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Prevalence of obesity by occupation among male residents of South East Nigeria

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ABSTRACT

Obesity, which was once considered a first-world disease, has become a global epidemic. It is now becoming more prevalent in undeveloped and developing nations. This present study assessed the prevalence and occupational predictors of obesity among males in rural and urban regions of south-eastern Nigeria. This cross-sectional survey involved 240 males aged 18 to 60. Participants were grouped into eight groups depending on their occupation: students, hawkers, artisans, public servants, traders, drivers, security personnel, and sports personnel. Weight and height were measured using a weighing scale and a stadiometer, and relevant biodata were collected using standardized questionnaires. All procedures in this study followed the ethical guidelines of the Helsinki Declaration on the use of human subjects. The prevalence of obesity in this present study was 11.3%. Stratification by occupation showed that security personnel (30%) and drivers (26.67%) had a higher prevalence of obesity compared to other professions. Expectedly, the result showed that the mean body mass index of drivers and security personnel were significantly higher ($p<0.001$) when compared to that of students. The incidence of male obesity may be linked to occupational choices. As seen in this study, participants with occupations that involved little physical activity appeared to be more affected. This study provides preliminary evidence on the potential involvement of occupation in the onset of male obesity.

Keywords: body mass index; obesity; occupation; physical activities; south-east Nigeria.

INTRODUCTION

Obesity has been regarded as an epidemic that has grown into a global health concern and is an increasing risk to the well-being of individuals in industrialised countries [1]. Since the 1980s, the rate of obesity has tripled in many countries, contributing to the ongoing growth of the obesity problem [2]. Overweight and obesity are defined as abnormal or excessive fat accumulation that presents a health risk [3]. Overweight and obesity among adults have increased significantly, with obesity rates nearly tripling since 1975 [4]. In low- and middle-income countries (LMICs), more than 70% of adults are overweight or obese [5]. Additionally, obesity and overweight cause 70.7 million disability-adjusted life years (DALYs) and about 2.4 million deaths per year [6]. Adult overweight and obesity are now far more prevalent in sub-Saharan Africa (SSA) [4,6], with a rise of 41.7 per cent, or an estimated 429 million individuals, from 28.4 per cent in 2000 [6]. SSA nations are all LMICs [7].

Due to their connections to multiple chronic conditions like cardiovascular diseases, diabetes, cancer and stroke, overweight and obesity are significant public health concerns [6]. Additionally, it is associated with morbidity, mortality, and disability [8]. Economic expansion, increased urbanization, and a sedentary lifestyle are all contributing factors to the obesity epidemic [9]. There has also been a connection made between the incidence of obesity and different occupational groups [10]. Obesity has been linked to absenteeism and sick leave [11], resulting in productivity losses, accidents at work, work constraints, premature death and early retirement. There is significant evidence that high rates of obesity lower output per

worker, earnings, and connection to the labour market [12].

Just a handful of the many variables that affect obesity are occupational qualities. There are reports that shift workers tend to gain weight more frequently than day workers [13]. In a study that followed a group of Chinese workers over time, it was found that consistent, non-standard night shifts were correlated with a higher likelihood of experiencing overweight and excess abdominal fat compared to rotating shift work [14]. In addition, a study that examined data in Australia discovered gender variations in the job category-specific patterns of overweight and obesity [15]. Another finding from a study of US workers was that the frequency of obesity varied depending on the type of work [16]. According to a US study using data from the National Health Interview Survey from 2004 to 2011, the average obesity prevalence among white-collar workers increased significantly over time while remaining relatively stable among blue-collar workers [17]. Working long hours was associated positively with the outcome of obesity in over 70% of the research, according to a comprehensive evaluation of 47 studies on the link between occupational variables and obesity [8]. Jang *et al*. found that among Korean male manual workers who worked 60 hours per week, the risk of obesity accelerated by 1.65 times, but not significantly among women [18]. Working long hours has several detrimental effects on health, as was previously mentioned [19,20]. Long hours of work are consistently challenging for the worker's health and raise their risk of getting injured or having an accident at work [21].

According to the studies mentioned above, occupational traits and worker obesity are related. However, the results among different occupational groups in South East Nigeria are still poor. The research aims to investigate the relationship between occupation and the prevalence of obesity among residents of South East Nigeria using body mass index (BMI). Specifically, the study seeks to identify whether certain occupational groups are more susceptible to obesity than others in this region. This research addresses the gap in understanding the potential influence of occupation on obesity rates and contributes to targeted public health interventions to address this issue.

