PERCEIVED BARRIERS TO PHYSICAL ACTIVITY AMONG OVERWEIGHT AND OBESE ADULT PATIENTS ATTENDING GENERAL OUT-PATIENT CLINIC IN LAGOS UNIVERSITY TEACHING HOSPITAL

Abstract

Background: Globally, only 1 in 4 adults engage in the recommended amounts of physical activity for health. The increasing rates of physical inactivity are partly caused by perceived obstacles to physical activity. Physical inactivity is the primary cause of roughly 21-25% of the burden of breast and colon cancer, diabetes, and ischemic heart disease.
Study Aim: To determine the perceived barriers to physical activity among overweight and obese adult patients attending the GOPC, LUTH using the barrier portion of the Exercise Benefit and Barrier Scale (EBBS).
Methodology: The research was a cross-sectional, descriptive study conducted in LUTH. Data was collected by means of questionnaire and interview. Statistical package for social sciences (SPSS IBM) version 25 was used for data entry, cleaning, and assessment. Frequency and percentage were used to represent all categorical parameters, and means, standard deviation, or, in the case of skewed continuous variables, median and interquartile range, were used to summarizethem via systematic random sampling, 285 overweight and obese adults between the ages of 18 and 64 were chosen.
Result: The majority of overweight and obese adults (78.6%) felt that there were moderate to high barriers to physical activity, most of which had to do with physical exertion. Age, family type, highest degree of education, type of occupation, median earnings, co-morbidity, smoking, alcohol consumption, and perceived barriers all showed significant correlations.
Recommendation: Further evaluation of the perceived barriers to physical activity should be carried out in order to identify overweight and obese adults who encountered a high level of barriers to physical activity, as a high level of barriers to physical activity independently predicted lack of exercise in this study.

Keywords: Perceived barriers to physical activity, Obese, and Overweight, Barrier portion of the Exercise Benefit and Barrier Scale (EBBS).

Introduction

Low levels of physical activity are linked to obesity, and obesity and inactivity are mutually reinforcing [1]. The World Health Organisation (WHO) estimates that physical inactivity causes 3.2 million deaths annually and is a major risk variable for death globally [2]. Globally, only 1 in 4 adults engage in the recommended amounts of physical activity for health [3]. By 2025, the WHO and its member states aim to reduce the percentage of people who do not get enough physical activity by 10% [4]. 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 [3].

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, low motivation, anxiety regarding injury, insufficient skills or resources, weather, travel, family responsibilities, and retirement age [5,6]. Overweight and obese people perceive greater barriers to physical activity than people of normal weight [7]. According to the World Health Organisation, physical activity is any skeletal muscle-driven movement that involves the use of energy [4]. Excessive or abnormal body fat accumulation in overweight and obese people is caused by a persistently positive energy balance, which happens when

energy intake surpasses energy expenditure [5]. Through increased physical activity, energy is expended [6].

People are prevented from engaging in adequate amounts of physical activity for their health by perceived obstacles to physical activity [7]. These barriers include time constraints, lack of knowledge, bad weather, conflicting demands, and external barriers like obesity, poor fitness, health issues, injury, absence of enjoyment, and lack of motivation [7]. Individuals who are overweight or obese engage in less physical activity compared to the overall population. The increasing rates of physical inactivity are partly caused by perceived obstacles to physical activity.Family doctors should, therefore, be interested in addressing barriers to physical activity because, among overweight and obese people, suggestions and interventions regarding physical activity for health not only improve the adaptation of subjective components of decreased physical activity but also inevitably lead to the support of physical activity between their family members. Few studies have focused on overweight and obese people, but there are studies on perceived obstacles to physical activity in adolescents, adults, kids, older people, stroke patients, individuals with diabetes, pregnant women, as well as people with chronic obstructive pulmonary disease [8-13]. To the highest extent of the author's knowledge along with the literature review, Sub-Saharan Africa (SSA) has little research in this area.

Barrier perception is a significant determinant of physical activity levels and there is an inverse association between physical activity levels and perception of barriers to physical activity[14]. Lack of time and lack of motivation are the most commonly identified barriers to physical activity. There is a need to study the perceived barriers to physical activity levels among adult overweight and obese individuals in order to create appropriate intervention programs.

Aim of the Study

The aim of the study is to determine the perceived barriers to physical activity among overweight and obese adult patients attending the GOPC, LUTH using the barrier portion of the Exercise Benefit and Barrier Scale (EBBS).

Literature Review

Definition of Overweight and Obesity and Abdominal Obesity

Overweight and Obesity: The World Health Organisation classifies overweight and obesity based on an adult's body mass index as abnormal or excessive fat accumulation that may compromise health**15**. 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. 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) **15**.

Abdominal Obesity: Abdominal obesity is defined by the WHO and the National Cholesterol Education Program Third Adult Treatment Panel (NCEP-ATP III) as waist circumference (WC) values of > 102 for men and > 88 cm for women, while the International Diabetes Federation (IDF) uses a lower cut off limit of WC (≥ 94cm in men and ≥ 80cm in women) [16,17]. The WHO also uses the Waist-Hip Ratio(WHR) definition of ≥ 0.90 cm for men and ≥ 0.85cm for women [16].

Prevalence and Trends of Overweight and Obesity

Once thought to be a condition exclusive to adults and the wealthy, obesity has spread to all age categories and socioeconomic classes[18]. 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 [19]. 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 climbed from 28.8% to 36.9% in men and from 29.8% to 38% in women [20]. 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 obese[21]. This equates to 52% of adults globally who are 18 years of age or older (39% overweight and 13% obese). Adults who are overweight or obese outnumber those who are normal weight worldwide [22]. Hunger and malnutrition do not compare to the immense risks to public health posed by obesity's negative health effects. In many parts of Africa, the frequency of obesity and overweight has been rising [23]. The obesity epidemic still causes SSA despite the burden of infectious diseases and malnutrition. 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[24] Over the course of ten years (1995–2005), the frequency of obesity in West African cities more than doubled (increased by 1140%)[25]. According to a systematic review, the incidence of overweight or obesity in Ghana ranged from 21.1% to 62.3%[26]. The complex interactions between globalisation, urbanisation, rising GDP (gross domestic product), sedentary occupation, physical inactivity, constructed 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[27, 28].

A systematic review predicted that the overall incidence of overweight and obesity in Nigeria was between 8.1% and 22.2%, and between 20.3% [29]and 35.1%.A more current systematic review placed the prevalence of overweight and obesity in Nigeria between (3.9 and 49%)%[26]. According to Igboanusi et al.'s community-based study conducted in Northern Nigeria, the prevalence of overweight and obesity was found to be 29.2% and 19.3%, respectively[30]. Ukegbu et al. conducted a cross-sectional analysis in southeast Nigeria and found that the incidence of overweight and obesity was 13.4% and 6.5%, respectively. In a different cross-sectional hospital-based study conducted in south-south Nigeria, Adaja and Idemudia found that the prevalence rates for overweight and obesity were, respectively, 31.7% and 25.5%[31].

Adaja and Idemudia conducted another qualitative hospital-based research in south-south Nigeria, and the results indicated that the prevalence rates for overweight and obesity were, respectively, 31.7% and 25.5% [31]. In a cross-sectional hospital-based study, Amole et al. found that the rate 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 [32-36].

Physical activity Definition and Classification

Any movement of the body made by the skeletal muscles that requires or results in the use of energy is considered physical activity [37]. Physical activity can be achieved in a variety of ways, including paid or unpaid household chores around the house (cleaning, carrying, and caring duties), leisure activities (dancing, cycling, sports), and work-related activities (lifting, carrying, or a different demanding tasks) [38]. All types of physical activity have health

benefits when done regularly, for a long enough period of time, and with enough intensity. However, the benefits of different types of physical activity vary depending on whether one participates actively or passively [38].
One can categorise physical activity as incidental or structured. While incidental physical activity is unplanned and typically consists of activities at home, at work, and while travelling, structured physical activity, also known as physical exercise, is planned, organised, repetitive, and carried out by someone to accomplish a specific goal. Exercise is a type of recreational physical activity that involves making repetitive motions with the body in an effort to maintain and increase physical fitness. Different types of physical exercise are classified according to their mechanical or metabolic properties [39]. Exercise can be either dynamic or static mechanically, and it can be either aerobic or anaerobic metabolically. Static/isometric (same length) exercise entails no limb movement, whereas dynamic/isotonic (same tension) exercise involves limb movement in tandem with the type of muscle contraction that drives the movement [39]. The metabolic classification is built on the degree of exercise intensity, which in turn determines whether oxygen is available for muscle contraction (aerobic) or not (anaerobic) [39].Anaerobic exercise happens at a high intensity level because the energy used in the exercise is produced by anaerobic respiration (glycolysis), whereas aerobic exercise is characterised by a large group of muscles acting dynamically, increasing heart rate and energy expenditure.Walking, hiking, biking, jogging, dancing, and swimming are examples of aerobic exercise; resistance training, like weightlifting, is an example of anaerobic exercise. It is important to remember that many different activities can combine both dynamic and static, along with aerobic and anaerobic, physical activity [39].

