ASSESSMENT OF LEVELS OF PHYSICAL ACTIVITY AMONG OBESE AND OVERWEIGHT ADULTS ATTENDING GENERAL OUT-PATIENT CLINIC IN LAGOS UNIVERSITY TEACHING HOSPITAL.

Abstract

A sedentary lifestyle is more likely in obese people which does not only aid weight gainbut also increases the risk of complications like diabetes mellitus, osteoarthritis, coronary artery disease, hypertension and cancers.The study will ascertain the degree of physical activity among adult patients who are overweight and who visit General Out-Patient Clinic (GOPC), Lagos University Teaching Hospital(LUTH).The research was a cross-sectional, descriptive study. The study population comprised of overweight and obese adults, aged 18 to 64, who attended the GOPC of the FMD, LUTH between July and September, 2019. The sample was 285. Data was collected through pre-tested, semi-structured questionnaire. Statistical package for social sciences (SPSS IBM) version 25 was used for data entry and analysis.Frequency and percentage were used to represent all categorical variables, and means, standard deviation, or, in the case of skewed continuous variables, median and interquartile range, were used to summarize them. The Kolmogorov-Smirnov test was employed to evaluate the normality of the data.The association between categorical variables was evaluated using the Fischer exact test and chi-square analysis. The study found that there is an inverse and possibly bidirectional causal relationship between physical activity and unhealthy BMI (overweight and obesity). The result revealed there is a high percentage of physical inactivity and low percentage of high physical activity among adult patients who are overweight visiting GOPC, LUTH. The study recommended that physical activity interventions should receive special attention in the handling of overweight adults, given the high levels of physical inactivity among them.

Keywords: Levels of Physical activity, Obese and Overweight Adults.

Introduction

According to [1] public health, obesity and overweight were deemed a global epidemic by the World Health Organisation (WHO) in 1997. Over the past three decades, there has been a notable increase in the prevalence of overweight and obesity[1]. If current trends continue, the majority of adults worldwide will either be overweight or obese by 2030. Obesity and being overweight are significant risk factors for non-communicable diseases (NCDs), and the obesity epidemic has increased the burden of various NCDs, including diabetes, cancer, and heart disease[2]. Three of the biggest risk factors for NCDs are obesity, overweight, and physical inactivity[2].NCDs are the leading cause of death globally. The prevalence of NCDs is rising, and estimates indicate that between 2010 and 2020, NCD deaths will rise by 15% worldwide. In South East Asia, the Eastern Mediterranean, and Africa, a higher increase of 20% is anticipated [3]. Among the primary risk factors for non-communicable diseases (NCDs), deaths attributable to physical inactivity were 6%, whereas deaths from overweight and obesity were 5% [4]. The bulk of people on the planet reside in nations where overweight and obesity cause more deaths than underweight, according to the WHO's 2017 update on the topics. [3]Infectious disease and non-

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communicable disease (NCD) burden is an important issue in many low- and middle-income countries, particularly in sub-Saharan Africa. Since 1975, the global rate of obesity has tripled, affecting people of all ages[3]. As of 2016, a projected 1.9 billion adults who are 18 years of age or older were considered overweight or obese.

Similar in cost to smoking and violent crime, obesity is one of the major human-caused global social burdens, costing the world $2 trillion, or 2.8% of GDP[7,8]. The financial toll that obesity and its related complications take is enormous; it can account for anywhere from 0.7 to 2.8% of the nation's total health expenditures, and as much as 20% of all health care costs when combined with related conditions like diabetes mellitus and heart disease[9]. Individuals who are obese bear a heavy financial cost; their medical expenses are roughly 30% higher than those of people of normal weight. Low levels of physical activity is linked to obesity, and obesity and inactivity are mutually reinforcing.

The World Health Organisation (WHO) states that lack of physical activity is a major global health issue and a major risk factor for death, which results in about 3.2 million deaths annually[10]. Just 1 in 4 adults worldwide engage in the recommended amounts of physical activity for health[10]. By 2025, the WHO and its member states aim to reduce the percentage of people who do not get enough physical activity by 10%. Physical inactivity is thought to be the primary cause of roughly 21-25% of the burden of breast and colon cancer, 27% of diabetes, and roughly 30% of the burden of ischemic heart disease, according to the WHO[2]. Reduced levels of physical activity and excess body weight are closely correlated.

A sedentary lifestyle is more likely in obese people, and this likelihood is further increased by perceived obstacles to physical activity, such as time constraints, social pressure, low energy, lack of inspiration, fear of injury, lack of abilities, lack of resources, weather, travel, family responsibilities, and retirement age[11, 12].People who are overweight or obese perceive more obstacles to physical activity than people of normal weight. Because perceived internal and external barriers to physical activity are inversely correlated with levels of physical activity, overweight and obese people should be especially concerned about the possibility of decreased levels of physical activity[13].

The World Health Organisation classifies overweight and obesity based on an adult's body mass index as abnormal or excessive accumulation of fat that may compromise health [6]**.** The formula for calculating a person's body mass index (BMI) or Quetelet index is to divide their weight in kilogrammes (kg) by the square of their height in metres square (m2). It is given as kg/m2.3. According to the BMI, people are classified as underweight (less than 18.5 kg/m2), normal weight (between 18.5 and 24.9), overweight (25.0–29.9), and obese (more than 30 kg/m2) [6]**.** According to the World Health Organisation, physical activity is any skeletal muscle-driven movement that involves the use of energy [15]**.**

Overweight and obesity are conditions where there is an abnormal or excessive build-up of body fat due to a sustained positive energy balance, which happens when calorie intake exceeds expenditure[6]. Through increased physical activity, energy is expended. People's perceptions of obstacles to physical activity keep them from

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engaging in the recommended amounts of physical activity for their health [14]. These barriers can be external (such as lack of time, lack of knowledge, bad weather, and conflicting demands) or internal (such as excess weight, poor fitness, health issues, injury, lack of enjoyment, and lack of motivation)[15]. Those who are overweight or obese engage in less physical activity than the general population.

Adequate physical activity not only aids in weight loss and maintenance but also lowers the risk of complications like diabetes mellitus, osteoarthritis, coronary artery disease, hypertension and cancers linked to obesity and overweight[5]. The study will ascertain the degree of physical activity among adult patients who are overweight or obese and who visit the GOPC, LUTH.

Research Objectives

The study assessed the degree of physical activity among adult patients who were overweight or obese and attended the GOPC, LUTH.

Research Question

What is the level of physical activity among adults who are overweight or obese and visit the Lagos University Teaching Hospital (LUTH) General Out-Patient Clinic (GOPC)?

Literature Review

Definition and Classification of Overweight and Obesity

In the words of the World Health Organisation, obesity and overweight are "abnormal or excessive buildup of fat that could damage or present a ~~risk to health~~ (health risk) [6]." The body mass index (BMI), which originates from a mathematical formula $\left[\frac{weight}{(height)^2}\right]$, is used by the World Health Organisation (WHO) to define and classify overweight and obesity [17]. This definition and classification is widely accepted among various other organisations. Using BMI values of ≥ 25 kg/m2 and ≥ 30 kg/m2, respectively, the WHO international classification of adult weight status divides people into overweight and obesity categories.

