/m². Table 4 presented the predictors of elevated BMI among the respondents. It shows that there was a less odd of

being overweight and obese in the male respondents and this was statistically significant ($p=0.003$, 95%CI: 0.29-0.78). Respondents of 40 years and below had less odd (COR: 0.40, 95%CI: 0.25-0.67, $p=0.0001$) of being overweight or obese compared to those older than 40 years.

Those currently married were 3.46 times more likely to have elevated BMI than those currently unmarried ($p=0.000$, 95%CI: 2.10-5.70). Lower educational status was significantly ($p=0.043$) associated with lower odds of being overweight or obese among the respondents. Those who were in the rank of supervisors and above had higher odds

Table 3: BMI of the respondents.

Variable	Frequency	Percentage
Nutritional status (Mean=26.33±3.99, min=19.75, max=37.83)		
Underweight (BMI<18.50Kg/m ²)	0	0.0
Normal Range (BMI: 18.50-24.99 Kg/m ²)	122	41.2
Overweight (BMI: 25.0-29.99 Kg/m ²)	129	43.6
Obese (BMI: 30.0 and above Kg/m ²)	45	15.2
Total	296	100

BMI: Body mass index

Table 4: Logistic regression of factors associated with elevated BMI among respondents.

Variable	Elevated BMI		COR*(95%CI)	P value	AOR*(95% CI)	P value
	Yes	No				
Sex of respondents						
Male	75	101	0.48 (0.29–0.78)	0.003	0.23 (0.12-0.42)	0.000
Female	24	96				
Age of respondents						
≤40 years	83	80	0.40 (0.25-0.67)	0.0001	0.24 (0.14-0.43)	0.000
>40 years	39	94				
Marital Status						
Currently married	59	133	3.46 (2.10-5.70)	0.0001	5.03 (2.86-8.87)	0.000
Currently unmarried	63	41				
Educational Status						
≤Secondary	45	45	0.60 (0.36-0.99)	0.043	0.46 (0.27-0.79)	0.005
>Secondary	77	129				
Rank of workers						
Supervisor/Director	36	52	1.02 (0.61-1.69)	0.944	1.18 (0.70-1.99)	0.541
Foremen/Junior staff	86	122				
Monthly income						
100,000 and below	61	51	0.42 (0.26-0.67)	0.0001	0.30 (0.18-0.51)	0.000
More than 100,000	61	123				
Freq. of snacks consumption						
≥4 times/week	22	26	0.80 (0.43-1.49)	0.478	0.64 (0.33-1.22)	0.174
<4 times/week	100	148				
Freq. of alcoholic consumption						
Sometimes/Always	41	66	1.21 (0.74-1.96)	0.446	1.75 (1.02-3.0)	0.041
None/Rarely	81	108				
Freq. of exercise in last one month						
Sometimes/Always	58	66	0.67 (0.42-1.08)	0.100	0.70 (0.43-1.12)	0.135
None/Rarely	64	108				

COR*: Crude Odd Ratio, AOR*: Adjusted Odd Ratio, CI: Confidence Interval, BMI: Body mass index

of having elevated BMI though it was not significant ($p=0.944$). Respondents' monthly income appeared to be a significant ($p=0.0001$) predictor of elevated BMI as those receiving 100,000 Naira and below had less odds (COR: 0.42, 95%CI: 0.26-0.67) of being overweight or obese compared to others. The frequency of snack consumption was not associated with elevated BMI in the respondents ($p=0.478$, COR: 0.80, 95%CI: 0.43-1.49). Those who sometimes, often, and always drank alcohol presented higher odds of having elevated BMI than others, when were adjusted ($p=0.041$, AOR: 1.75, 95%CI: 1.02-3.0). Those with average to regular exercise had less odds of being overweight or obese although, this association was not significant ($p=0.10$, AOR: 0.67, 95%CI: 0.42-1.08) even when were adjusted.