Physical activity among the Overweight and Obese

Obesity and physical activity have an inverse relationship, and since obesity is a known cause of physical inactivity, the relationship between the two is probably bidirectional80.Obese or overweight people are less likely to engage in adequate physical activity, while physically inactive people have a greater likelihood to be overweight or obese. This inverse trend has been observed in a number of physical activity studies [41, 42, 43, 44, 45]. Samir, Mahmud, and Kuwaja conducted a longitudinal investigation on physical inactivity along with barriers to physical activity among 350 adult obese subjects. The study found a high level of physical inactivity (72.6%). A rise in age, a rise in BMI, marriage, illiteracy, and a family history of obesity were all linked to the subjects' lack of physical activity. The subjects' lack of physical activity was not correlated with their gender, ethnicity, or income [46]. Cheah et al. conducted a second cross-sectional research on physical activity in overweight and obese adults and found that the sociodemographic corresponds of physical activity in overweight and obese adults varied between moderate and intense exercise [47]. Overweight adults were also found to be more active than obese adults.

Among adults who were overweight or obese (class I and II), physical activity was significantly correlated with age, level of education, income, ethnic background, gender, relationship status, family size, and employment status. Effective interventions for the encouragement of physical activity should be implemented in overweight and obese adults due to the negative relationship between obesity and physical activity [39].

Barriers to physical activity amongst Overweight and Obese Adults

Even though physical activity has been shown to have benefits, rates of adequate physical activity participation and long-term compliance to physical activity programmes are

inadequately low among adults who are overweight or obese [48]. When it comes to encouraging overweight and obese adults to participate in physical activity, identifying barriers is a great area to focus on [48]. Obesity and overweight are in and of themselves obstacles to physical activity, and they are often associated with co-morbidities that may further restrict physical activity [39]. Overweight and obese people must engage in higher levels of physical activity, which they may find more challenging, in order to lose weight and benefit from the advantages of physical activity associated with obesity [7]. Obese and overweight people frequently face greater environmental and personal obstacles to physical activity and might face fewer opportunities to get past them. Physical activity is more difficult for overweight and obese people than for those with normal weights [39]. Studies on obese adults have revealed a number of obstacles to physical activity.Mc Intosh, Hunter, and Royce's systematic review broadly categorised the barriers as either internal or external. External barriers consist of lack of time, lack of knowledge, bad weather, and conflicting demands, while internal barriers were further divided into psychological (weight perception, low spirits, a lack of employment, and injury) and physical (excess weight, poor fitness, health issues, and injury). [7]. The most frequent obstacles are lack of motivation and time constraints [48].

Classification of Barriers to physical activity amongst Overweight and Obese Adults

Internal barriers*:*

Physical barriers: This covers being overweight, being unfit, and being ill or injured [7]. Obese people who are overweight experience a vicious cycle of weight loss. Despite being motivated and well-informed about the role exercise plays in weight control, they struggle to lift their weight and get tired easily when exercising [7]. Inadequate physical fitness has also been found to be a barrier to getting enough exercise because it causes overweight and obese adults to tyre out quickly when exercising. Injuries or health issues can also be obstacles to physical activity.

Migraine and osteoarthritis frequently coexist and have been identified as obstacles to physical activity in adults who are overweight or obese [7]. Obese people frequently sustain injuries when exercising, which may deter them from doing so.

Psychological barriers: In addition to psychological obstacles, adults who are overweight or obese also face physical obstacles to physical activity, such as low mood, weight perception, lack of enjoyment, as well as lack of motivation or willpower [7]. One well-known obstacle to exercise is the stigma attached to being overweight. Adults who are overweight or obese frequently co-occur with depression, and the depressed state that accompanies depression impedes an individual's interest in physical activity [7]. One known barrier is lack of enjoyment, which manifests as low pleasure ratings, pain, and unpleasant past experiences related to physical activity. Another psychological barrier that obese adults frequently report is a lack of willpower.

External barriers: External obstacles that prevent people from engaging in physical activity include a lack of time, ignorance, inclement weather, obligations to family and friends, lack of support from friends and family, high costs, and a lack of facilities [7]. Among obese adults, the most common excuse given for not exercising is a lack of time [7].

Critical investigation has been conducted in other studies into the obstacles that keep adults who are overweight or obese from engaging in adequate physical activity.

A longitudinal study by Samir, Mahmud, and Kuwaja on perceived barriers to physical activity among obese adults in Malaysia found that 72.6% of the obese people who were not

exercising reported being physically inactive. Of those who did not exercise, 75%, >50%, 50%, and 25% said they lacked skills, that other family members (apart from the spouse and children) did not support them, that they had no desire to exercise as a result, and that they were unwell [46]. The study also mentioned a lack of time, the expense of using facilities, and dangerous outdoor settings as barriers.

A second cross-sectional investigation by Ibrahim et al. found that the most common obstacle to physical activity among adult men in Malaysia was the conviction that exercising is not as enjoyable as other forms of recreation with friends and family. The purpose of this study was to determine the respondents' current body weight status.
Over 25% of those who participated reported that the following problems were the most frequent ones: extreme temperatures, lack of control, lack of spare time, lack of money, as well as lack of friends [46]. Perceptions that physical activity was harmful (5.5%) as well as emotions of shame (6.7%) were the least common barriers [49].
Ibrahim et al. also found that a higher BMI, relationship status, low level of education, and inactivity were positively correlated with perceived barriers to physical activity.
A study by Rech et al. found that the most commonly reported barriers to physical activity among overweight adults in Brazil were interpersonal (feeling of negative body image, lack of confidence in performing physical activity, lack of time, the absence of financial backing, and having a disease).
Environmental barriers like bad weather, inadequate security, and a lack of places to work out were also mentioned [50]. People most frequently mentioned a lack of social support as an interpersonal barrier and a lack of safety from crime as an environmental barrier [51]. Women in Nigeria who scored significantly on the Exercise Benefit and Barrier Scale (EBBS) barrier portion were less likely to be physically active, per a qualitative study by Awotibe et al. on physical inactivity [51].

Assessment of barriers to physical activity

For specific populations (adults, adolescents, pregnant women, diabetics, and the elderly), a number of unconventional self-reported questionnaires with questions covering both internal and external barriers to physical activity have been created and used. However, the Exercise Benefit and Barrier Scale (EBBS), a standardised tool created by Sechrist et al., is the section on barriers to physical activity. Numerous studies have found that the EBBS has a high test-retest reliability (0.77) and internal consistency (0.87)[12,51]. The barrier section of the EBBS demonstrated good test-retest reliability (ICC=0.80, 95% CI=0.70-0.88) in a Nigerian study conducted by Awotibe et al [51].
It improved the accuracy of comparisons between research on obstacles to physical activity.
Adults who are overweight or obese may find it difficult to engage in physical activity due to perceived obstacles, which prevents them from benefiting from the lower health risks and improved weight management associated with physical activity. To improve compliance, doctors should discuss and identify potential obstacles to physical activity with adults who are overweight or obese[52]. This will allow them to create customised physical activity programmes.
It takes 3-5 minutes for a doctor to discuss the advantages, obstacles, patient preferences, and physical activity practices. As primary care physicians, family doctors should make an effort to learn about obstacles to physical activity from overweight and obese patients who come into their clinics. Lower levels of barriers have been linked to higher rates of participation in the suggested levels of physical fitness for health[48].

Materials and Methods

Study Area

This study was carried out at the Lagos University Teaching Hospital (LUTH), Idi-Araba in Surulere, Lagos state, at the General Outpatient Clinic (GOPC) of the Family Medicine Department (FMD). 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, along with other health-related fields. 39 doctors (6 consultant family physicians, 27 family medicine residents, and 7 medical officers) oversee the GOPC. It is open Monday through Friday from 8:00 am to 16:00 pm. Every month, about 2,050 patients are seen, of whom about 822 are overweight and obese adults, aged 18-64 years.

Study design

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

Study 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.

Determination of Sample size

Using the proportions estimation formula[25]

$$n = z^2pq/d^2 \qquad \text{Equation (1)}$$

Where,

n = minimum sample size

z = 1.96 (standard normal deviate at 95% confidence interval)

p = prevalence of overweight and obesity in adults from a previous related study (hospital based cross-sectional study in Ogbomoso, South West Nigeria) [35] = 25.0% and 14.8% respectively. The higher prevalence which is a better representative of both (25.0%) was used.