Class I (30-34.9) kg/m2, class II (35-39.9) kg/m2, and class III (≥ 40) kg/m2 are additional classifications for obesity [29]. Different age groups, sexes, and ethnicities have different BMIs. As BMI rises above the cut-off point (24.9 kg/m2) for normal weight, adverse health effects, morbidity, and mortality increase steadily [17].

Prevalence and trends of Overweight and Obesity

Prevalence Worldwide: Because obesity has such severe negative effects on one's health and finances, it has reached epidemic proportions globally and is now a serious concern. Overweight and obesity have played a major role in the global burden of disease and disability [1]. Once thought to be a condition exclusive to adults and the wealthy, obesity has spread to all age groups and socioeconomic classes [1]. The obesity epidemic affects almost every nation, despite some differences between and among individual nations. The industrial, urban, and mechanical changes of developing countries have led to an increase in sedentary lifestyles and high-fat (high-calorie) diets worldwide [2]

This has caused a double burden of disease in low- and middle-income countries (LMICs), where undernutrition was an important burden, as overweight and obesity have resulted [2]. Overweight and obesity rates have risen worldwide during the past three decades. Obesity rose from 3.2% to 10.8% in men and from 6.4% to 14.9% in women, while overweight went up from 28.8% to

36.9% in men and from 29.8% to 38% in women [18]. The World Health Organization's 2016 report on overweight and obesity states that, since 1975, the prevalence of obesity has nearly tripled worldwide, with 650 million of the 1.9 billion overweight adults being obes**e** [19]. This equates to 52% of adults globally who are 18 years of age or older (39% overweight and 13% obese) [19].

While there has been a noticeable slowdown in the majority of developed nations, the rising time trend has continued in developing nations [8]. According to projections, 3.3 billion adults worldwide—or 57.8% of the total population—will be overweight or obese by 2030 [12]. As a result, it is anticipated that in the years to come, the burden of disease linked to obesity will rise. Adults who are overweight or obese outnumber those who are normal weight worldwide. Hunger and malnutrition do not compare to the enormous threats to public health posed by obesity's negative health effects [12].

Prevalence in Sub-Saharan Africa (SSA): In many parts of Africa, the prevalence of obesity and overweight has been rising. The obesity epidemic still causes SSA despite the burden of infectious diseases and undernutrition. From 1980 to 2008, the average global BMI increased by 0.4 kg/m2 for females and 0.5 kg/m2 for males per decade; however, during the same period, the average BMI in Sub-Saharan Africa (SSA) was higher for both sexes per decade. Over the course of ten years (1995–2005), the prevalence of obesity in West African cities more than doubled (increased by 114%).

In a multi-country cross-sectional study conducted in four Sub-Saharan countries (Uganda, Tanzania, Nigeria, and South Africa), the prevalence of overweight and obesity was found to be 31% and 34% overall, respectively.Forty The highest combined incidence of overweight and obesity was found in South Africa (85%), whereas the lowest combined prevalence was found in rural Uganda (46%). Forty According to a systematic review, the frequency of overweight or obesity in Ghana ranged from 21.1% to 62.3%[28].

The complex interactions between globalisation, urbanisation, rising GDP (gross domestic product), sedentary occupation, lack of exercise, built environments that encourage sedentary lifestyles, high calorie/fat diet consumption, and incorrect cultural perceptions are to blame for this prevalence and trend in Sub-Saharan Africa. [29, 30]

The Nigerian situation:Because of its size and rapid population growth, Nigeria's situation—the most populated black nation in the world—is more concerning than that of other SSA countries[31]. The problem of increasing urbanisation and its detrimental effects on health, including obesity, coexists with this population explosion [44]. A systematic review estimated the prevalence of overweight and obesity in Nigeria to be between 8.1% and 22.2% and between 20.3% and 35.1%. In Nigeria, the prevalence of overweight or obesity was estimated by a current systematic review to be between 3.9 and 49%[28]. Over the course of eight years (2002–2012), the prevalence of obesity increased by roughly 20%, pointing to an epidemic trend[33].

Numerous studies conducted in Nigerian hospitals and communities across different regions have revealed a high prevalence of overweight and obesity. Igboanusi et al. conducted a community-

based study in Northern Nigeria and found that the prevalence of overweight and obesity was 19.3% and 29.2%, respectively[34]. In a cross-sectional study conducted in southeast Nigeria, Ukegbu et al. found that the prevalence of obesity and overweight was 6.5% and 13.4%, respectively. Adaja and Idemudia conducted another cross-sectional hospital-based study in south-south Nigeria, and the results indicated that the prevalence rates for overweight and obesity were, respectively, 31.7% and 25.5%.48

In a cross-sectional hospital-based study, Amole et al. found that the frequency of overweight and obesity in south-west Nigeria remained high, at 14.8% and 25.0%, respectively. In Nigeria, age over 40, gender identity, marital status, low physical activity, family history, professional status, high socioeconomic class, and urban residency are socioeconomic factors linked to overweight and obesity [31, 36- 40].

Declining physical activity

In LMICs, rising obesity rates are known to be primarily caused by declining levels of physical activity[20]. Physical activity in LMICs has significantly decreased as a result of major shifts from manual to more sedentary jobs, mechanisation of household chores (laundry, cleaning, gardening), a decrease in active modes of transport (commuter walking and cycling), and decline in recreational physical activity[20]. Modern technology and the availability of devices (computers, televisions, and cell phones) have contributed to a more sedentary lifestyle, which is also linked to behaviours that encourage obesity, such as snacking[20].

Aetiology/risk factors of overweight and obesity

There is no well-defined cause of obesity. It is a complicated multifactorial illness brought on by interactions between environmental, dietary, genetic, and lifestyle variables. Genetic variations can explain up to 70% of the variation in weight between individuals. [22]

Obesity and overweight are correlated with multiple risk factors. A family history of obesity, ageing, a sedentary lifestyle, addiction to alcohol, female sex, drugs (steroids, antidepressant medications antipsychotics), endocrine disorders (Cushing's disease, hypothyroidism, hypogonadism, hypopituitarism, polycystic ovarian syndrome), and female sex are risk factors linked to adult obesity,

Late age at pregnancy/delivery, lack of sleep, stress, anxiety, depression, and low temperature variation, as well as reduced smoking rates, menopause, childhood and teenage obesity, high socioeconomic status, marriage, and cultural factors (obesity has been associated with affluence and feminine appeal in Africa) are all contributing factors to the rise in obesity and overweight rates [41-45].

Pathogenesis of Obesity: When energy intake exceeds energy expenditure, body fat increases. A positive energy balance leads to obesity when this continues for an extended period of time [46]. Given the current global threat to public health posed by the rising prevalence of overweight and obesity, it is imperative to have an in-depth knowledge of the pathogenic mechanisms underlying obesity. Energy can be transformed from one form to another, but it cannot be created or destroyed, in accordance to the first law of thermodynamics [46].Humans obtain their energy from food, store it as high-calorie molecules,

and burn it through activity, thermogenesis, and basal metabolic processes.

In humans, energy intake and expenditure are balanced in the steady state; however, when calorie intake exceeds expenditure, 60–80% of the excess is stored as fat. The remainder is stored as glycogen, which is then utilised to produce heat or to synthesise proteins [46]. The pathogenesis of obesity has historical seemed fairly straightforward, based on the previously mentioned idea of energy disequilibrium and its underlying principles. However, recent research indicates that the pathogenesis of obesity involves far more than passive energy accumulation and instead involves a complicated relationship between environmental, genetic, developmental and neuro-humoral factors that most likely act in concert. This is the reason why treating obesity is difficult [48,49].

