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ASSOCIATION BETWEEN OBESITY AND LIFESTYLE PRACTICES AMONG ADULTS IN A RURAL COMMUNITY IN EDO STATE NIGERIA

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ABSTRACT

Obesity, a growing global concern, has significant health complications. This descriptive cross-sectional study aimed to determine the relationship the between practices/pattern of lifestyle of the rural population of Igueben and the development of obesity. A semi-structured questionnaire was administered to 360 participants, aged 29 to 60 years, collecting their biodata, sociodemographic characteristics and lifestyle patterns including dietary habits, physical activity, alcohol intake and smoking. Their anthropometry as well as blood pressure and blood glucose were checked and recorded. The mean age of the study population was 45.12±08.23 years with a prevalence of hypertension and diabetes of 14.4% and 32.4% respectively. The majority of the respondents, who were farmers, had a primary level of education. The prevalence of overweight and obesity was high. Significantly associated with obesity were increasing age, female sex, and low levels of education. Other factors this study revealed to be closely associated with obesity include increasing hypertension, an unhealthy diet, physical inactivity, poor sleep and alcohol consumption. Periodic health education will no doubt be beneficial and prevent the concomitant of obesity-related comorbidities.

Keywords: *Obesity, Lifestyle modification, Rural community, Edo State.*

INTRODUCTION

Obesity is a growing concern worldwide (Ojeogwu & Husin 2020). In 2016, 650 million people, representing 13% of the global population of adults 18 years and older were obese (Ayogu *et al.*, 2022). This is expected to rise to $1.12 billion by 2030 It is worse in Nigeria, where the prevalence of obesity has soared from 18.1% to 22.2% (Ojeogwu & Husin 2020). Obesity increases the risk of non-communicable diseases like hypertension and diabetes as well as worsens the prognosis of these diseases where they are present (Akinkugbe, 1997; Ojeogwu & Husin, 2020). Non-communicable diseases cause significant morbidity and mortality worldwide, with low- and middle-income countries (LMIC) like Nigeria bearing the brunt of the burden (Kebede, 2022). About 25% of the global population and 15% of Africans currently have hypertension which is set to increase if not checked (Angelo 2020). Obesity also plays a role in metabolic syndrome. Hypertension and diabetes have been linked to behavioural risk factors such as a sedentary lifestyle, unhealthy diet, alcohol consumption, and cigarette smoking (Nkeiruka & Funmilayo 2021). Therefore, control of obesity is key to the prevention and treatment of hypertension, diabetes, and other non-communicable diseases.

Lifestyle modification has been proven to prevent and control non-communicable diseases, including hypertension and diabetes (Bogale *et al.*, 2020). It consists of eating a healthy diet that is high in fibre and low in calories and salt; adequate physical activity consisting of moderate to intense activity such as cycling, jogging, swimming, skipping, and brisk walking for a minimum of 150 minutes per week; alcohol reduction/caseation; and smoking cessation (Andualem 2020). Lifestyle modification is currently considered a first-line treatment for hypertension, diabetes, and other Non-Communicable Diseases (NCDs) (Habib *et al.*, 2018).

This study aims to determine the relationship between obesity and lifestyle modification practices among adults in a rural community in Edo State, south-south geopolitical zone of Nigeria.

MATERIALS AND METHODS

SELECTION OF PARTICIPANTS

The study was a descriptive cross-sectional study conducted in Igueben, Igueben Local Government Area, in Edo Central Senatorial District of Edo State. Adults, 18 years of age and older who have resided in the community for at least 12 months and consented to participate were recruited for the study through a multi-stage sampling in which Igueben Local Government was randomly selected out of the 18 local government areas in Edo State. In addition, the Igueben community was chosen at random from among the four communities in the local government. Purposive sampling was then used to select study participants during an outreach programme conducted for the community. The sample size was calculated to be 343 using fisher's formula ($n=Z^2\ pq/d^2$) and obesity prevalence among patients with hypertension in Irrua Edo State Nigeria of 33.7% (Oseni et al 2021). A total of 360 respondents were recruited for the study.