Q = 1-p

d = degree of accuracy= 5%

$n = 1.96^2 \times 0.25 \times (1-0.25)/ 0.05^2$

$= 1.96^2 \times 0.25 \times 0.75/ 0.0025$

$= 0.7203/0.0025$

$= 288.12$

n= ≈ 289 participants

The estimated number of overweight and obese adults, 18-64 years who were seen at the GOPC of LUTH in the previous 3 months was 2,466.

The entire sample population was < 10,000 therefore the final sample size $n_f$was calculated using the correction formula [25]:

$$n_f = n/\left(1 + \frac{n}{N}\right) \qquad \text{Equation (2)}$$

Where n_f = final sample size when a study population is < 10,000

N= estimated study population = 2,466

n = minimum sample size = 289
Records of clinic attendance in previous months had shown an average of 822 overweight and obese patients per month, thus giving an expected total of 2,466 overweight and obese adult patients, 18-64 years in a period of 3 months.
Therefore,
$n_f = 289/\left(1 + \frac{289}{2466}\right)$
$n_f = 289/(1+ 0.117)$
$n_f = 289/1.117$
$n_f = 258.73$
To compensate for withdrawals and incomplete data, 10% of 258.73= 25.87 was added to the sample estimate.
Final sample size to be recruited = 258.73 + 25.87 = 284.60 ≈ 285

Therefore, 285 participants were recruited for this study.

Sampling method, Eligibility Criteria and Sampling Interval

Sampling method: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.

Eligibility Criteria: Adults who are overweight or obese and those who attend the GOPC between the ages of 18 and 64 and have given their consent to take part in the study are included. Based on their BMI, they were classified as obese (≥ 30 kg/m2) and overweight (25.0-29.9 kg/m2).

Sampling Interval: Study population (N) / total sample size (n) = 2466/285 = 8.65 ≈9. This 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 average number of those involved that was due for recruitment each day, given 22 working days per month and 66 total work days for three months, was sample size divided 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. The ninth overweight or obese person was then chosen based on the order in which they arrived 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.

Data collection methods, procedures and Duration of study

Measuring Instruments:A semi-structured interviewer supervised a pre-tested questionnaire that included the following:

- Participants' sociodemographic details in the study
- Health and way of life background
- The exercise benefit and barrier scale (EBBS) barrier section (Appendix 2): an approved instrument for evaluating perceived obstacles to physical activity. It has 14 items that can be used individually and are rated on a 4-point Likert scale. Four subscales—exercise milieu (6 items), time expenditure (3 items), physical exertion (3 items), and family discouragement (2 items)—are used to investigate barriers to exercise. There is a minimum of 14 and a maximum of 56 points. The degree of perceived barriers directly relates to the score.

  First, a percentage score was obtained by multiplying the result by 100 after dividing the obtained scores by the total score. The percentage scores were then classified as low, moderate, or high levels of perceived barriers, respectively, using the 25th, 50th, and 75th percentiles.The validity coefficient of the EBBS, which has been used in numerous studies, was 0.866, and its test-retest reliability was 0.772[12, 53,54]. In certain studies conducted in Nigeria, it was utilised to evaluate obstacles to physical activity[26, 54].

  In addition to the EBBS barrier questions, two additional barriers to physical activity (lack of confidence and past injuries/experiences) were evaluated independently. Because these two obstacles are significant deterrents to physical activity among adults who are overweight or obese, especially in developing countries[7, 120].

Data Collection

The author educated two research assistants who were recently graduated doctors at the FMD in LUTH when the study first started. The research assistants participated in a simulated exercise wherein the researcher and the assistants took turns administering the questionnaire. After that, in order to lessen inter-observer variability, they received coaching and correction on how to properly pose the questions and document the responses. During the course of the study, they also received ongoing evaluation and counselling. The FMD employees were also made aware of the study and asked for their cooperation.

Data Collection Procedure

The study was brought up with patients during their routine pre-clinic health discussions. Following an explanation of the study's details to each of the chosen participants who satisfied the inclusion criteria as overweight or obese based on estimations of their height, weight, and BMI, they were each given a confidentiality guarantee and asked for their informed consent (Appendix 1). The Author and research assistants conducted interviews with consenting participants using the pretested semi-structured questionnaires.

Duration of study:The study took place over the course of three months.

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 assessment. Frequency and percentage were used to represent all categorical parameters, 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.

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 can be utilized to locate 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.

Results and Data Analysis

Via systematic random sampling, 285 overweight and obese adults between the ages of 18 and 64 were chosen. The barrier section of the EBBS was administered through a semi-structured, previously tested interviewer-administered questionnaire that included medical, social, and lifestyle factors in addition to sociodemographic data. A total of 285 respondents, or 100%, finished the survey.

Socio-demographic characteristics of the respondents

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 participants were widowed (6.3%), separated (1.1%), or divorced (1.1%). 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. In terms of ethnicity, the Yoruba ethnic group constituted the majority (63.2%) of the respondents. The Igbo ethnic group and other ethnic groups, which made up 31.9% and 4.9% of the respondents, respectively, came next. The majority of respondents (42.1%) had some sort of postsecondary education under their belt. Less than one-fourth(22%) of the respondents were in the least educated category, having only completed primary school. Regarding the respondents' current employment status, 207 (72.6%) of them were employed, making up the majority of the sample. Of them, 20 (7.0%) were retired and 58 (20.4%) were jobless. In terms of the kind of work, 47.3% of the respondents were skilled workers. Those with less experience (28.0%) and professionals (24.6%) came next. The respondents' income ranged from 75,000 to 350,000 naira, with 150,000 naira serving as the median.

Table 1a: 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

Table 1b: Social characteristics of respondents

Variable	Frequency (n=285)	Percentage
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
Ethnic group		
Yoruba	180	63.2
Igbo	91	31.9
Others	14	4.9
Highest level of education	22	7.7
Primary	54	18.9
Secondary	120	42.2
Tertiary	89	31.2
Postgraduate		
Current employment status	58	20.4
	207	72.6
Unemployed	20	7.0
Employed		
Retired	51	24.6
Type of occupation (n=207)	98	47.4
	58	28.0
Professional		
Skilled	26	9.1
Unskilled	75	26.3
Average income	85	29.8
≥50,000	99	34.8
50,000-100,000	150 (75.0-350.0)	
101,000-200,000		
>200,000		

Median (Q1, Q3)

Medical and lifestyle characteristics of respondents

The respondents' medical and lifestyle details are displayed in Table 2, a multiple-choice table. 40% 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.

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

Perceived barriers to physical activity among respondents

Figure 3 is a multiple bar chart that shows two other significant barriers (security concerns and prior injury/health problems) perceived between the respondents. Table 3 shows the perceived barriers to physical activity employing the Barrier portion of the EBBS among the respondents. 100% of the respondents said they faced at least one perceived obstacle to engaging in enough physical activity. The respondents perceived the highest frequencies of barriers associated with physical exertion, including fatigue during exercise, being weary of exercise, and perceiving exercise as hard work. 174 respondents, or 61%, said they were tired of exercising.

This was followed by 122 (42.5%) respondents who thought exercise was hard work and 167 (58.6%) respondents who felt tired after exercising. When it comes to obstacles pertaining to the exercise environment, notable obstacles that each affected more than one-third of the respondents were those pertaining to availability and access to space/facilities for exercise (such as locations for exercise being too distant away, fitness centres not having convenient schedules, and there being not enough places for exercise). Of the respondents, 109 (38.3%) thought that the exercise facilities had schedules that were inconvenient for them, and 113 (39.7%) thought that the distance between the places for exercise was a barrier. Additionally, 102 people, or 35.8%, said they didn't think there were many places to work out.

Exercise cost was perceived by 78 (27.4%) of the respondents as a barrier while being too embarrassed by exercise was perceived by 55 (18.3%) of the respondents as a barrier. The least perceived barrier as regards exercise milieu was that of the funny looks of clothing on individuals performing exercise, which affected 41(14.4%) of the respondents. As regards time expenditure, exercise taking too much of personal time was a more frequent barrier than exercise competing with time meant for family responsibilities and relationships. 121(38.9%) of the respondents perceived that exercise time encroached their personal time for other activities.

Similar percentages of respondents said that exercising interfered with their time for relationships with family members and obligations: 46 (16.1%) said that exercise clashed with time for family obligations, and 44 (15.4%) said that it interfered with time for interactions with relatives. About one-fourth (24.9%) of the respondents felt that they weren't urged by their relatives to engage in enough physical activity, while 28.1% of the respondents cited their spouse's lack of encouragement as a barrier. When it comes to specific barrier questions, the top five barriers that respondents perceived, according to frequency ranking, are getting tired of exercising or finding it tiring (61%), Exercise locations that are too far away (39.7%) and that require too much personal time (38.9%). The least five barriers, on the other hand, were thought to be the cost of exercise (27.4%), embarrassment about exercise (19.3%), conflicting exercise and family obligations (16.1%), taking up too much time from relationships with loved ones (15.4%), and the idea that people would think less of those who wear athletic wear (14.4%). Figure 1 illustrates the majority of respondents' disagreement with the statement that prior injuries or health issues (62.8%) and security concerns (69.1%) deterred them from engaging in physical activity. Approximately one-fourth (25.3%) agreed/strongly agreed that security concerns were a barrier, while 30.6% agreed/strongly agreed that prior injuries/health issues discouraged them from physical activity.