Environmental factors: Owing to common environmental changes, obesity is currently one of the world's most important health issues. Environmental factors such as increased energy intake (high-calorie food consumption), reduced energy expenditure (physical inactivity and sedentary behaviour), and rising use of weight-gain-inducing medications have all contributed to a positive energy balance that has over time led to weight gain[43,48]**.**

Sedentary screen time (TV and other electronic devices) has supplanted physical recreational pursuits in recent times.61 Obesity has also been linked to other variables such as chronic stress, insufficient sleep, and environmental pollutants [48].

Diet: Because traditional diets gave way to ones with a lot of sugar-containing foods, the global diet can be characterised as sweetened. One of the main dietary causes of obesity worldwide is added sugars in soft drinks, beverages, coffee, juice, tea, and alcoholic beverages 33. Because they are less filling than solid foods, high-calorie liquid drinks exacerbate individual intake of calorie[20]. Obesity and dietary variables such as high fat, low fibre, unrefined sugar, and low consumption of fruits and vegetables are positively correlated. People burn less energy as they consume more calories because of the global energy flip that happened when human energy demand decreased as a result of technological advancements**[**41].

Adipose tissue stores excess calories as fat, which causes weight gain, overweight, and obesity[49].

Sedentary lifestyle: It is widely acknowledged that reduced physical activity and sedentary behaviour are major contributors to obesity; however, it can be challenging to analyse how physical activity relates to overall daily expenditure and the pathophysiology of obesity [47]. Sedentary behaviours, non-exercise generated thermogenesis, and repetitive/structured activity (exercise) can be used to further categorize physical activity overall [47].

As with increased calorie intake, a major factor in positive energy balance is decreased physical activity. Additionally, obese people engage in fewer non-exercise induced thermogenesis activities, such as standing, computer work, occupational duties, household chores, and personal hygiene. Sedentary lifestyles are positively correlated with increased weight and obesity [47].

Body Mass Index

The formula for calculating the body mass index (BMI), also called the

Quetelet index, is weight in kilogrammes divided by height in metres squared [66]. It is the most popular and user-friendly tool for evaluating obesity in clinical practice. Underweight (<18.5 kg/m2), normal weight (18.5-24.9 kg/m2), overweight (25.0-29.9 kg/m2), and obese (≥ 30.0 kg/m2) are the categories into which people are placed [52, 53]. The BMI is useful in identifying mortality risk because it has a strong correlation with total body adiposity, one of the gold standard body measures. It is unable to differentiate between lean and fat mass, though [65,67].

Health implications/complications of obesity

Mortality and co-morbidities are linked to obesity [54, 56,68]. The ~~amount~~(number)of co-morbidities associated with obesity is enormous and is still growing as new research reveals more and more. Obesity-related co-morbidities are multisystem[54]. Below is a list of the body systems and how obesity affects each system:

1. Central nervous system: Idiopathic intracranial hypertension, stroke, migraine, depression, low self-worth, and body dysmorphic disorder [54, 56,68].
2. Cardiovascular system:Heart failure, phlebitis, venous stasis, dyslipidemia, hypertension, coronary heart disease, and metabolic syndrome [41, 54]
3. Respiratory system:Pulmonary embolism, hypoventilation syndrome, obstructive sleep apnea, and asthma [41, 43, 54].
4. Gastrointestinal system:severe pancreatitis, gall bladder disease, non-alcoholic fatty liver, and gastroesophageal reflux diseaseThe health benefits of physical activity and cardiorespiratory fitness..
5. Endocrine system: Specifically, metabolic syndrome and type 2 diabetes [41, 43, 54].
6. Urogenital system: These include infertility, menstrual irregularities, precocious puberty, polycystic ovarian syndrome, and stillbirth [41, 43, 54].
7. Musculoskeletal system:Low back pain, pes planus, gout, and osteoarthritis. [41]
8. Dermatological system: stretch marks, intertrigo, and cutaneous moniliasis. [54]

Additional problems of obesity include cancers of the oesophagus, pancreas, colon, kidney, breast, uterus, ovary, and prostate; social stigma; hernias (diaphragmatic and abdominal); complications during and after surgery; decreased quality of life; and decreased access to care.[41, 43, 54].

Epidemiology of physical activity

According to theory, a health disorder's priority is determined in large part by its prevalence and trends, exposure risk, and proof of its efficient prevention and control. Public health regulations should target any behaviour or actions that contributes to a health disorder whose prevalence is rising or staying constant.Public health interventions should focus on physical inactivity since it contributes to overweight and obesity**[55]**. It has long been known that accurate organising of policies and programmes to prevent NCDs requires data on physical activity[56].

Engaging in physically demanding activities was essential to human evolution.

Because of this innate tendency towards activity and energy, sedentary lifestyles are incompatible with the human

condition[57]. Because they actively engaged in physical activities like hunting, gathering food, evading predators, and migrating from one location to another, our ancestors had longer, healthier lives [58].Genes that support physical activity were handed on to the following generation as a result of the survival of the fittest, which refers to the most physically active and best performers in physical activity. High levels of physical activity were therefore essential to human survival and successful reproduction over many centuries [57].

The main causes of the centuries-long decline in physical activity have been the industrial revolution and the rapid advancement of technology.

Due to the incredible increase in production capacity brought about by the industrial revolution in the latter half of the 18th century, people became unduly dependent on new power sources like electricity and internal combustion engines. Similar to the latter stages of the industrial revolution, humans didn't require to engage in physically demanding tasks to survive. The situation was exacerbated by the speed at which technology was developing.The introduction of personal computers, fibre optics, satellites for communication, the World Wide Web, and other devices has completely changed how people work and travel [57].

As technology has advanced and jobs and transportation have become less physically demanding, physical activity levels have kept on fall. It is now difficult for people to achieve the advised levels of physical activity for health unless they consciously choose to be physically active ~~in spite of~~(despite) all obstacles [57].

Global prevalence and trends of physical activity

Globally, there is a decline in physical activity, and a pandemic of physical inactivity has emerged[59]. As per the World Health Organisation, the fourth leading cause of death globally is physical inactivity. In 2010, approximately 23% of adults above the age of 18 were not physically active enough, with women making up 27% and men 20% of the total. The percentage of people who do not exercise differed between high-income countries (26 percent of men and 35 percent of women) and low-income countries (12% of men and 24% of women). Lower levels of physical activity have been associated with higher gross domestic product, lower levels of physical activity during leisure time, higher rates of sedentary habits at work and at home, and higher use of passive ways of transportation.

Globally, there is a great deal of variation in the prevalence of inadequate physical activity across nations, regions, and socioeconomic classes. The prevalence of physical inactivity varied from 16.3% in Oceania to 31.6% in Latin America and the Caribbean in 2016, according to a pooled prevalence study conducted by Guthold et al. involving 1.9 million participants from 168 countries. Compared to 23.3% in 2010, over one-fourth (27.5%) of adults globally did not engage in enough physical activity in 2016 **[59]**This suggests that more than 1.4 billion adults worldwide are at risk of acquiring or exacerbating conditions like overweight and obesity that are linked to insufficient physical exertion.