MATERIALS AND METHODS

Participants

Convenient sampling was adopted in the selection of the participants. A total of 240 male participants were recruited for this study. These participants were drawn from the major different occupational groups in Abakaliki in Ebonyi State, South East Nigeria.

Occupations Taken

The occupations taken during this work cut across different groups which are the major occupations in the studied area and they include students, hawkers, artisans, public servants, traders, drivers, security personnel and sports personnel.

Inclusion and Exclusion Criteria

In this study, participants outside the anticipated age bracket of 18-60 and also those not gainfully working were excluded. Only those whose grandparents and parents are from South-East Nigeria and are Igbo were included in this study. The study excludes those not interested in participating in the study despite eligibility.

Collection of Data/ Anthropometry

The participants were recruited after they consented verbally before the measurements were carried out. Their age was recorded. Height and weight were measured using a stadiometer (SECA 22089 Hamburg, Germany with model number 2171821009 24/15) and an axiom-made body weighing scale (with 1 kg sensitivity and 150 kg capacity).

Data Analysis

The data collected from each participant was assembled and compiled for statistical analysis. The anthropometric variables were calculated and their results were presented as mean ± standard deviation. One-way Analysis of Variance (ANOVA) was used to compare the differences. Pearson's correlation coefficient (r) was used to evaluate the relationship between anthropometric parameters. The level of significance for all analyses was $p<0.05$. The software for the statistical analysis from which tools for analysis were obtained was Statistical Package for the Social Sciences (SPSS) version 20.

RESULTS

Age, height and weight distribution in the evaluated populations

Notable findings include students having an average age of 22.50 years, a mean height of 176.00 cm, and a mean weight of 67.60 kg. Hawkers, artisans, public servants, traders, drivers, security personnel, and sports personnel also display distinct characteristics. Artisans have the highest average age (27.03 years) and mean weight (71.00 kg), while sports personnel exhibit the lowest mean weight (63.57 kg) and drivers have the lowest mean height (163.52 cm) (Table 1).

Table 1: Showing the age, height and weight distribution across different occupations

Occupations		Age (Yrs)	Height (cm)	Weight (kg)
Students	Mean	22.50	176.00	67.60
	Minimum	18	168	58
	Maximum	29	189	75
Hawkers	Mean	21.77	171.40	70.20
	Minimum	18	160	56
	Maximum	30	183	90
Artisans	Mean	27.03	175.46	71.00
	Minimum	0	163	55
	Maximum	42	192	99
Public Servants	Mean	25.90	172.21	69.47
	Minimum	20	160	55
	Maximum	40	192	99
Traders	Mean	26.60	173.82	68.80
	Minimum	21	163	54
	Maximum	40	192	90
Drivers	Mean	25.53	163.52	69.30
	Minimum	19	137	52
	Maximum	41	177	99
Security Personnel	Mean	24.73	164.16	69.90
	Minimum	19	157	44
	Maximum	43	174	99
Sport Personnel	Mean	26.40	162.94	63.57
	Minimum	19	155	44
	Maximum	43	178	78

BMI distribution in the evaluated populations

The results of the BMI distribution revealed that 7.1% of the population is underweight, while 60.8% have normal weight. The prevalence of overweight and obesity in the population are both 20.8% and 11.3% respectively as shown in Table 2.

Table 2: BMI distribution in the evaluated populations

Categories	Frequency (n=240)	Per cent (%)
Underweight	17	7.1%
Normal weight	146	60.8%
Overweight	50	20.8%
Obese	27	11.3%

The data indicates that among Students, 3.33% are classified as Underweight, while 96.67% fall within the Normal range. Hawkers show 66.67% within the Normal range and 33.33% in the Overweight category. Artisans exhibit 16.67% as Underweight, 53.33% as Normal, 13.33% as Overweight, and 16.67% as Obese. Public Servants are 6.67% Underweight, 70% Normal, 13.33% Overweight, and 10% Obese. Traders have 13.33% Underweight, 60% Normal, and 26.67% Overweight. Drivers show 53.33% Normal and 26.67% both Overweight and Obese. Security Personnel include 6.67% Underweight, 43.33% Normal, 20% Overweight, and 30% Obese. Sports Personnel depict 10% as Underweight, 43.33% as Normal, 40% as Overweight, and 6.67% as Obese. An illustration of this is shown in **Table 3**.