Discussion

This cross-sectional and analytical study that was carried out among staff of two multinational companies in Rivers State, Nigeria revealed the prevalence of overweight and obesity and its associated factors to be 43.6% and 15.2%, respectively. The overweight and obesity prevalence in this study was higher than the 18.6% and 1.7%, respectively reported in a study conducted among a Chinese population (16), and the 10.7% in Madagascar (overweight or obese) (17). On the other hand, in this study, the prevalence of overweight and obesity was lower than the 31.3% and 53.2% of overweight and obesity, respectively reported among civil servants in Bida Niger State Nigeria (18), and 51.89% and 26.42% reported among traditional chiefs in south-south Nigeria (19), 80.8% reported among primary school teachers in Port Harcourt metropolis, Nigeria (overweight and obesity) (20) and 88.5% reported among the staff of a multi-national company in the Niger-Delta (21). Comparing these study findings with previous studies (21, 22) conducted in this region of the country, it appears that elevated BMI should be a great cause for the concern. Incidentally, the Nigeria Demographic and Health Survey (23) report, though was among the women, showed that the South-South zone of Nigeria had the highest prevalence of overweight and obesity (42.9%), and South East (39.5%), and South West (37.8%) with North East had the lowest prevalence (15.1%). These studies found that the prevalence of obesity increased rapidly in developing countries as they developed economically.

Although, some of the respondents did not take snacks, however, those who consumed high-energy and fat-based diets like sausages/pie, biscuits, and roasted plantain and yam may

consume them frequently. More importantly, many of them consumed alcoholic beverages, less than 9% exercised regularly, and the majority sometimes, rarely, and never exercised. A study conducted in China and India (24) appropriately conceded that the shift from and/or modification of local and traditional diets to high-energy and fat-based diets, accompanied by sedentary lifestyles had encouraged an apparent rise in BMI with its associated morbidity and mortality.

The logistic regression of factors associated with elevated BMI among our studied respondents revealed that female respondents appeared to have significant elevated BMI when compared to males. The male respondents demonstrated less odds of developing overweight and obesity. Similarly, in a study carried out among the Greek adult population, it was reported that central obesity significantly prevailed in female than in male respondents (25). Some studies have reported related findings (16, 26). However, obesity was more prevalent in men than in women in a study in Japan (27), though these differences could be related to dissimilarities in lifestyle, health-seeking behavior, and genetics. Besides, women reportedly aspired to have larger body sizes and therefore use their resources to acquire their desire (28). A study review illustrated that women in developing countries largely experienced elevated BMI as a sign of beauty and affluence and this could contribute to why women were more obese than men in such regions (29).

The age of respondents and marital status were demonstrated to be predictors of overweight and obesity ($p<0.001$ in both cases). A similar finding was found among financial institution workers in Accra Metropolis, Ghana (30). In a cross-sectional study in Alkharj, Saudi Arabia (31), it was shown that increasing age, being married and high serum cholesterol level were found to be significant predictors of overweight and obesity. Hence, age has been identified as one of the risk factors for overweight and obesity. A study that investigated the relationship between obesity and romantic partnership/duration of cohabitation (marital status) exhibited that single individuals, who dated, cohabited, and later married were more likely to become obese. Obesity-related activities were found to be strongest among couples who had lived together for at least 2 years (32, 33).

Those with secondary education and less income were significantly less likely to be overweight or obese and the high rank/grade staff had higher odds of having elevated BMI, though was not significant. Hence, high socioeconomic status was a predictor of elevated BMI. Dagne *et al.*, (33) similarly reported

that the odds of being overweight or obese were higher among adults who had higher wealth status. However in a study of national health interview surveys from nineteen European countries, the reverse was noticed with a higher prevalence of obesity and overweight among people with lower educational level (34). Zhang *et al.*, (16), similarly reported higher levels of education as a predictor of gaining weight, however, education was not found to be a predictor of overweight and obesity in a cross-sectional study in Alkharj, Saudi Arabia (31).

Obesity observed in our study was higher among those who sometimes and often drank alcohol. Golzarand *et al.*, (35), identically reported increased odds of overweight/obesity, especially among heavy alcohol drinkers than non-alcohol drinkers or light alcohol drinkers. Respondents who sometimes/always exercised had less odds of having elevated BMI, although this was not significant. Nevertheless, it has been reported that moderate to vigorous physical activities decreased the risk of being overweight and obese (36).

Conclusion

Risk factors associated with overweight and obesity among workers in the two multinational companies in Rivers State studied factors such as female sex, increasing age, marital status, level of education, rank or categories of workers, monthly income, and physical inactivity. Comparing the findings with previous studies conducted in this region of the country showed that more than usual attention should be given to the rising BMI in Southern Nigeria. Top management of companies should as a matter of concern implement ongoing, regular, and work-station interventions to address rising BMI among their staff. Besides, government and non-governmental bodies should promote healthy body size through awareness or campaigns especially in the local languages for the population to embrace a healthy life style, improve physical activity and avoid risky behaviors that could impair their health status.

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Conflict of Interest

None declared.

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