During a 15-year period, the prevalence of lack of physical activity reduced by more than 5% in East and South-East

Asia (from 25.7% in 2001 to 17.3% in 2016), in contrast to the high-income western countries where it increased by more than 5% (30.9% in 2001 to 36.8% in 2016). It was discovered that women engaged in fewer leisure activities and were less active than men. The lack of social and community support, traditional roles, and cultural norms all contribute to women's low levels of physical activity around the world.

The change to more sedentary occupations and the use of private vehicles for transportation in wealthier nations may be the cause of the rising rates of physical inactivity. Lower-income nations, on the other hand, engage in greater physical activity, though these trends are rapidly shifting[59].

Prevalence and trends of physical activity in Africa

The change to more sedentary occupations and the use of private vehicles for transportation in wealthier nations may be the cause of the rising rates of physical inactivity. Lower-income nations, on the other hand, engage in greater physical activity, though these trends are rapidly shifting [56].

With the exception of Nigeria, 79.1% of the 22 countries fulfilled the suggestions made by the WHO for physical activity (150 minutes or more of moderate activity per week or equivalent) for health, and 72.8% of them met the GPAQ's physical activity classification criteria [56]. Two West African nations, Mali and Mauritania, had the lowest percentages of physical activity (roughly 50%), while two South-East African nations, Malawi and Mozambique, had the highest percentages (roughly 95%)**.**[56]. Compared to women (75.7%), more men (83.8%) satisfied the WHO's recommendation for physical activity.In certain countries (Mauritania and Mali), women's low levels of physical activity may be partially attributed to their attempts to gain weight, which was once thought to be a traditional aesthetic value [56].

The fast urbanisation and globalisation of most African nations may have resulted in a general decline in non-leisure time physical activity. This decline should be offset by the creation of environments that encourage physical activity [56].

Prevalence and trends of physical activity in Nigeria

[60] Approximately 3 million deaths in Sub-Saharan Africa are attributed to non-communicable diseases (NCDs) linked to physical activity. If timely mitigation measures are not implemented, this number of deaths could rise by up to 80% by 2020. Physical activity is advised as a means of reducing non-communicable diseases (NCDs), and since NCDs account for roughly 25% and 33% of all deaths in Nigeria, respectively, it should be given high priority.Nigeria is the most populous country in Africa and the sixth most populous country in the world, making physical activity surveillance there vital for planning and action related to national, regional, and public health. However, there is insufficient physical activity surveillance in Nigeria. Nigeria's 2013 contribution to global physical activity research was a mere 0.24%, which likely explains why the country was left out of the WHO physical activity study involving 22 African nations[60].

The International Physical Activity Questionnaire Short form (IPAQ-SF), which was accepted as the baseline physical activity country card for

Nigeria by the Global Observatory for Physical Activity (GoPA) in 2014, was used by Oyeyemi et al. to conduct a cross-sectional study on physical activity between adult Nigerians in Northern Nigeria in 2013 [84, 85]. In this study, the percentage of participants who were physically inactive was 31.4%, while the overall prevalence of physical activity was 68.6%. Males were more physically fit than females, and as people aged, so did their levels of physical activity[61].

People with lower levels of physical activity were married, without cars, employed, in blue collar jobs, educated beyond secondary school, and had low incomes. Using the IPAQ-SF, numerous other studies have been conducted in Nigeria among various special groups and across different regions with varying occurrence of physical inactivity. Aliyu et al. conducted a cross-sectional study among adults in Maiduguri, Northern Nigeria. The study found that the prevalence of physical inactivity was lower (19.2%) than the estimate disclosed in the Nigerian physical activity country card (31.4%)[62,63]. Some studies found a significantly higher prevalence of physical inactivity than that listed in the Nigerian physical activity country card (31.4%).Awotibe et al. found that 35.2% of Nigerian women were physically inactive.

Adegoke and Oyeyemi's cross-sectional study of young adults in South-West Nigeria found that 41% of them were physically inactive. Iwuala et al. conducted a cross-sectional research project among health professionals in South-West Nigeria, finding a prevalence of physical inactivity of 79.2% [66]. The highest rate of physical inactivity was found in another cross-sectional study conducted by Akarolo-Anthony and Adebamowo among adults in Abuja, Nigeria, with a prevalence of 83%. The aforementioned studies show that Nigerians have a high rate of physical inactivity.

Assessment/measurement of physical activity

In humans, physical activity is a complicated and multidimensional exposure that is challenging to measure accurately[67]. Subjective methods (questionnaires, diaries, logs) and objective methods (energy expenditure measurements, physiological measures, motion sensors, combined sensor methods, and new technologies) are the two main categories into which the methods of assessing physical activity fall [67, 68]. While objective methods use one or more bio-signals, such as heart rate, acceleration, and other indicators of physical activity or energy usage, to directly measure activities as they take place, subjective methods rely on the individual's ability to document activities as they take place or recall past activities[68]. Because of their high level of accuracy, measured energy expenditure—such as indirect calorimetry and the doubly labelled water method—has been used as a standard of validation for various techniques to quantify physical activity [67].

Subjective methods: Self-reported methods are another name for subjective methods. They are the most practical approach for measuring physical activity in reliable epidemiological studies because they are the most practical way to gather data regarding physical activity in a large number of subjects [67].

Physical Activity Questionnaires: Through self-report or interviewing, physical activity questionnaires (PAQs) evaluate the dimensions and domains of physical activity [68]. They range in

number from a few that offer an overview to many that provide a detailed assessment of activity over several months or even a lifetime. There are three types of physical activity questionnaires: global, recall, and quantitative history.

Through short item (2-4) questions, global questionnaires provide an instant summary of physical activity and are used to determine whether a person meets a given standard of physical activity or to provide a specific classification (active or inactive) [68]. Two such examples are the rapid evaluation of physical activity questionnaire and the 2-item exercise vital sign. The brief recall tests quickly determine how much physical activity there is based on intensity or domain. In descriptive epidemiology and surveillance, they are primarily used to calculate the percentage of adults who meet the national and international proposed levels of physical activity. In interventional studies, they are also utilised to evaluate behavioural changes72. The General Physical Activity Questionnaire (GPAQ) and the International Physical Activity Questionnaire (IPAQ) are two examples.

Booth and associates created the IPAQ in 1966. It is a well-known and reputable population monitoring tool for comparing and assessing physical activity across national borders. It has been extensively utilised, translated into 22 languages, and verified. It consists of questionnaire categories, such as the long form (IPAQ-LF) and the short form (IPAQ-SF), which can be used through self-reported methods or over the phone. The IPAQ's long and short forms yielded data with a respectable level of reliability (Spearman's correlation coefficient, r = 0.8) when they were validated against accelerometer data from 14 centres spread across 12 different countries. A Spearman's correlation coefficient of 0.30 (the median of the pooled data) was obtained as a result of the criteria validity.

The dependability and criterion validity correlations obtained from the assessment of seven additional self-reported PAQs were similar to these values. A WHO tool designed primarily for use in developing nations is the GPAQ [68]. In-depth measurements of physical activity over a month, year, or lifetime are made using quantitative history physical activity questionnaires. They are employed to evaluate the positive or negative effects that an individual's physical activity habits have on their health. Examples are the 29-item Tecumseh self-administered Occupational Physical Activity questionnaire and the 63-item Minnesota Leisure Time Physical Activity (LTPA) questionnaire. The ability to measure physical activity levels across multiple domains is one benefit of PAQs.