Table 3 Perceived barriers to physical activity among respondents

	SA	A	D	SD
Exercise milieu subscale				
Places for me to exercise are too far away	31(1.9)	82(28.8)	142(49.8)	30(10.5)
I am too embarrassed to exercise	9(3.2)	46(16.1)	174(61.1)	56(19.6)
It costs too much to exercise	2(0.7)	76(26.7)	161(56.5)	46(16.1)
Exercise facilities do not have convenient schedules for me	17(6.0)	92(32.3)	147(51.6)	29(10.2)
I think people in exercise clothes look funny	2(0.7)	39(13.7)	193(67.7)	51(17.9)
There are too few places for me to exercise	18(6.3)	84(29.5)	165(57.9)	18(6.3)
Time expenditure subscale				
Exercising takes too much of my time	30(10.5)	81(28.4)	150(52.6)	24(8.4)
Exercise takes too much time from family relationships	8(2.8)	36(12.6)	200(70.2)	41(14.4)

Exercise takes too much time from my family responsibilities	8(2.8)	38(13.3)	204(71.6)	35(12.3)
Physical exertion subscale				
Exercise tires me. (I am weary of exercise)	40(14.0)	134(47.0)	98(34.4)	13(4.6)
I am fatigued when involved in exercise	26(9.1)	141(49.5)	111(38.9)	7(2.5)
Exercise is hard work for me	30(10.5)	92(32.3)	145(50.9)	18(6.3)
Family discouragement subscale				
My spouse or significant other does not encourage exercising	10(3.5)	70(24.6)	174(61.1)	31(10.9)
My other family members do not encourage me to exercise	8(2.8)	63(22.1)	187(65.6)	27(9.5)

SA: Strongly Agree, **A:** Agree, **D:** Disagree, **SD:** Strongly Disagree.

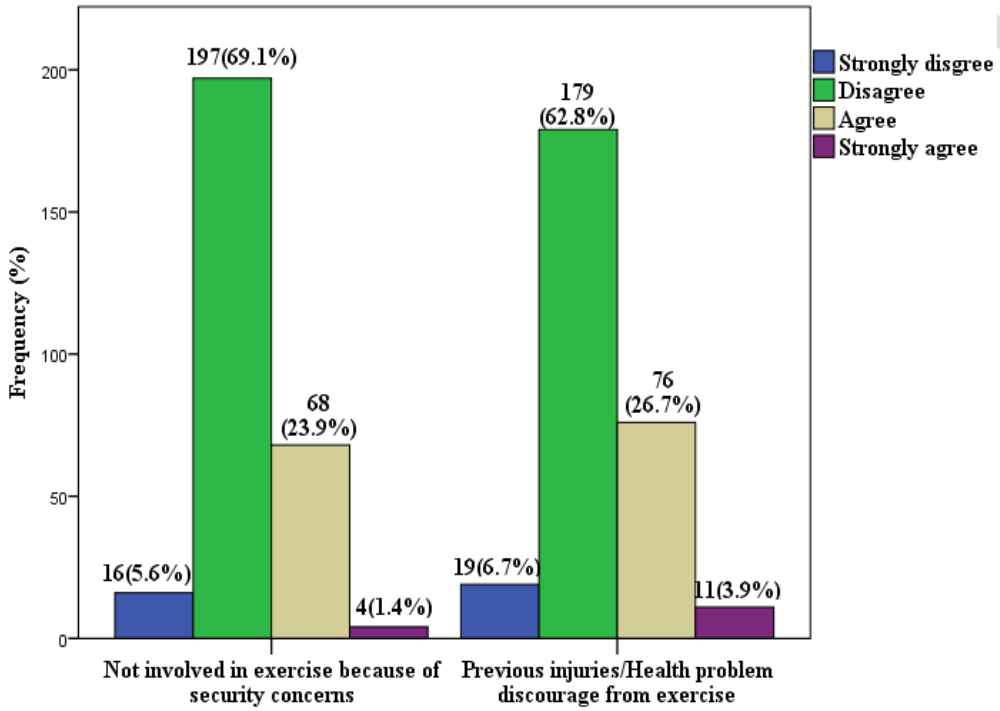

Figure 1: Security Concerns and Previous injuries/health problems as barriers.

Levels of perceived barriers to physical activity among respondents

The respondents' perceived barriers to physical activity are depicted at different levels in Figure 2.

The majority of respondents—56.8%—felt that there were moderate barriers to engaging in physical activity. Comparable percentages of respondents reported facing low levels of perceived barriers (21.4%) and high levels of perceived barriers (21.8%).

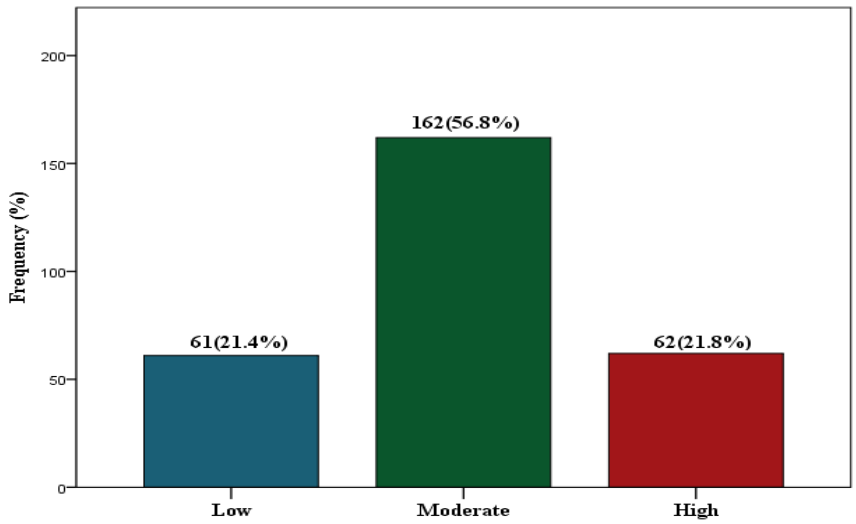

Figure 2: Levels of perceived barriers to physical activity among respondents.

Predictors of high levels of perceived barriers to physical activity among respondents

The independent variables of a great deal of perceived barriers to physical activity among the respondents who reported being overweight or obese are displayed in Table 4. The respondents' physical inactivity was not independently predicted by any of the factors (age, family type, highest level of education, type of profession, current employment status, average income, the existence of co-morbid medical condition, and alcohol intake) that achieved statistically noteworthy connections with high levels of barriers to physical activity (p= > 0.05). In terms of age, participants who were 50 years or older were about half as likely to perceive high levels of barriers as those who were between the ages of 20 and 49. The p-value (p = 0.079, OR 0.539; 95% CI 0.241-1.287) was not significant, though.In terms of education, participants with postgraduate or tertiary education were roughly two thirds less likely than primary education respondents to perceive significant barriers to physical activity. The p-value (p = 1.627, OR 0.314; 95% CI 0.065-1.780) was not significant, though. Regarding the nature of their work, respondents who were skilled were roughly three-fifths more likely than those who were professional to perceive significant obstacles to physical activity. But the p-value (p = 0.422, OR 1.605; 95% CI 0.505-5.009) did not indicate statistical significance. Regarding employment status, participants who had jobs at the time were about one-third less likely than those who were unemployed to perceive high levels of barriers. The p-value (p = 0.143, OR 0.644, 95% CI 0.358-1.160) did not indicate significance.

When it came to average income, people who made more than 50,000 naira were twice as likely as those who made less than 50,000 naira to perceive significant barriers to physical activity. Individuals with incomes over 200,000 naira were twice as likely to perceive more barriers than those with incomes under 50,000 naira. P-value (p = 0.232, OR 1.955; 95% CI 0.652-5.859) did not indicate statistical significance. When it came to the perception of high barriers to physical activity, people with co-morbid conditions were approximately three-fifths less likely than people without co-morbid conditions to report having one.

The p-value (p = 0.432, OR 0.406; 95% CI 0.043-3.844) was not significant, though. Compared to individuals who did not consume alcohol, individuals who were currently using alcohol were approximately one-fifth less inclined to believe that there were significant obstacles to physical activity. The p-value (p = 0.665, OR: 0.771; 95% CI: 0.264-2.251) was not significant, though.