Table 3: BMI distribution in each occupational group

	Categories			
Occupational Groups	**Underweight (%)**	**Normal (%)**	**Overweight (%)**	**Obese (%)**
Students	1 (3.33)	29 (96.67)	-	-
Hawkers	-	20 (66.67)	10 (33.33)	-
Artisans	5 (16.67)	16 (53.33)	4 (13.33)	5 (16.67)
Public Servants	2 (6.67)	21 (70)	4 (13.33)	3 (10)
Traders	4 (13.33)	18 (60)	8 (26.67)	-
Drivers	-	16 (53.33)	6 (20)	8 (26.67)
Security Personnel	2 (6.67)	13 (43.33)	6 (20)	9 (30)
Sports Personnel	3 (10)	13 (43.33)	12 (40)	2 (6.67)
TOTAL	**17 (7.1)**	**146 (60.8)**	**50 (20.8)**	**27 (11.3)**

Results revealed that the BMI of drivers, security personnel, and sports personnel are on average significantly higher ($p = 0.000$, 0.000, and 0.043 respectively) when compared to that of students. No significant difference was however observed in the BMI of hawkers, public servants, traders, and artisans when compared to the BMI of students as displayed in **Table 4**.

Table 4: BMI difference compared to the BMI of students

Occupations	Mean ± SEM	P-value
Students	21.84±0.31	
Hawkers	23.82±0.48	0.057
Artisans	23.16±0.88	0.203
Public Servants	23.40±0.62	0.131
Traders	22.86±0.60	0.322
Drivers	26.11±1.02	0.000*
Security Personnel	25.87±1.02	0.000*
Sport Personnel	23.94±0.57	0.043*

$p < 0.05$

DISCUSSION

This study focused on the prevalence of obesity among different occupational groups in South East Nigeria specifically among the male populations. In Nigeria, the prevalence of obesity is of epidemic proportion, with more obese people in urban than in rural settings [22]. Although obesity is preventable through basic life decisions such as lifestyle changes, it remains one of the significant health challenges sub-Saharan Africa is dealing with [23]. Our study revealed that workers in some occupations have a lower likelihood of obesity. We reported an overweight prevalence of 20.8% among the selected occupations. Studies have reported likely prevalence of overweight in same region; however, these were higher than findings in the current study [23,24]. Furthermore, our study showed an obesity prevalence of 11.3% which was lower than what has been reported in the same region [22] but higher in other regions [23,25]. The differences recorded could be related to the level of urbanisation.

While the studies above focused on the prevalence of obesity and overweight among a selected population, ours dived into understanding this prevalence among different occupational groups. Previous studies have reported that the prevalence of obesity varies by occupation as seen in different studies around the world [17,26]. When compared to the control group (students), we recorded a significant difference in the obesity prevalence among drivers, security personnel and sports personnel. It has been proposed that occupation and obesity are linked because certain socioeconomic circumstances and behavioural characteristics are closely associated with particular occupations. They may therefore have an impact on the risk of obesity [15]. Additionally, the majority of the time, the nature of a job determines how much physical activity is required [27]. The prevalence of artisans, hawkers and traders did not increase which could be related to how physically active these jobs demand. According to reports, occupations that require physical activity have an impact on the obesity crisis that is evident in these fields [28]. Occupations that are not physically demanding are said to reduce the chance of obesity [29] with a level of 2.4% [30]. The public service is an example of white-collar employment [31]. White-collar employees are thought to generally support a healthy lifestyle and view being slender as a class norm [26] and so strive for a healthy body. White-collar

employment is typically associated with the educated class. There is evidence that education lowers the risk of obesity [32], hence their level of obesity did not increase. This is also consistent with research by Proper & Hildebrandt [33] which showed jobs with lower BMIs tend to have workers with greater education levels, and vice versa. This has been made feasible since these individuals can follow healthier lifestyles and decision-making principles [34].

However, we see a rise in the drivers and security personnel. People who work in these professions are known to have sedentary lifestyles [35]. In a study carried out in Australia, Allman-Farinelli *et al.* [15] reported a significant level of obesity among drivers. The increase in their results has been reported to be related to different factors such as longer hours at work, sedentary lifestyle and negative working conditions [8,18]. However, one issue with the use of BMI is that it does not take into account variations in body fat distribution [36]. This could be the cause of the difference between the BMI of sports personnel and the control population. BMI may underestimate body fat in individuals with strong body-build, such as athletes. Others have reported that BMI confuses muscle mass as body fats [37,38].