Comparing them to other self-reported instruments like physical activity diaries or logs, they are also less expensive and burdensome for both study participants and investigators. PAQs are easily administered on a large scale to the majority of the population in free-living circumstances[68].

Physical activity logs and dairies are used to compile comprehensive records of sedentary behaviour and physical activity on an hourly and activity-by-activity basis. Dairies can be finished using mobile phone applications or a paper and pencil booklet. The Bouchard physical activity record is a typical physical activity log. Logs and dairy products are used in research as an addition to objective surveillance and to

assess the psychometric qualities of physical activity questionnaires[68].

Objective methods: These include physiological measurements (heart rate monitoring), motion sensors (pedometers and accelerometers), combined sensor methods, new technologies (text classification, GPS technology, and smart phones), and measures of energy spending (double labelled water method and indirect calorimetry) [67, 68].

Energy expenditure:The Doubly Labelled Water (DLW) Method calculates energy expenditure by extrapolating the amount of carbon dioxide produced from the consumption of water labelled with hydrogen and oxygen isotopes. Indirect calorimetry measures carbon dioxide production and oxygen uptake under carefully controlled conditions [67, 68].

Physiological measure: Heart Rate Monitoring (HRM) distinguishes between intensities and measures the direct physiological reaction to physical activity. To determine the intensity of activity, it makes use of the linear relationship that exists between heart rate and oxygen consumption throughout moderate and energetic physical activity [67, 68].

Motion sensors/combined sensors: Accelerometers measure the body's accelerations in various planes during movement to provide a gauge of the frequency, length, and intensity of exercise while on the go. Pedometers are unique gadgets that calculate a person's level of activity based on how many steps they take each day. They estimate the walking behaviour by recording movements during regular gait cycles. The physical activity behaviour based on step counts from pedometers is categorised as follows: activity level ≤5,000 (sedentary behaviour), activity level 5,000 to 7,499 (low activity), activity level 7,500 to 9,999 (somewhat active), activity level 10,000 to 12,499 (active), and activity level 12,500 (highly active).

Heart rate and an accelerometer, or several accelerometers in various body parts, are combined in multi-sensing devices [68].

New technologies:Physical activity is currently measured and improved through the use of mobile phones, smart phones, speech recognition, text classification, geographic information systems (GIS), and GPS/mobile phone technology[67]. Accelerometers and pedometers are built into mobile phones. While text classification groups documents according to predefined categories based on specific functions or topics, speech recognition uses electronic connections to transfer recorded physical activity into text[67].GPS and GIS technologies monitor people's physical activity in relation to their surroundings.

Physical activity and health

Engaging in physical activity has numerous and substantial health benefits[69]. Physical activity is inversely correlated with cardiovascular risk and all-cause mortality, and it has a positive and graded association with health. Research from both population-based epidemiological studies and experimental trials has demonstrated that physical activity is linked to improved psychological status and a lower risk of developing specific diseases. Apart from helping individuals manage and lower their personal risk of developing chronic conditions like obesity, depression, cancer, type 2 diabetes, hypertension, and stroke, physical activity also improves cognitive and psychosocial functioning [70, 69, 96].

Up to 30% less all-cause mortality, functional limitation, and disability are linked to physical activity 80. In hypertensives, physical activity lowers blood pressure by 3.4-10.5 mmHg and 2.4-7.6 mmHg, respectively, at the systolic and diastolic levels [69,72].

Excessive physical activity reduces the risk of type 2 diabetes by 25–58% and stroke by 31%, respectively. Patients with chronic diseases who exercise experience a 30% reduction in depressive symptoms. In terms of cancers, exercise is linked to a 20–30% and 30–40% decrease in the risk of colon cancer (in both men and women) and breast cancer (in women), respectively. Additionally, it can lower cancer patients' chances of dying from their disease by up to 26-40% and of their cancer returning [73]. Engaging in physical activity can reduce the risk of cognitive decline (by approximately 38%), dementia, and Alzheimer's disease by increasing grey matter volume and mitigating the acceleration of brain ageing and neuronal loss.

Given the many health advantages of exercise and physical activity, significant and ongoing promotion of this essential lifestyle component should be a primary goal, particularly for those who are more likely to be physically inactive, such as overweight and obese people [69].

MATERIALS AND METHODS

Research Design

The research was a cross-sectional, descriptive study conducted in LUTH.

Study Area

This study was carried out at the Lagos University Teaching Hospital (LUTH), Idi-Araba in Surulere, Lagos state (figure 1), at the General Outpatient Clinic (GOPC) of the Family Medicine Department (FMD). Nigeria's most densely populated city, Lagos metropolis (Centre of excellence), is situated in the country's southwest and has a population of roughly 21 million [74]. LUTH, a renowned tertiary healthcare facility, was founded in 1962. It currently has an estimated 800 beds available. Since then, it has been carrying out its mandate to provide Lagos residents and those in the surrounding area with multispecialist tertiary healthcare along with undergraduate and graduate education in medicine, dentistry, as well as other health-related fields.

The LUTH FMD is situated on the third floor of the building housing the outpatient clinics. 39 doctors (6 consultant family physicians, 27 family medicine residents, and 7 medical officers) oversee the GOPC. Regardless of age, gender, or medical condition, all patients receive comprehensive, ongoing, and coordinated care from its GOPC. It is open Monday through Friday from 8:00 am to 16:00 pm. Every month, roughly 2,050 patients are seen, including 822 adults between the ages of 18 and 64 who are overweight or obese.

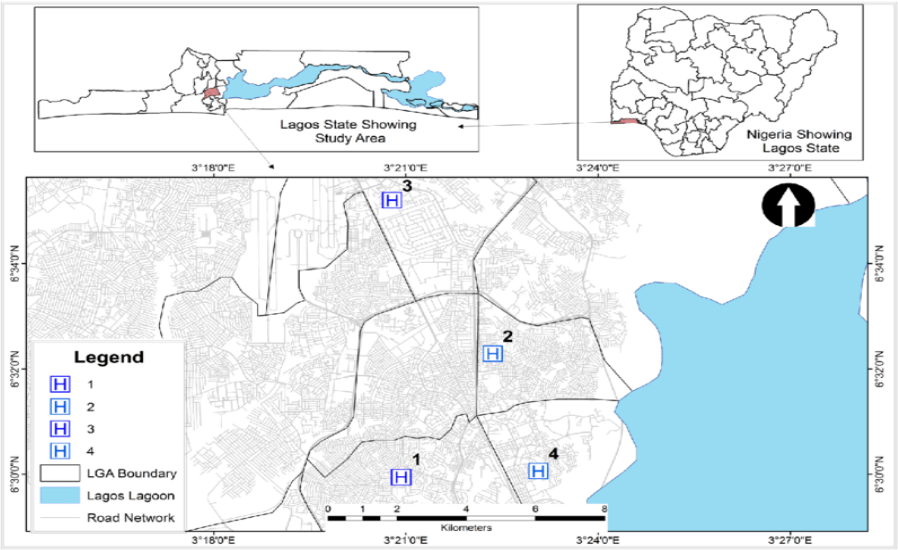


Figure 1: Showing Map of study area in Lagos, Nigeria.