DATA COLLECTION

Data was collected via an interviewer-administered, semi-structured questionnaire that contained questions on the sociodemographic characteristics of respondents and their lifestyle patterns including dietary habits, physical activity,

alcohol intake, and smoking. Their height (in metres and recorded to the nearest 0.01m) and weight (in kilogrammes and recorded to the nearest 0.1kg) were measured using a stadiometer (Secca 240 wall mounted, Hamburg Germany) and a bathroom scale (Secca 770 Floor Digital Scale, Hamburg Germany) respectively and their body mass index (BMI) was calculated using the formula BMI = Weight (Kg)/Height^2(m^2). Respondents with BMI < 18Kg/m^2 were categorised as underweight; those with BMI of 18 to 24.9 Kg/m^2 as normal weight; those with BMI of 25 to 29.9 Kg/m^2 as overweight and those with BMI ≥ 30 Kg/m^2 as Obese (Han et al, 2006 and Oseni et al, 2021). Their blood pressure was measured using Omron 6 digital sphygmomanometer (OMRON M2 Classic Intellisense). Two measurements were taken 10 minutes apart with the participant sitting comfortably and the mean was determined and used for the study. Respondents were categorised as normal if their blood pressure was ≤ 120/80mmHg; pre hypertensive if their blood pressure was between 121-139/81-89mmHg and hypertensive if their blood pressure was ≥ 140/90mmHg. This was based on JNC 7 classification of hypertension (Rahman et al, 2021). Fasting Blood Glucose level was also checked using a glucometer and the value was recorded. Respondents were categorised as having normal blood glucose if it was < 100mg/dl; prediabetic for those between 100 and 125mg/dl and diabetic for respondents with fasting blood glucose of ≥ 126mg/dl. The questionnaire was pretested in Ewu, a neighbouring community, with subjects of similar characteristics.

STATISTICAL ANALYSIS

All the data collected with the questionnaires were entered into a computer and analysed using an Excel worksheet (2007) and the Statistical Package for the Social Sciences (SPSS) version 20.0 (IBM SPSS Statistics). The categorical variables were summarized using proportions and frequency tables. Quantitative variables such as age were summarized using mean, median, standard deviation, and frequency tables. Chi-Square test statistics were used to ascertain the statistical significance with a 95% Confidence interval computed and the level of significance was set at P value < 0.05.

ETHICAL CONSIDERATIONS

Approval for this study was obtained from the Ethical and Research Committee of the Irrua Specialist Teaching Hospital (ISTH) and informed written consent was obtained from the participants before the commencement of the study and recruitment of subjects, respectively. Details of this research (including the procedure, benefits, etc.) were explained to the participants in a language they could understand and interpreters were engaged where necessary.

RESULTS AND DISCUSSIONS

The ages of the 360 respondents interviewed ranged from 29 to 60, with a mean age of 45.12±08.23 years. They were mostly females 244 (67.8%), married 320 (94.4%), and Esan by tribe 340 (94.4%). The majority of respondents had a primary level of education 150 (41.7%) and were mostly farmers 210 (58.3%). The sociodemographic characteristics of the respondents are tabulated in Table 1.

Table 1: Sociodemographic characteristics of respondents (N=360)

Variable	Frequency	Percentage
Age (Years)		
21 – 30	29	8.1
31 – 40	59	16.4
41 – 50	152	42.2
51 – 60	120	33.3
Sex		
Male	116	32.2
Female	244	67.8
Marital Status		
Single	12	3.3
Married	320	88.9
Divorced	22	6.1
Widowed	6	1.7
Tribe		
Esan	340	94.4
Ibo	6	1.7
Bini	4	1.1
Others	10	2.8
Level of Education		
No Formal Education	58	16.1
Primary	150	41.7
Secondary	102	28.3
Tertiary	50	13.9
Occupation		
Farmer	210	58.3
Artisan	88	24.4
Civil Servant	38	10.6
Unemployed	18	5.0
Student	6	1.7

The clinical characteristics of respondents are shown in Table 2. The majority of them 202 (56.1%) had normal BMI, 84 (23.3%) were overweight and 74 (20.6%) were obese. The blood glucose level of most respondents 230 (63.9%) was normal, 78 (21.7%) of them were prediabetic and the rest 52 (14.4%) were diabetic. Most respondents 198 (55.0%) had normal blood pressure. The rests were pre-hypertensive 46 (12.8%) and hypertensive 116(32.2%) respectively.