Table 4: Logistic regression showing independent predictors of high perceived barriers

	Odd ratio	95% CI	p-value
Age group (Years)			
20-49	1		
≥50	0.539	0.241-1.287	0.079
Highest level of education			
Primary	1*		
Secondary	1.055	0.236-4.710	0.944
Tertiary/Postgraduate	0.314	0.065-1.780	1.627
Type of occupation (n=207)			
Professional	1*		
Skilled	1.605	0.505-5.009	0.422
Unskilled			
Current employment status			
Unemployed	1		
Employed	0.644	0.358-1.160	0.143
Average income			
≤50,000	1*		
50-99,000	2.936	0.991-8.700	0.062
100,000-200,000	2.354	0.774-7.158	0.131
>200,000	1.955	0.652-5.859	0.232
Co-morbid medical condition			
No	1		
Yes	0.406	0.043-3.844	0.432
Description of alcohol intake			
Never	1*		
Previously drank alcohol >6 months ago	0.740	0.214-5.562	0.634
Currently drinking alcohol	0.771	0.264-2.251	0.665

* Reference category

Discussion of the findings

The purpose of this cross-sectional study, which was conducted in a hospital, was to evaluate the levels of physical activity, the perceived barriers to it, and the connection between the two in a population of adults who were overweight or obese. It also sought to determine the associations between the participants' sociodemographic traits and the levels of perceived barriers. There were 285 adults in the sample who were overweight or obese and came from the GOPC and LUTH.

Adults who are overweight or obese encounter unique obstacles to physical activity because of their body weight [50]. In addition to being a perceived cognitive barrier to physical activity, obesity's co-morbidities and stigma change how this particular group of people perceives barriers to physical activity[49,50].

When designing physical activity interventions for the prevention and overseeing of overweight and obesity, it is critical to ascertain the perceived barriers to physical activity among adults who are overweight or obese[55].

The most common reasons given by respondents for not engaging in physical activity in this research were those pertaining to physical exertion, such as getting tired of exercising, feeling exhausted while exercising, and the fact that exercising is labor-intensive. The study's overweight and obese adults viewed the distance between exercise locations as the biggest

obstacle to their exercise routine. They also believed that a personal barrier to physical activity was exercise taking up too much of their time.

In line with this study, Thompson, Buckley, and Brinkworth discovered that barriers associated with physical exertion were the biggest obstacles perceived among overweight/obese adult women in a randomised control trial using the EBBS [56]. Gundemir and Guler's findings in a cross-sectional hospital based research among Turkish nurses using the EBBS was also consistent with the current study in that barriers pertaining to physical efforts were the most perceived barriers. Feeling embarrassed by exercise and funny. In line with this research, Gundemir and Guler also discovered that the nurses' least common perceived personal obstacles were embarrassment about exercising and the fear of people thinking less of them when they wear certain clothes [56].

Similar to this study, Leone and Ward's study of obese women revealed that the most commonly perceived barriers to physical exertion were those related to weight, such as physical discomfort and shortness of breath. Similarly, Dalibalta and Davison discovered that physical effort was the biggest perceived obstacle to physical activity in a cross-sectional study involving a mixed student body. Similarly, in their study, Samir, Mahmud, and Kuwaja found that the biggest obstacle faced by obese adults was a lack of motivation and enjoyment [46].

Poor physical fitness is probably the cause of the physical exertion, lack of enjoyment, and lack of motivation that overweight and obese adults report as the biggest barriers to physical activity. In this study, 92.3% of the participants did not engage in enough physical activity. Physical fitness declines with extended periods of inactivity [57]. Because attempts to carry out moderate to high activity from a low active or physically inactive status will probably end in easy tiredness, weakness, physical fatigue, lack of enjoyment, and eventually loss of motivation, poor fitness would consequently likely lead to a perception of physical exertion, lack of pleasure, and lack of motivation as a barrier [7].

Additionally, obese adults who are unfit would consider inadequate exercise to be more difficult than adults of normal weight. Another reasonable explanation is that body weight may make movements difficult and may also result in pain, perspiration, and injury when exercising, which may deter people from exercising or make them less motivated to do so[7,1]. This can be a major obstacle that discourages adults who are overweight or obese from exercising.

In contrast to the results of this study, Keohane, Mulligan, and Daly stated that Irish general practitioners and trainees using the EBBS believed that the biggest obstacle to exercise was a lack of time [57]. Time expenditure was also cited by Gontarev, Kalac, and Aleksovska as the biggest obstacle faced by female teenage university students in Macedonia58.

Due to the percentage of inactive participants and work circumstances, the current study differs from these others in that it takes longer to complete. In contrast to the 53.3% of participants in this research who were physically inactive, Keohane, Mulligan, and Daly claimed that 21% of those who participated were inactive57. Additionally, the medical professionals were overly preoccupied with their jobs, worked long shifts, and spent a lot of time studying on computers, which left them with little time for exercise58. Students would prefer to spend time with computers, gadgets, and television than with fitness centres or competitive sports, according to Gontarev, Kalac, and Aleksovska's report.

This probably explained why the students felt there wasn't enough time for exercise.

The percentage of respondents who stated that safety and security concerns affected their willingness to exercise in their neighbourhood (24.7%) is comparable to that found in Oyeyemi's study conducted in Nigeria regarding the impact of these concerns on physical activity (25.3%). This may suggest that Nigerians believe it is generally safe to engage in physical activity in their neighbourhoods.

Like the study by Gundemir and Guler, the most commonly reported barriers of the exercise milieu subscale in this study were the scarcity of exercise spaces and the distance between locations 56. This is probably because there are less places to exercise in Lagos due to the city's dense population and fast urbanisation.
Furthermore, the otherwise accessible might be located far from populated areas.
Family discouragement did not appear to be an important barrier to physical activity among the adults in this study who were overweight or obese. This is a somewhat encouraging finding because the overweight and obese adults in this research can benefit from family and social support, which has an important beneficial effect on physical activity [59].
It can encourage and maintain physical activity among overweight and obese adults if these perceived barriers—particularly those pertaining to physical exertion—that might prohibit them from engaging in the suggested levels of physical activity are taken care of before physical activity interventions.

Levels of Perceived barriers to physical activity among overweight and obese adults.

Physical activity barriers can range in intensity from low to high. Physical activity is significantly harmed by high perceived barrier levels. The majority of study participants (78.6%) believed that there were moderate to severe obstacles to engaging in physical activity. 21.4% of adults who were overweight or obese reported having few obstacles to engaging in physical activity.
These results were comparable to those of a cross-sectional study conducted among women in Nigeria by Awotibe et al., in which 78% of the participants reported moderate to high levels of perceived barriers, while 22% reported low levels [60].
Similar results were found in another study conducted by Awotibe et al. among Nigerian university students, where the majority of participants (66.5%) reported facing moderate to high levels of perceived barriers. Comparatively speaking, a higher percentage of the students (33.5%) encountered minimal obstacles to physical activity than those found in this research (21.4%)[61]. This might be because the respondents were young and in an academic setting that encouraged physical activity. They were also likely to engage in competitive and recreational physical activity, so they encountered fewer obstacles.
The planning and execution of strategies for the promotion of physical activity are influenced by sociodemographic differences regarding the degrees of perceived barriers to physical activity.
Targeted physical activity interventions can be more effectively designed when the sociodemographic predictors of high barriers to physical activity are understood. All the sociodemographic factors (age, marital status, highest level of education, type of profession, employment status, as well as average income) except gender were significantly correlated with the perceived barriers levels ($p = < 0.05$) among the overweight and obese adults in this study. Nevertheless, among the overweight and obese adults in this study, high levels of perceived barriers were not predicted by any of the sociodemographic variables that achieved an important degree of association with the levels of perceived barriers individually. The complexity of obstacles to physical activity and potential confounders may be the cause of this.

Age and Perceived barriers to physical activity*:* Age-wise, overweight people over 50 were approximately half as likely (OR. 0.539; 95% CI 0.241-1.287) to believe that high levels of physical activity were a barrier than people between the ages of 20 and 49. The P-value ($p = 0.079$, OR 0.539; 95% CI 0.241-1.287) was not significant, though. This contrasts with Fernando et al.'s findings, which showed that perceived barriers rose with age among adults in the 20–50 age range. The age range of participants in the Fernando et al. study did

not go beyond 50 years, which is probably why there is a plausible difference between that study and this one.

This suggests that compared to people over 50 who are probably nearing the end of their careers or starting to prepare for retirement, young and middle-aged adults who are more probable to be actively employed may probably report lack of time as a major barrier.

Level of education and Perceived barriers to physical activity: Regarding educational attainment, compared to adults with only elementary school education, overweight and obese adults in this research who had completed postgraduate or tertiary education were two-thirds less inclined to perceive an elevated degree of barriers to physical activity. The p-value (p = 1.627, OR 0.314; 95% CI 0.065-1.780) was not significant, though. This result is consistent with that of Ibrahim et al. and Fernando et al., who found that participants with higher educational attainment perceived fewer obstacles to physical activity than respondents with lower educational attainment[49, 62]. This is due to the fact that educated people tend to have higher income levels and more prestigious jobs, which raises their awareness of the advantages of exercising and adopting healthy lifestyles[49].Rich and well-educated people are also more likely to be capable to pay for the material and communal assets (such as a gym membership) that encourage physical activity even in the face of other obstacles like weather, crowding, and security issues. Another reasonable explanation is that people with lower levels of education are more likely to experience stressful life circumstances and financial hardships, which can prevent them from engaging in physical activity[49]. Well-educated people are likely to perceive fewer obstacles to physical activity as a result of the reasons mentioned.