Research Population

Overweight and obese adults, aged 18 to 64, who attended the GOPC of the FMD, LUTH between July and September of 2019 made up the study population. Over the course of the study, 2,466 adult patients who were overweight or obese were determined to be part of the study population. This was predicated on data from past clinic visits, which showed an average of 822 obese and overweight patients each month.

Sample size and Sampling technique

The participants who fulfilled the selection criteria were chosen through a methodical sampling procedure. The study population, N=2,466; the average monthly attendance of adult patients who were overweight or obese during the preceding quarter-year was used to determine the total sample size, n=285, which was gathered over a period of three months.

Study population (N) / total sample size (n) = 2466/285 = 8.65 ≈9 is the sampling interval (SI).

Consequently, every ninth person who satisfied the inclusion criteria was chosen for the research.

The daily count of adult patients who are overweight or obese was: Study population (N) / no of days = 2466/66 = 37.36 ≈ 37. The sample size divided by the total number of work days, or 66 work days over three months, was the average number of the respondents that were due for recruitment each day, given 22 working days per month. Daily average of participants due for recruitment was calculated by dividing sample size by total number of days (285/66 = 4.31 ≈ 4).

Simple random sampling was used to choose the first participant through voting. To achieve this, the first nine adults who arrived at the clinic overweight or obese were asked to choose blindly from nine papers numbered one through nine. The person who selected one served as the day's index participant. Then, ninth overweight or obese individuals were chosen in chronological order of their

showing up at the clinic. The chosen person gave their informed consent, and if they satisfied the study's inclusion requirements, they were fully recruited as participants.

The next qualified consenting patient was recruited if the chosen patient did not meet the inclusion and exclusion criteria for the study. To avoid duplication, an identifying sticker was applied to each patient's case file from the time of recruitment until the study's conclusion. Up until the sample size was reached, this was done.

Inclusion Criteria

Participants in the study were overweight and obese adults (18–64 years old) who were present at the GOPC and gave their consent. Based on their BMI, they were classified as obese (≥ 30 kg/m2) and overweight (25.0-29.9 kg/m2).

Exclusion Criteria

- Since weight gain during pregnancy due to foetal mass, amniotic fluid mass, and fluid retention would result in an incorrect weight status classification and an artificially high BMI, all women who were pregnant or in puerperium (examined with last normal menstrual period and last confinement) were included in the study. Additionally, a falsely elevated waist circumference and, consequently, a falsely low waist-hip ratio can result from a gravid abdomen [37,75].
- Patients with ascites, other oedema types, or intra-abdominal masses from the physical examination and history, as these conditions could cause an erroneous increase in weight and BMI, leading to an incorrect classification of weight status [37,75].
- Individuals with physical abnormalities of the limbs or spine that made it difficult or awkward for them to stand still or take accurate weight or height measurements [75].
- Every patient who was critically unwell and in need of immediate medical care[37].

Data collection methods

Measuring Instruments

1. An interviewer used a pre-tested, semi-structured questionnaire (Appendix 1) that included the following items:
   - Participants' sociodemographic details in the study
   - Social, cultural, and lifestyle background
   - Adults' Short Form of the International Physical Activity Questionnaire (IPAQ-SF): a verified instrument for gathering data on how much time a person spent exercising during the preceding seven days. It gauges walking, sitting, moderate intensity, and intense walking. The physical activity level is determined by multiplying the seven items on the questionnaire by the METs that correspond to each activity category. To get a projection for a week, a summation is then performed. Walking (3.3 METs), moderate (4 METs), and vigorous (8 METs) are the three MET intensities.
   - Weekly scoring intensity categories and total METs are as follows: highly active (>1500METs), moderately active (600-1499 METs), and inactive (< 600 METs) [76]. The three categories would then be divided into sufficiently physically active

and inactive groups according to the World Health Organization's guidelines for healthy physical activity (150 minutes of moderate-impact activity, 75 minutes of vigorous intensity activity, or an equivalent combination of both). Those who meet the WHO recommendations for healthy physical activity and are classified as moderately or highly active based on IPAQ will be included in the sufficiently active group [77].

- In clinical practice, the IPAQ is the self-report physical activity questionnaire (SRPAQ) that is most frequently used. Its good reliability and moderate correlations with accelerometry make it a preferred and more suitable measure of physical activity compared to other self-reported physical activity questionnaires[78, 79]. In Nigeria, it had good concurrent validity (p = 0.78-0.92) and test-retest validity (intra-class correlation coefficient = 0.33-0.73)[80]. Numerous studies, including ones on obesity in Nigeria, have made use of it.[81, 82, 83]

Data Collection Procedure

The study was brought up with patients during their routine pre-clinic health discussions. Following an explanation of the study's specifics and an assurance of confidentiality, participants who were chosen and who satisfied the inclusion criteria by being overweight or obese based on measurements of their height, weight, and BMI gave their informed consent. Interviewing consenting participants, the author and research assistants used the pretested semi-structured questionnaires. The researcher will mark each case file and perform clinical measurements to prevent the use of consenting participants twice.

The participants' height and weight were recorded, and the BMI was computed using the following formula: Weight (kg) / Height (m2). The BMI was categorised as overweight (BMI 25.0-29.9 kg/m2) and obese (≥ 30.0 kg/m2) based on the WHO weight status classification[27].

Study Duration

Three months were spent conducting the study.

Data presentation and analysis of results

Software known as the statistical package for social sciences (SPSS IBM) version 25 was used for data entry, cleaning, and analysis.

Frequency and percentage were used to represent all categorical variables, and means, standard deviation, or, in the case of skewed continuous variables, median and interquartile range, were used to summarise them. The Kolmogorov-Smirnov test was employed to evaluate the normality of the data.

The association between categorical variables was evaluated using the Fischer exact test and chi-square analysis.

Ethical Considerations

After completing the foundational course on Biomedical Research offered by the Collaborative Institutional Training Initiative (CITI) programme, ethical approval was acquired from the Health Research and Ethics Committee of LUTH. The West African College of Physicians' Faculty of Family Medicine approved this study as well. No one was forced to take part in the study, and no one ever withdrew while it was underway. The study's output contained

no personal data that could be employed to determine participants and was only meant to be used for research. Participants' confidentiality was properly maintained, and none of the respondents suffered any negative effects from the study. The HREC/APP/2609 assigned number was ADM/DCST/HREC.

RESULTS AND DATA ANALYSIS

Via systematic random sampling, 285 overweight and obese adults between the ages of 18 and 64 were chosen. An adult IPAQ-SF was given along with a semi-structured, pretested interviewer-administered questionnaire that included medical, social, and lifestyle characteristics, as well as sociodemographic data. A total of 285 respondents, or 100%, finished the survey.

Presentation of Results

Socio-demographic Characteristics of the Respondents

Table 1 Demographic characteristics of respondents

Variable	Frequency (n=285)	Percentage
Age group (Years)		
20-29	55	19.3
30-39	63	22.1
40-49	46	16.1
50-59	77	27.1
≥60	44	15.4
Mean±SD	44.25±14.3	
Gender		
Male	127	44.6
Female	158	55.4
Marital status		
Single	83	29.1
Currently married	178	62.4
Separated	3	1.1
Divorced	3	1.1
Widowed	18	6.3
Family type (n=202)		
Monogamous	197	97.5
Polygamous	5	2.5
Religion		
Christianity	228	80.0
Islam	56	19.6
Traditional	1	0.4

The respondents' sociodemographic details are displayed in Table 1. The respondents' ages ranged from 20 to 64 years old. The respondents' average age (+SD) was 44.25 + 14.3. 51–59 years old was the modal age group, with 77 (27.0%) responders. The age groups of 20–29 and 30-39, which made up 22.1% and 19.3% of the respondents, respectively, came next. The age group

of ≥ 60 years accounted for the smallest percentage of respondents (15.4%).