Table 2: Respondent's Clinical Characteristics (N=360)

Variable	Frequency	Percentage
Body Mass Index (BMI)		
Normal (BMI 18 – 24.9Kg/m^2)	202	56.1
Overweight (BMI 25 – 29.9Kg/m^2)	84	23.3
Obese (BMI ≥ 30Kg/m^2)	74	20.6
Fasting Blood Sugar (FBS) Level		
Normal (FBS < 100mg/dl)	230	63.9
Prediabetic (FBS 100 – 125mg/dl)	78	21.7
Diabetic (FBS > 125mg/dl)	52	14.4
Blood Pressure		
Normal (BP ≤ 120/80mmHg)	198	55.0
Pre-Hypertensive (BP 121/81 – 139/89mmHg)	46	12.8
Hypertensive (BP ≥ 140/90mmHg)	116	32.2

Table 3 shows the lifestyle pattern of the respondents. Most respondents consumed a healthy diet rich in fibre and low in calories 214 (59.4), engaged in moderate to severe physical activity 218 (60.6%), slept adequately (six to eight hours at night) 192 (53.3%), avoided stressful activities 196 (54.4%), did not consume alcohol 214 (59.4%) and did not smoke 218 (60.6%).

Table 3: Lifestyle Pattern of Respondents (N=360)

Variable	Frequency	Percentage
Healthy Diet		
Yes	214	59.4
No	146	40.6
Physical Activity		
Yes	218	60.6
No	142	39.4
Adequate Sleep		
Yes	192	53.3
No	168	46.7
Stress Avoidance		
Yes	196	54.4
No	164	45.6
Intake of Alcohol		
Yes	214	59.4
No	146	40.6
Non-Smoking		

The relationship between obesity and sociodemographic characteristics is shown in Table 4. Obesity was shown to be associated with increasing age, female sex, and low level of education (p <0.001).

Table 4: Relationship Between Sociodemographic Characteristics and Obesity among Respondents (N=360)

Variable	Normal (n=202)	Overweight (n=84)	Obese (n=74)	Total (N=360)	χ^2	P value
Age					16.816	0.002*
≤ 40	52 (59.09)	30 (34.09)	6 (6.82)	88 (100.00)		
41 – 50	84 (55.26)	29 (19.08)	39 (25.66)	152 (100.00)		
51 – 60	66 (55.00)	25 (20.83)	29 (24.17)	120 (100.00)		
Sex					28.703	< 0.001*
Male	46 (39.66)	28 (24.14)	42 (36.21)			
Female	156 (63.93)	56 (22.95)	32 (13.11)	244 (100.00)		
Level of Education					19.596	< 0.001*
Below Secondary	128 (61.54)	54 (25.96)	26 (12.50)	208 (100.00)		
Secondary and Above	74 (48.68)	30 (19.74)	48 (31.58)	152 (100.00)		
Occupation					11.876	0.065
Farmers	130 (61.91)	46 (21.90)	34 (16.19)	210 (100.00)		
Artisans	38 (43.18)	26 (29.55)	24 (27.27)	88 (100.00)		
Civil Servants	19 (50.00)	9 (23.68)	10 (26.32)	38 (100.00)		
Unemployed	15 (62.50)	3 (12.50)	6 (25.00)	24 (100.00)		

*Statistically significant

The relationship between obesity and lifestyle patterns is shown in Table 5. Obesity was shown to be associated with increasing hypertension, an unhealthy diet, physical inactivity, poor sleep and alcohol consumption (p <0.001).

Table 5: Relationship Between Lifestyle Patterns and Obesity among Respondents (N=360)

Variable	Normal (n=202)	Overweight (n=84)	Obese (n=74)	Total (N=360)	χ^2	P value
FBS Level					5.273	0.260
Normal	122 (53.04)	62 (26.96)	46 (20.00)	230 (100.00)		
Prediabetic	50 (64.10)	12 (15.39)	16 (20.51)	78 (100.00)		
Diabetic	30 (57.69)	10 (19.23)	12 (23.08)	52 (100.00)		
Blood Pressure					23.797	<0.001*
Normal	104 (52.53)	46 (23.23)	48 (24.24)	198 (100.00)		
Pre-hypertensive	16 (34.78)	14 (30.43)	16 (34.78)	46 (100.00)		
Hypertensive	82 (70.69)	24 (20.69)	10 (8.62)	116 (100.00)		
Diet					26.433	<0.001*
Healthy Diet	103 (48.13)	48 (22.43)	63 (29.44)	214 (100.00)		
Unhealthy Diet	99 (67.81)	36 (24.66)	11 (7.53)	146 (100.00)		
Physical Activity					102.460	<0.001*
Active	146 (66.97)	65 (29.82)	7 (3.21)	218 (100.00)		
Inactive	56 (39.44)	19 (13.38)	67 (47.18)	142 (100.00)		
Sleep					28.523	<0.001*
Adequate	112 (58.33)	59 (30.73)	21 (10.94)	192 (100.00)		
Inadequate	90 (53.57)	25 (14.88)	53 (31.55)	168 (100.00)		
Stress					0.230	0.891
Not Stressed	112 (57.14)	44 (22.45)	40 (20.41)	196 (100.00)		
Stressed	90 (54.88)	40 (24.39)	34 (20.73)	164 (100.00)		
Alcohol					18.129	<0.001*
Drinkers	108 (50.47)	46 (21.49)	60 (28.04)	214 (100.00)		
Non-Drinkers	94 (64.38)	38 (26.03)	14 (9.59)	146 (100.00)		
Smoking					1.843	0.398
Non-Smokers	102 (61.47)	43 (19.72)	41 (18.81)	218 (100.00)		
Smokers	68 (47.89)	41 (28.87)	33 (23.24)	142 (100.00)		