Type of occupation and Perceived barriers to physical activity:This study revealed a negative correlation between the perception of high barriers and the type of occupation (skilled, skilled, and professional) in relation to income. People who have completed more education are more likely to hold positions in higher-level job classifications. According to this study, in comparison to adults in professional jobs, those who are overweight or obese and work in skilled jobs are three-fifths more inclined to believe that there are significant obstacles to physical activity. But the p-value (p = 0.422, OR 1.605; 95% CI 0.505-5.009) did not indicate statistical significance. The present study's findings regarding the correlation between occupational categories and a high barrier perception bear similarities to those reported by Ibrahim et al.[49].

This relationship arises from the likelihood of education among those in professional roles. They are less likely to perceive obstacles to physical activity because they are more likely to be conscious of the health advantages of exercise and to have the ability to afford the expense of exercise programmes.

Income and Perceived barriers to physical activity: There was a positive correlation between the degree of income and the perception of obstacles to physical activity. In this study, adults who were overweight or obese and had higher incomes were more likely to encounter a high level of barriers. Individuals with incomes over 200,000 naira were twice as likely to perceive more barriers than those with incomes under 50,000 naira. But the p-value (p = 0.232, OR 1.955; 95% CI 0.652-5.859) did not indicate statistical significance. Ibrahim et al. discovered, in contrast to the results of this study, that people with higher income levels perceived fewer obstacles to physical activity [49]. One possible explanation for this discrepancy could be the disparity in purchasing power and currency between Malaysia and Nigeria.

According to Ibrahim et al., another likely explanation for this discrepancy could be that individuals with higher incomes are likely businesspeople who find it difficult to find time to exercise, despite having the means to pay for fitness centres and programmes[49].

Employment status and Perceived barriers to physical activity: Compared to their jobless counterparts, employed overweight and obese adults in this study were approximately one-third less likely to believe that there are significant obstacles to physical activity. The p-value (p = 0.143, OR 0.644; 95% CI 0.358-1.160) was not significant, though. Borodulin et al. found a similar thing in a cross-sectional study of adults who had finished their education[63]. Economic barriers were found to be more prevalent among the unemployed by Borodulin et al. Given that financial hardship is one of the most frequent obstacles to physical activity, this could explain why adults without jobs encounter greater obstacles to it.

Other sociodemographic characteristics and perceived barriers to physical activity: In this study, there was no discernible correlation found between the perceived barriers level and gender among adults who were overweight or obese. Similarly, in this study, there was no significant correlation found between the level of perceived barriers and marital status. In contrast to this study, the Al-Baho et al. study found that married women and those with children perceived more barriers to physical activity[64]. Al-Baho et al. gave the number of children, especially among women, as their explanation. Compared to women without children, individuals who had one or more kids perceived more barriers [64].

Women are discouraged from engaging in physical activity because of the stress and time commitment required to care for their children. The number of children that was stated in Al-Baho et al.'s study but was not stated in this one may be the reason for the discrepancy between their findings and those of this study.

Medical/lifestyle characteristics and perceived barriers to physical activity

The degrees of perceived barriers to physical activity within the overweight and obese adults in this research were significantly correlated with all medical and lifestyle factors (co-morbidity, smoking, consumption of alcohol, and use of routine medications). This indicates that they had a major impact on the perceived level of barriers among the adults in this study who were overweight or obese. A high degree of barriers to physical activity was not, however, independently predicted by lifestyle or medical factors. In this study, adults who were overweight or obese and had one or more co-morbid conditions were three-fifths less likely to report feeling that there are significant obstacles to physical activity and to be physically inactive.

The p-value (p = 0.432, OR 0.406; 95% CI 0.043-3.844) was not significant, though. In addition, in contrast to those who took medications, those who did not took medication were one-tenth as likely to believe that there were significant obstacles to physical activity. The p-value, however, was not statistically significant (p = 0.811 OR 0.902; 95% CI 0.385-2.111). This appears to be at odds with the results of other studies that have demonstrated a negative correlation between co-morbidity and physical activity. It is plausible to argue that the high barriers experienced by individuals who have co-morbid conditions may be related to their physical inactivity[65, 66].

This seemingly paradoxical finding could be explained by the fact that the two co-morbidities that study participants had the most frequently(diabetes and hypertension) are lifestyle-related conditions. In order to manage their conditions, people with diabetes and hypertension would probably be exposed to lifestyle counselling. Consequently, they may be less likely than those without co-morbidity to perceive a high degree of barriers.

In this research, those who consumed alcohol were one-fifth less inclined to believe that there are significant obstacles to physical activity. The p-value (p = 0.665, OR: 0.771; 95% CI: 0.264-2.251) was not significant, though. This could be the case because individuals who drink alcohol might not view physical activity as vital, just as they might not view the health risks associated with their unhealthy behaviours.

Conclusion and Recommendations

According to this study, the majority of overweight and obese adults (78.6%) felt that there were moderate to high barriers to physical activity, most of which had to do with physical exertion. Age, family type, highest degree of education, type of occupation, median earnings, co-morbidity, smoking, alcohol consumption, and perceived barriers all showed significant correlations. In lifestyle counselling, physical exertion which is the most common obstacle to physical activity among adults who are overweight or obese—should also be taken into account in order to get past this obstacle.

Given the global obesity epidemic and its substantial impact on the co-occurrence of infectious diseases and non-communicable diseases (NCDs) in the West African Sub-region, it is imperative that overweight and obese adults receive extra attention to encouraging physical activity and removing obstacles to it. This is because their levels of physical activity are extremely low, which contributes to the ongoing obesity pandemic. The following suggestions were put forth:

- Further evaluation of the perceived barriers to physical activity should be carried out in order to identify overweight and obese adults who encountered a high level of barriers to physical activity, as a high level of barriers to physical activity independently predicted lack of exercise in this study. This is so that they can receive specialised counselling that will enable them to get through their obstacles and raise their levels of physical activity.

- Physical exertion was the main barrier to physical activity that the overweight and obese adults in the present research perceived, suggesting that their lack of fitness was probably an obstacle to physical activity. Given this, health care providers should educate adults who are overweight or obese about this potential barrier and, at the onset of their exercise programmes, provide them with graded exercise along with static exercises to help them get past it.
- Healthcare providers need to encourage overweight and obese adults who encounter these barriers to use alternative forms of physical activity, such as household, transportation, and work-related activities, in order to improve their overall levels of active lifestyles. These barriers include time expenditure, accessibility of places for exercise, and distance to exercise locations. These barriers were important and felt by the adults in this study.

References

1. Nantel J, Mathieu ME, Prince F. Physical activity and obesity: Biomechanical and physiological key concepts. J Obes. 2011;1–11. Available at: doi: 10.1155/2011/650230.
2. World Health Organization. WHO | Physical activity. WHO. 2014 Available at:http://www.salute.gov.it/imgs/C_17_pubblicazioni_2177_ulterioriallegati_ulterioreallegato_0_alleg.pdf. Accessed 21 November 2017.
3. WHO. Global strategy on diet, physical activity and health. Physical inactivity: A global public health problem. Physical Activity and Health. 2017 Available at: http://www.who.int/dietphysicalactivity/factsheet_inactivity/en/. Accessed 21 November 2017
4. Al-Hazzaa HM, Abahussain NA, Al-Sobayel HI, Qahwaji DM, Musaiger AO. Lifestyle factors associated with overweight and obesity among Saudi adolescents. BMC Public Health. 2012;12(1):354.