Among the overweight and obese respondents, there were more females (55.4%) than males (44.6%), with a male to female ratio of 1:1.2. In terms of marital status, the majority of respondents (52.5%) or (29.5%) were either single at the moment.

A small percentage of the participants were divorced (1.1%), separated (1.1%), or widowed (6.3%). Just 5 (2.5%) of the 202 respondents who had ever married were in a polygamous family, compared to the majority (97.5%) who were in a monogamous one (married, widowed, separated, or divorced). Regarding religion, 56 (19.6%) of them practiced Islam, while 228 (80%) practiced Christianity. Of the respondents, only one (0.4%) practiced traditional religion.

Respondents' lifestyle and medical characteristics

Table 2 Medical and lifestyle characteristics of respondents

Variable	Frequency (n=285)	Percentage
***Co-morbid medical conditions**		
None	114	40.0
Hypertension	106	37.2
Diabetes	45	15.8
Asthma	17	6.0
Migraine	16	5.6
Depression	4	1.4
Arthritis	20	7.0
Back pain	40	14.0
Currently smoke		
Yes	5	1.8
No	280	98.2
Ever smoke in the past		
Yes	15	5.3
No	270	94.7
Description of alcohol intake		
Never	194	68.1
Previously drank alcohol >6 months ago	42	14.7
Currently drinking alcohol	49	17.2

*Multiple response

The respondents' medical and lifestyle details are displayed in Table 2, a multiple-choice table. Forty percent of the respondents did not have a co-morbid medical condition, while the majority (60%) did. The most common co-morbid condition, affecting 106 (37.2%) of the respondents, was hypertension. Subsequently, 15.8% and 14.0% of the participants reported having back pain and diabetes, respectively. Of the respondents, only 5 (1.8%) smoked cigarettes at present, but 15 (5.3%) had smoked cigarettes in the past. Of the respondents, 42 (14.7%) had consumed alcohol more than six months' prior, compared to 49 (17.2%) who did so currently.

Physical activity levels among respondents (IPAQ-SF)

Using the IPAQ-SF, figure 2 shows the physical activity levels of the overweight and obese respondents. In general, 53.3 percent of adults who were overweight or obese did not engage in physical activity. The proportion of respondents who were highly active (66) and moderately active (67) was nearly equal, making up 23.2% and 23.5% of the total. Respondents who were physically inactive (53.3%) made up more than twice as many as those who were moderately active (23.5%) and highly active (23.2%).

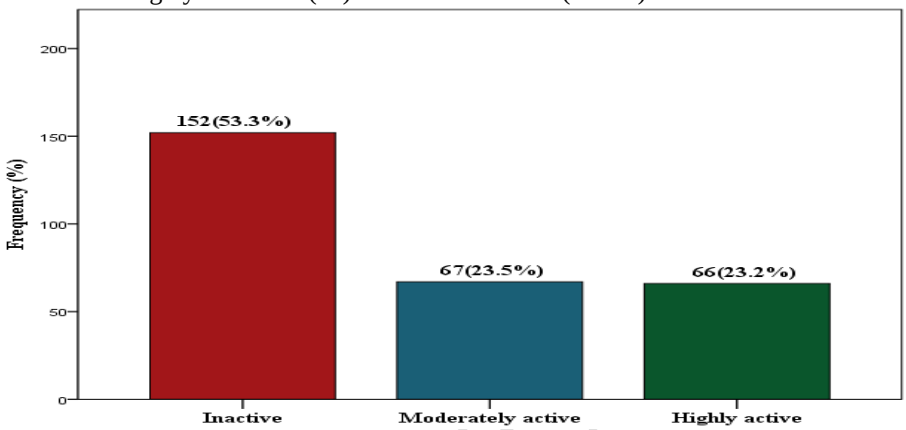


Figure 2: Physical activity levels among respondents (IPAQ-SF).

Categories for physical activity based on WHO recommendations

Figure 3 provides clarification on the physical activity categories for the overweight and obese respondents, based on WHO recommendations. There were 263 respondents, or 92.3% of the total, who did not meet the WHO's recommendations for physical activity for health. Just 22 out of the respondents, or 7.7% of them, reported engaging in enough physical activity for good health.

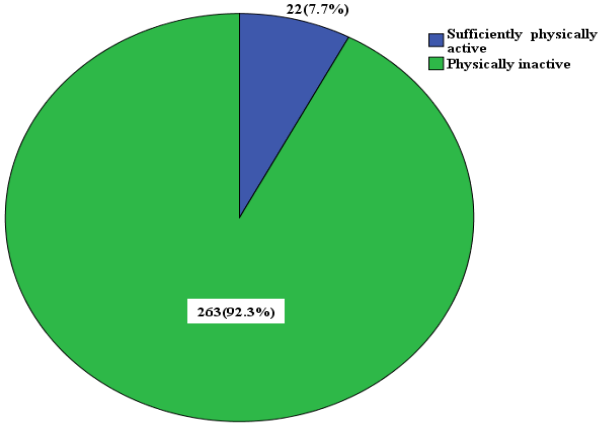
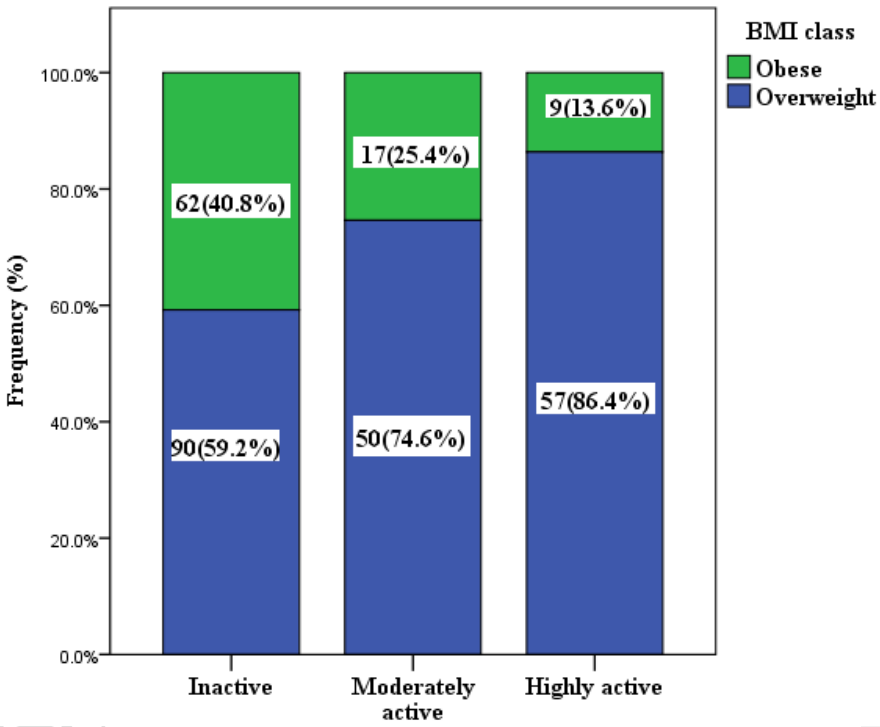


Figure 3: Categories for physical activity based on WHO recommendations

Association between BMI class (overweight/obese) and physical activity among respondents

The relationship between physical activity and BMI class (obesity/overweight) is shown in Figure 4. The respondents' levels of physical activity and their BMI class are statistically significantly correlated (p = <0.001). Compared to obese respondents, overweight respondents were more active. Obese respondents made up 25.4% and 13.6% of the moderately and highly active respondents, compared to 74.6% and 86.4% of overweight respondents.