CONCLUSION

The study indicates that various occupational groups exhibit different proportions of underweight, normal weight, overweight, and obese individuals. Physically demanding jobs appear to lower obesity risk, emphasizing the significance of lifestyle choices, such as leisure time physical activity and a balanced diet, in maintaining a healthy weight.

REFERENCES

1. Goettler A, Grosse A, Sonntag D. Productivity loss due to overweight and obesity: a systematic review of indirect costs. BMJ Open 2017;7(10):e014632.
2. Nigatu YT, van de Ven HA, van der Klink JJL, Brouwer S, Reijneveld SA, Bültmann U. Overweight, obesity and work functioning: the role of working-time arrangements. Appl Ergon. 2016;52:128–34.
3. Lim SS, Vos T, Flaxman AD, Danaei G, Shibuya K, Adair-Rohani H, et al. A comparative risk assessment of burden of disease and injury attributable to 67 risk factors and risk factor clusters in 21 regions, 1990-2010: a systematic analysis for the Global Burden of Disease Study 2010. Lancet 2012;380(9859):2224–60.
4. Nglazi MD, Ataguba JE-O. Overweight and obesity in non-pregnant women of childbearing age in South Africa: subgroup regression analyses of survey data from 1998 to 2017. BMC Public Health. 2022;22(1):395.
5. Owobi O, Okonji O, Nzoputam C, Ekholuenetale M. Country-Level Variations in Overweight and Obesity among Reproductive-Aged Women in Sub-Saharan Countries. Women. 2022;2(4):313–25.
6. Amegbor PM, Yankey O, Davies M, Sabel C. Individual and contextual predictors of overweight or obesity among women in Uganda: a spatio-temporal perspective. GeoJournal. 2021;87:1–21.
7. GBD 2019 Risk Factors Collaborators. Global burden of 87 risk factors in 204 countries and territories, 1990-2019: a systematic analysis for the Global Burden of Disease Study 2019. Lancet. 2020;396(10258):1223-1249.
8. Solovieva S, Lallukka T, Virtanen M, Viikari-Juntura E. Psychosocial factors at work, long work hours, and obesity: a systematic review. Scand J Work Environ Health. 2013;39(3):241–58.
9. Popkin BM. Global nutrition dynamics: the world is shifting rapidly toward a diet linked with noncommunicable diseases. Am J Clin Nutr. 2006;84(2):289–98.
10. Schulte PA, Wagner GR, Ostry A, Blanciforti LA, Cutlip RG, Krajnak KM, et al. Work, obesity, and occupational safety and health. Am J Public Health. 2007;97(3):428–36.
11. De Wet T, Kruger WH, Joubert G. Obesity and sickness absenteeism among health workers in a private hospital in South Africa. South African Fam Pract Off J South African Acad Fam Pract Care. 2022;64(1):e1–8.
12. Biener A, Cawley J, Meyerhoefer C. The Impact of Obesity on Medical Care Costs and Labor Market Outcomes in the US. Clin Chem. 2018;64(1):108–17.
13. Liu Q, Shi J, Duan P, Liu B, Li T, Wang C, et al. Is shift work associated with a higher risk of overweight or obesity? A systematic review of observational studies with meta-analysis. Int J Epidemiol. 2018;47(6):1956–71.
14. Sun M, Feng W, Wang F, Zhang L, Wu Z, Li Z, et al. Night shift work exposure profile and obesity: Baseline results from a Chinese night shift worker cohort. PLoS One. 2018;13(5):e0196989.
15. Allman-Farinelli MA, Chey T, Merom D, Bauman AE. Occupational risk of overweight and obesity: An analysis of the Australian Health Survey. J Occup Med Toxicol. 2010;5(1):1–9.
16. Luckhaupt SE, Cohen MA, Li J, Calvert GM. Prevalence of obesity among U.S. workers