5. Pedisic Z, Grunseit A, Ding, Chau JY, Banks E, Stamatakis E, et al. High sitting time or obesity: Which came first? Bidirectional association in a longitudinal study of 31,787 Australian adults. Obesity. 2014;22(10):2126–2130.
6. CDC. Overcoming barriers to physical activity .2011, Centers for Disease Control and Prevention. 2011. Available at: https://www.cdc.gov/physicalactivity/basics/adding-pa/barriers.html. Accessed 21 November 2017.
7. McIntosh T, Hunter DJ, Royce S. Barriers to physical activity in obese adults: A rapid evidence assessment. J Res Nurs. 2016;21(4):271–287.
8. Bauer C, Graf C, Platschek AM, Strüder HK, Ferrari N. Reasons, motivational factors, and perceived personal barriers to engagement in physical activity during pregnancy vary within the BMI classes: the prenatal prevention project Germany. Journal of Physical Activity and Health. 2018;15(3):204-211.
9. Nicholson S, Sniehotta FF, van Wijck F, Greig CA, Johnston M, McMurdo MET, et al. A systematic review of perceived barriers and motivators to physical activity after stroke. Int J Stroke. 2013;8(5):357–364.
10. Justine M, Azizan A, Hassan V, Salleh Z, Manaf H. Barriers to participation in physical activity and exercise among middle-aged and elderly individuals. Singapore Med J. 2013;54(10):581–586.
11. Stankov I, Olds T, Cargo M. Overweight and obese adolescents: what turns them off physical activity? Int J Behav Nutr Phys Act. 2012;9(1):53.
12. Idowu OA, Adeniyi AF, Ogwumike OO, Fawole HO, Akinrolie O. Perceived barriers to physical activity among Nigerian stroke survivors. Pan Afr Med J. 2015;21:1–8.
13. Aldukhayel A. The magnitude, determinants and barriers for physical activities among diabetic patients in Qassim area of Saudi Arabia. Int J Adv Med. 2018;5(3):482.
14. Herazo-Beltrán Y, Pinillos Y, Vidarte J, Crissien E, Suarez D, García R. Predictors of perceived barriers to physical activity in the general adult population: a cross-sectional study. Brazilian J Phys Ther. 2017;21(1):44–50.
15. World Health Organization. Obesity and Overweight. 2017. Available at: https//:www.who.int/en/news-room/fact-sheets/detail/obesity-and-overweight. Accessed 21 November 2017.
16. WHO Expert Consultation. Waist circumference and waist-hip ratio. WHO Expert.2011. Available at: http://apps.who.int/iris/bitstream/handle/10665/44583/9789241501491_eng.pdf. Accessed 7 July 2018.
17. Min T, Stephens JW. Targeting abdominal obesity in diabetes. Diabetes Manag. 2015;5(4):301–309.
18. Haththotuwa RN, Wijeyaratne CN, Senarath U, Mahmood T, Arulkumaran S. Worldwide epidemic of obesity. Obesity: A ticking time bomb for reproductive health. 2013:3-11. Available at: doi: 10.1016/B978-0-12-416045-3.00001-7.
19. Ellulu M, Abed Y, Rahmat A, Ranneh Y, Ali F. Epidemiology of obesity in developing countries: challenges and prevention. Glob Epidemic Obes. 2014;2(1):2.
20. Ford ND, Patel SA, Narayan KMV. Obesity in Low- and Middle-Income Countries: Burden, drivers, and emerging challenges. Annu Rev Public Health. 2017;38(1):145–164.
21. World Health Organization. Obesity and Overweight. 2017. Available at: https//:www.who.int/en/news-room/fact-sheets/detail/obesity-and-overweight. Accessed 21 November 2017.

22. González-Muniesa P, Mártinez-González MA, Hu FB, Després JP, Matsuzawa Y, Loos RJF, et al. Obesity. Nat Rev Dis Prim. 2017;3:17034. Available at: doi: 1038/nrdp.2017.34.
23. Olatunbosun ST, Kaufman JS, Bella AF. Central obesity in Africans: Anthropometric assessment of abdominal adiposity and its predictors in urban Nigerians. J Natl Med Assoc. 2018;110(5):519–527.
24. Kengne AP, Echouffo-Tcheugui JB, Sobngwi E, Mbanya JC. New insights on diabetes mellitus and obesity in Africa-Part 1: Prevalence, pathogenesis and comorbidities. Heart. 2013;99(14):979–983.
25. Scott A, Ejikeme CS, Clottey EN, Thomas JG. Obesity in Sub-Saharan Africa: Development of an ecological theoretical framework. Health Promot Int. 2013;28(1):4–16.
26. Commodore-Mensah Y, Samuel LJ, Dennison-Himmelfarb CR, Agyemang C. Hypertension and overweight/obesity in Ghanaians and Nigerians living in West Africa and industrialized countries: A systematic review. J Hypertens. 2014;32(3):464–472.
27. Steyn NP, Mchiza ZJ. Obesity and the nutrition transition in Sub-Saharan Africa. Ann N Y Acad Sci. 2014;1311(1):88–101.
28. Adeboye B, Bermano G, Rolland C. Obesity and its health impact in Africa: a systematic review. Cardiovasc J Afr. 2012;23(9):512–521.
29. 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 Targets Ther. 2013;6:43–47.
30. Igboanusi CJC, Joshua IA, Henry J, Nmadu AG, Onoja-Alexander MO. The prevalence of overweight and obesity and associated factors among Adults in Goni Gora Kaduna State, Northwestern Nigeria. Ann African Med Res. 2018;1(40):63–8.
31. Adaja T, Idemudia O. Prevalence of overweight and obesity among health-care workers in University of Benin Teaching Hospital, Benin City, Nigeria. Ann Trop Pathol. 2018;9(2):150.
32. Dankyau M, Shu'aibu J, Oyebanji A, Mamven O. Prevalence and correlates of obesity and overweight in healthcare workers at a tertiary hospital. J Med Trop. 2016;18(2):55.
33. Ko D, Po D. Socio- demographic factors associated with overweight / obesity in a primary care clinic of a tertiary hospital in Nigeria. J Fam Med community Heal. 2017;4 (3):1113.
34. Umuerri E, Ayandele C, Eze G. Prevalence and sociodemographic correlates of obesity and overweight in a rural and urban community of Delta State, Nigeria. Sahel Med J. 2017;20(4):173-178.
35. Amole IO, Adeniran A., Awotunde OT., Durodola OA., Oyelade BO. The prevalence of adult obesity in Ogbomoso, SouthWest Nigeria. Res J Heal Sci. 2014;2(3):140–149.
36. Obiora Nwachukwu N, Ulasi AE, Okoronkwo UC, Okereke HC. Prevalence of overweight and obesity in Enugu metropolis, Nigeria. Sci Arena Publ Spec J Med Res Heal Sci. 2018;3(3):1–6.
37. Strath SJ, Kaminsky LA, Ainsworth BE, Ekelund U, Freedson PS, Gary RA, et al. Guide to the assessment of physical activity: Clinical and research applications: A scientific statement from the American Heart Association. Circulation. 2013;128(20):2259–2279.

38. WHO. Global Action Plan on Physical Activity 2018-2030. 2018. Available at: https://www.who.int/ncds/prevention/physical-activity/global-action-plan-2018-2030/ en/. Accessed 3 March 2020.
39. Schmid D, Leitzmann MF. Physical Activity Epidemiology. In: Ahrens W, Pigeot I, editors. Handbook of Epidemiology: Second Edition. 2nd ed. Regensburg: Springer New York; 2014. p. 1927–2002.
40. Janssen I. Physical Activity Epidemiology . Acevedo EO. The Oxford Handbook of Exercise Psychology. Oxford University Press; 2012. p. 1–49. Available at: doi:10.1093/oxfordhb/9780195394313.013.0002.
41. Oyeyemi AL, Oyeyemi AY, Jidda ZA, Babagana F. Prevalence of physical activity among adults in a metropolitan Nigerian city: A cross-sectional study. J Epidemiol. 2013;23(3):169–177.
42. Aliyu SU, Samaila Chiroma A, Jajere AM, Kachalla Gujba F. Prevalence of physical inactivity, hypertension, obesity and tobacco smoking: A Case of NCDs prevention among adults in Maiduguri, Nigeria. Am J Med Sci Med. 2015;3(4):39–47.
43. Adegoke BOA, Oyeyemi AL. Physical inactivity in Nigerian young adults: Prevalence and socio-demographic Correlates. J Phys Act Heal. 2016;8(8):1135–1142.
44. Akarolo-Anthony SN, Adebamowo CA. Prevalence and correlates of leisure-time physical activity among Nigerians. BMC Public Health. 2014;14(1):1–8.
45. Bauman AE, Reis RS, Sallis JF, Wells JC, Loos RJF, Martin BW, et al. Correlates of physical activity: Why are some people physically active and others not? Lancet. 2012;380(9838):258–271.
46. Samir N, Mahmud S, Khuwaja AK. Prevalence of physical inactivity and barriers to physical activity among obese attendants at a community health-care center in Karachi, Pakistan. BMC Res Notes. 2011;4(174):1–7.
47. Cheah YK, Azahadi M, Phang SN, Abd Manaf NH. Vigorous and moderate physical activity among overweight and obese adults in Malaysia: Sociodemographic correlates. Obes Med. 2019;15:1–9. Available from: https://doi.org/10.1016/j.obmed.2019.100114.
48. Jakicic JM, Davis KK. Obesity and physical activity. Psychiatr Clin North Am. 2011;34(4):829–840.
49. Ibrahim S, Karim NA, Oon NL, Ngah WZW. Perceived physical activity barriers related to body weight status and sociodemographic factors among Malaysian men in Klang Valley. BMC Public Health. 2013;13(1):1–10.
50. Rech C, Camargo E, Almeida M, Bronoski R, Okuno N, Reis R. Barriers for physical activity in overweight adults. Rev Bras Atividade Física Saúde. 2016;21(3):272–279.
51. Awotibe TO, Bisiriyu LA, Ativie RN, Oke KI, Adedoyin RA, Nabakwe EC, et al. Prevalence of physical inactivity among Nigerian women: do socio-demographic characteristics, women's personal attributes and psychosocial factors play any role? J Exerc Ther Rehabil. 2017;4(1):33–45.
52. Samir N, Mahmud S, Khuwaja AK. Prevalence of physical inactivity and barriers to physical activity among obese attendants at a community health-care center in Karachi, Pakistan. BMC Res Notes. 2011;4(174):1–7.
53. Stutts WC. Physical activity determinants in adults. AAOHN J. 2018;50(11):499–507.
54. Awotidebe TO, Adeyeye VO, Ativie RN, Adedoyin RA, Borode AO, Balogun MO, et al. Functional capacity and psychosocial correlates of exercise in Nigerian