X^2=17.140, p<0.001*

Figure 4: Association between BMI class and physical activity.

DISCUSSION OF THE FINDINGS

The purpose of this cross-sectional study, conducted in LUTH, was to evaluate participants' levels of physical activity.

Numerous studies have consistently reported that adults who are overweight or obese have high levels of low physical activity/inactivity and low levels of high physical activity[65, 84]. It has also been stated that there is an inverse and possibly bidirectional causal relationship between physical activity and unhealthy BMI (overweight and

obesity). To customise appropriate and focused on physical activity programmes for health and weight management among adults who are overweight or obese, it is essential to ascertain the levels of physical activity and its predictors.

According to the International Physical Activity Questionnaire Short Form (IPAQ-SF), 53.3% of the overweight and obese adults in this study did not engage in any physical activity. Of them, 23.2% were highly active and 23.5% were moderately active. The study's finding of 53.3% for the prevalence of physical inactivity is within the range of levels (19.2-83%) reported by earlier research on adult Nigerians[61, 62, 64]. Similar levels of physical inactivity (53.6%) were found in the current study (53.1%) and in a study by Ramya et al. on physical activity levels among obese adults using the general physical activity questionnaire (GPAQ) [84].

The study's findings regarding the high percentage of physical inactivity (53.3%) and low percentage of high physical activity (23.2%) are consistent with a cross-sectional study conducted by Cassidy et al. on low physical activity, high television viewing, and poor sleep, which found that, according to the IPAQ, 32.3% and 22% of overweight/obese adults were physically inactive and highly active, respectively[84]. In a cross-sectional study on physical activity and perceived barriers among adult Kuwaitis, Al-Baho et al. reported the same trend. In Al-Baho et al.'s study, 496 overweight/obese adults had low levels of high physical activity (5%) and high levels of physical inactivity (40.3%)[86].Using the IPAQ-SF, Oyeyemi et al. found that 44.3% of 142 overweight/obese adults were physically inactive, 32.4% were moderately active, and 23.2% were highly active in their study on physical inactivity among young adults in Nigeria [65].

There are a number of explanations for the variations in physical inactivity levels between the present research and the other studies. While a larger number of overweight/obese participants was a strength of the Cassidy et al. study, their comparative IPAQ cut-offs for low activity/inactivity were ≤ 967.5 MET-minutes/week, and for high activity, they used a higher cut-off of > 3786 MET-minutes/week. These cut-offs were different from the standard IPAQ cut-offs of < 600 MET-minutes/week and > 3000 MET-minutes/week used in this look for thresholds for high and low levels of physical activity, respectively[85]. This could have been the reason for the lower levels of high physical activity (22%) and physical inactivity (32.3%) in comparison to the study's results of 53.3% and 23.2% for these categories, respectively.

The study by Al-Baho et al. found that while the percentage of physical inactivity (40.0%) was high and somewhat similar to the percentage of physical activity obtained in this study (53.3%), the percentage of high physical activity (5%) was remarkably lower than that of the current study (23.2%)[86].

This could be due to the high rates of obesity and physical inactivity in the Gulf region, especially among women who are discouraged from engaging in high levels of physical activity by gender norms (conservative dress unfit for exercise, women needing to be accompanied in public, and a lack of gender-specific fitness centres). According to the previously mentioned gender norms, the study by Al-Baho et al. found that among the

overweight/obese adults, there were slightly more females (250) than males (266)—50.4% and 49.6%, respectively[86]. This could have explained the remarkably low level of high physical activity [15].

A slightly lower level of physical inactivity—44.3%—was found in the Nigerian study conducted by Oyeyemi et al. than in this one (53.1%). This could be because Oyeyemi et al.'s study population, young adults, is probably more active. The high activity level, nevertheless, was comparable to what this study found. In this study, 23.2% of overweight/obese respondents engaged in high levels of activity. This is precisely the same as the 23.2% that Oyeyemi et al. reported [65].

According to the WHO guidelines for appropriate physical activity, 92.3% of the overweight and obese adults in this study did not engage in enough physical activity. Akaralo-Anthony and Adebamowo also found that among adult urban residents in Nigeria, 83% of people did not participate in enough physical activity[87].The high prevalence of overweight and obesity (64%) among the respondents in the Akaralo-Anthony and Adebamowo study may be the reason for the similarity in the high level of physical inactivity centred around WHO recommendations between that study and the current one. Furthermore, there was a similarity in the mean age between this study (44.25±14.3) and the study by Akaralo-Anthony and Adebamowo (41.6±9.3)[87].

In contrast to the 68.6% and 64.8% of overweight and obese respondents in Oyeyemi et al.'s and Awotibe et al.'s studies conducted in Niger, respectively, only 7.7% of these respondents were physically active enough[61, 64].The emphasis on overweight and obese adults, who are less inclined to be physically active in this study, is probably what caused the difference. This difference may also be explained by differences in the number of participants in the various age groups, which always has an impact on participation in adequate amounts of physical activity.

In contrast to the majority of respondents in studies by Oyeyemi et al. (47.2%) and Awotibe et al. (58%) who were younger adults in the age group of 20-34 and < 30, respectively, the majority of respondents (27.0%) in the present research were within the 50-59 age group. In the studies conducted by Oyeyemi et al. and Awotibe et al., respectively, only 12.1% and 8.6% of participants were older than 55. Oyeyemi et al. and Awotibe et al. may have reported higher levels of adequate physical activity for health because young adults are more inclined than middle-aged and older adults to engage in adequate amounts of physical activity[61, 64].

Using the IPAQ, Samir, Mahmud, and Kuwaja found that among obese employees of a Karachi medical facility, the prevalence of physical inactivity was 72.6%. This was comparable to the 70.5% incidence of physical inactivity among the study's obese participants [88].

CONCLUSION AND RECOMMENDATIONS

According to this study, only 7.7% of the adult population of overweight and obese people met the WHO recommendation of adequate physical activity for health, and 53.3% of them were physically inactive. The majority of overweight and obese adults (78.6%) believed that there were moderate to

high barriers to physical activity, most of which had to do with physical exertion. Age, gender, career status, co-morbidity, alcohol consumption, BMI, hypertension, and levels of physical activity were all significantly correlated. The suggestions that followed were made:

1. Given the obesity pandemic in the West-African Sub-region, adults who are overweight or obese in general should receive enough attention.
2. Physical activity interventions should receive special attention in the handling of overweight and obesity among adults, given the high levels of physical inactivity within the overweight and obese adults in this study.

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