and associations with occupational factors. Am J Prev Med 2014;46(3):237–48.
17. Gu JK, Charles LE, Bang KM, Ma CC, Andrew ME, Violanti JM, et al. Prevalence of obesity by occupation among US workers: the National Health Interview Survey 2004-2011. J Occup Environ Med. 2014;56(5):516–28.
18. Jang T-W, Kim H-R, Lee H-E, Myong J-P, Koo J-W. Long work hours and obesity in Korean adult workers. J Occup Health. 2014;55(5):359–66.
19. Ryu J, Yoon Y, Kim H, Kang CW, Jung-Choi K. The Change of Self-Rated Health According to Working Hours for Two Years by Gender. Int J Environ Res Public Health. 2018;15(9).
20. Ma Y, Wang Y-J, Chen B-R, Shi H-J, Wang H, Khurwolah MR, et al. Study on association of working hours and occupational physical activity with the occurrence of coronary heart disease in a Chinese population. PLoS One. 2017;12(10):e0185598.
21. Friedman LS, Almberg KS, Cohen RA. Injuries associated with long working hours among employees in the US mining industry: risk factors and adverse outcomes. Occup Environ Med. 2019;76(6):389–95.
22. Chukwuonye II, Chuku A, John C, Ohagwu KA, Imoh ME, Isa SE, et al. Prevalence of overweight and obesity in adult Nigerians - a systematic review. Diabetes Metab Syndr Obes. 2013;6:43–7.
23. Ijoma UN, Chime P, Onyekonwu C, Ezeala-Adikaibe BA, Orjioke C, Anyim OB, et al. Factors Associated with Overweight and Obesity in an Urban Area of South East Nigeria. Food Nutr Sci. 2019;10(07):735–49.
24. Osunkwo DA, Nguku PM, Mohammed A, Umeokonkwo CD, Kamateeka M, Ibrahim M, et al. Prevalence of obesity and associated factors in Benue State, Nigeria: A population-based study. Ann Afr Med. 2021;20(1):9–13.
25. Ijoma UN, Njoku P, Arodiwe E, Ijoma C. Increasing Trend of Overweight and Obesity in a Rural Community in South East Nigeria. Open J Epidemiol. 2020;10:323–33.
26. Shaikh RA, Sikora A, Siahpush M, Singh GK. Occupational variations in obesity, smoking, heavy drinking, and non-adherence to physical activity recommendations: findings from the 2010 National Health Interview Survey. Am J Ind Med. 2015;58(1):77–87.
27. Kajitani S. Which is worse for your long-term health, a white-collar or a blue-collar job? [Internet]. J Jpn Int Econ. 2015;38:228–43
28. Steeves JA, Tudor-Locke C, Murphy RA, King GA, Fitzhugh EC, Harris TB. Classification of occupational activity categories using accelerometry: NHANES 2003-2004. Int J Behav Nutr Phys Act. 2015;12:89.
29. Bonauto DK, Lu D, Fan ZJ. Obesity prevalence by occupation in Washington State, Behavioral Risk Factor Surveillance System. Prev Chronic Dis. 2014;11:130219.
30. Böckerman P, Johansson E, Jousilahti P, Uutela A. The physical strenuousness of work is slightly associated with an upward trend in the BMI. Soc Sci Med. 2008;66(6):1346–55.
31. Narisada A, Suzuki K. Association between procrastination, white-collar work and obesity in Japanese male workers: a cross-sectional study. BMJ Open. 2019;9(11):e029931.
32. Wardle J, Waller J, Jarvis MJ. Sex differences in the association of socioeconomic status with obesity. Am J Public Health. 2002;92(8):1299–304.
33. Proper KI, Hildebrandt VH. Overweight and obesity among Dutch workers: differences between occupational groups and sectors. Int Arch Occup Environ Health. 2010;83(1):61–8.
34. Caban-Martinez AJ, Lee DJ, Fleming LE, LeBlanc WG, Arheart KL, Chung-Bridges K, et al. Leisure-time physical activity levels of the US workforce. Prev Med (Baltim). 2007;44(5):432–6.
35. Moreno CRC, Louzada FM, Teixeira LR, Borges F, Lorenzi-Filho G. Short sleep is associated with obesity among truck drivers. Chronobiol Int. 2006;23(6):1295–303.
36. Nuttall FQ. Body Mass Index: Obesity, BMI, and Health: A Critical Review. Nutr Today.2015;50(3):117–28.
37. Thomas DM, Bredlau C, Bosy-Westphal A, Mueller M, Shen W, Gallagher D, et al. Relationships between body roundness with body fat and visceral adipose tissue emerging from a new geometrical model. Obesity (Silver Spring). 2013;21(11):2264–71.
38. Rahman M, Berenson AB. Accuracy of current body mass index obesity classification for white, black, and Hispanic reproductive-age women. Obstet Gynecol. 2010;115(5):982–8.