*Statistically significant

The prevalence of obesity in this study, which aimed to determine the relationship between practices and patterns of the lifestyle of the study population and the development of obesity in a rural setting, was high. The majority of the respondents were in their middle age of life, with a female preponderance. The preponderance of female participants does not come as a surprise, as studies have shown greater health-seeking behaviour in females compared to their

male counterparts (Atchessi *et al.*, 2018). More than half of the respondents were farmers, as farming is the main source of livelihood for the study population. The Esan people are traditionally known to be agriculturalists, trado-medical practitioners, mercenary warriors, and hunters (Okoduwa, 2006).

In this study, a fifth of the respondents was obese, this was higher than the findings of a similar study in the Eastern part of the country (Iloh et al 2011). Similar studies in various rural communities in sub-Saharan Africa reported higher prevalence rates (Ajayi *et al.* 2016). The variation in findings may not be unconnected with differences in lifestyle patterns and diets of these two populations. The findings contrast with those of Egbi and Ogoina (2018), who discovered that nearly one-quarter of the study population was overweight in a rural population in Bayelsa State, south-south Nigeria.

The overall prevalence of prediabetes and diabetes was found to be 21.67% and 14.4%, respectively. These figures agree with the findings of Nwatu *et al.* (2016), who similarly reported a prevalence of 21.5% in a rural community survey in south-eastern Nigeria. Also in this study, the rate of diabetes recorded was in accordance with findings in a rural agrarian setting in southern Nigeria (Egbi 2020).

In this study, the majority of the respondents (55%) had normal blood pressure, while pre-hypertension and hypertension were recorded at 12.78% and 32.22% respectively. Our findings were slightly higher than the prevalence rate of 28% in the work of Adeloye *et al.* (2015) but far lower than the earlier reported findings of a national survey on non-communicable diseases (NCDs) of an overall crude prevalence of 11.2% (1997).

The study population's lifestyle pattern revealed that 54.4% consumed a healthy diet high in fibre and low in calories, 60.6% engaged in moderate to severe physical activity, 53.3% slept well, 54.4% avoided stressful activities, 59.4% did not drink alcohol and 60.6% did not smoke cigarettes.

The study also reported a high prevalence rate of overweight and obesity in the population (23.33% and 20.56% respectively). In a similar study, Oladapo et al (2010) found a prevalence of 20.8% in a rural agrarian setting. However, Onwubere *et al.* (2011) recorded a higher prevalence figure. There seems to be a growing trend of obesity in rural settings from recent findings (Chukwuonye, 2013; Hendriks, 2012 and Sola 2011) which may not be unconnected with changing lifestyle patterns and practices of the rural population. Significantly associated with obesity were increasing age, female sex, and low levels of education. Other factors this study revealed to be closely associated with obesity include increasing hypertension, an unhealthy diet, physical inactivity, poor sleep, and alcohol consumption. In a related survey by Akarolo-Anthony *et al.* 2014, factors that were independent predictors for overweight and obesity were female gender and older age, while middle or high socio-economic status was independently associated with obesity. Obesity and overweight became more common as people got older. The prevalence of obesity and overweight increases with old age. This is associated with increased morbidity and a reduction in quality of life.

CONCLUSION

The prevalence of overweight and obesity was high, suggesting an increasing global trend. This was significantly associated with unwholesome lifestyle practices and risky behaviours. The need for continued health education to curtail obesity-related co-morbidities could not be more apt.

CONFLICT OF INTEREST

The authors declare that there is no potential conflict of interest.

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