patients with hypertension. Int J Clin Med. 2016;07(07):464–473.
55. Thomson RL, Buckley JD, Brinkworth GD. Perceived exercise barriers are reduced and benefits are improved with lifestyle modification in overweight and obese women with polycystic ovary syndrome: A randomised controlled trial. BMC Womens Health. 2016;16(1):1–9.
56. Gundemir E, Guler G. Perceived benefits and barriers of nurses to exercise. Stud Ethno-Medicine. 2017;11(1):98–105.
57. Keohane DM, McGillivary NA, Daly B. Physical activity levels and perceived barriers to exercise participation in Irish General Practitioners and General Practice trainees. Ir Med J. 2018;111(2):690.
58. Gontarev S, Kalac R, Aleksovska L. Perceived exercise benefits and barriers of non-exercising in adolescent female in the Macedonia. Res Phys Educ Sport Heal. 2016;5(2):11–18.
59. 134. Morowatisharifabad MA, Abdolkarimi M, Asadpour M, Fathollahi MS, Balaee P. Study on social support for exercise and its impact on the level of physical activity of patients with type 2 diabetes. Open Access Maced J Med Sci. 2019;7(1):143–147.
60. Awotibe TO, Bisiriyu LA, Ativie RN, Oke KI, Adedoyin RA, Nabakwe EC, et al. Prevalence of physical inactivity among Nigerian women: do socio-demographic characteristics, women's personal attributes and psychosocial factors play any role? J Exerc Ther Rehabil. 2017;4(1):33–45.
61. Awotidebe TO, Adeboyin RA, Adegbesan OA, Babaola JF, Olukuju IO, Mbada, Chidozie E, et al. Psychosocial correlates of physical activity participation among Nigerian university students. Int J Sport Sci. 2014;4(6):205–211.
62. Fernando Arango E, Alonso Patiño F, Andrés Quintero M, María Arenas M. Levels of physical activity, barriers, and stage of change in an urban population from a municipality in Colombia. Colomb Med. 2011;42(3):352–361.
63. Borodulin K, Sipilä N, Rahkonen O, Leino-Arjas P, Kestilä L, Jousilahti P, et al. Socio-demographic and behavioral variation in barriers to leisure-time physical activity. Scand J Public Health. 2016;44(1):62–69.
64. Al-Baho AK, Al-Naar A, Al-Shuaib H, Panicker JK, Gaber S. Levels of physical activity among Kuwaiti adults and perceived barriers. Open Public Health J. 2016;9(1):77–87.
65. McKevitt S, Healey E, Jinks C, Rathod-Mistry T, Quicke J. The association between comorbidity and physical activity levels in people with osteoarthritis: Secondary analysis from two randomised controlled trials. Osteoarthr Cartil Open. 2020;1–7. Available at: doi: 10.1016/j.ocarto.2020.100057.
66. Durstine JL, Gordon B, Wang Z, Luo X. Chronic disease and the link to physical activity. J Sport Heal Sci. 2013;2(1):3–11.
67.

Appendix

Appendix 1

RESPONDENTS' INFORMED CONSENT FORM

Title of Research: Physical activity levels and perceived barriers among overweight and obese adults attending General Outpatient Clinic, Lagos University Teaching Hospital.

HREC assigned number: ADM/DCST/HREC/APP/2609

HREC duration of study: 15-11-2018 to 15-11-2019.

Name and affiliation of the Researcher: I am Dr. Adeyemi Samuel Sogo, a Senior Registrar in The Department of Family Medicine, Lagos University Teaching Hospital, Idi -Araba, Lagos. I will be carrying out a research on Physical activity levels and perceived barriers among overweight and obese adults attending General Outpatient Clinic, Lagos University Teaching Hospital.

Purpose of the study: The purpose of this study is to determine physical activity levels and perceived barriers among overweight and obese adults.

Procedure of the Research: If you consent to participating in this study, a questionnaire that requires you to give information about your personal and medical history would be administered to you. Your weight, height, blood pressure, waist circumference and hip circumference will be measured.

Duration: With your consent, you shall be engaged for about 10 to 15 minutes in one of the consulting rooms of the GOPC, LUTH.

Potential Benefits: This study will be beneficial to you directly by detecting or screening you for overweight, general and abdominal obesity. It will also determine your physical activity levels and barriers preventing you from attaining recommended levels of physical activity. You will subsequently be counselled appropriately. Findings from this study would also be useful to researchers working in this subject area and to the general populace.

Potential Risks: This study shall pose no risk to your health, however participating in this study might take some of your time and you might feel uncomfortable responding to some of the questions. I do not wish to make you uncomfortable with any of the questions. However, you are free not to answer any question, if you feel the question(s) are too personal or makes you uncomfortable.

Confidentiality: The information collected from you for this study will be kept private. Any information about you will have a number on it instead of your name and shall be used for research purposes only. Your identity will never be disclosed.

Right to refuse and/or withdraw: You do not have to take part in this research if you do not wish to do so, and choosing to participate will not affect you in any way. You may stop participating in the study at any time. You will be given opportunity at the end of the study to review your remarks, and you can ask to modify or remove portions, if you so wish.

Participant's responsibilities: You are implored to complete the questionnaire, answering every question with all honesty

Sharing the results: The knowledge that we get from this study shall be shared with you before it is made widely available to the public. You will receive a summary of the results, after which the results shall be published so that other interested people may learn from the study.

Appendix 2

SOCIO DEMOGRAPHIC CHARACTERISTICS

1. Age (last birthday)……..years
2. Sex: Male □ Female □
3. Marital Status: Single □ Married cohabiting □ Separated □ Divorced □ widowed □
4. Type of family: Monogamous □ Polygamous □
5. Religion: Islam □ Christianity □ Traditional □ Others, Specify……
6. Highest level of Education: No formal education □ Primary □ Secondary □ Tertiary □ Postgraduate Degree □
7. Current employment status: Un-employed □ Employed □ Retired □
8. Occupation: Professional □ Skilled work □ Unskilled work □
9. Ethnic groups: Yoruba □ Igbo □ Hausa □ others specify…….
10. Average monthly income of family (in Naira) ……
11. Number of children ……

MEDICAL, SOCIAL AND LIFESTYLE HISTORY

12. Do you have any of the following condition(s)? If yes, tick the corresponding box (es), otherwise leave blank.
    Hypertension □ Diabetes □ Asthma □ Migraine □ Depression □ Arthritis □ Back pain □
13. Do you currently smoke? YES □ NO □ If NO please go to question 16
14. How many sticks do you smoke per day? :……..
15. For how many years have you been smoking? Pack year = (number of sticks per day/20× years of smoking) ……
16. Have you ever smoked in the past? YES □ NO □ If NO please go to question 19
17. If yes, for how long did you smoke? ……
18. How long ago did you stop smoking…….
19. How will you describe your alcohol intake? Never drink alcohol □ previously drank alcohol > 6months ago □ currently drinking alcohol □
20. If you currently drink alcohol, which type and what quantity do you drink per day? ----------
21. Are you on any routine medications? YES □ NO □
22. If yes, list: ……..,
    …….. ……..,
    ……

EXERCISE BENEFIT AND BARRIER SCALE (BARRIER PORTION)

DIRECTIONS: Below are statements that relate to ideas about exercise. Please indicate the degree to which you agree or disagree with the statements by circling **SA for strongly agree, A for agree, D for disagree, or SD for strongly disagree.**

23. Exercising takes too much of my time. SA A D SD
24. Exercise tires me. (I am weary of exercise) SA A D SD
25. Places for me to exercise are too far away. SA A D SD
26. I am too embarrassed to exercise. SA A D SD
27. It costs too much to exercise. SA A D SD
28. Exercise facilities do not have convenient schedules for me. SA A D SD
29. I am fatigued when involved in exercise. SA A D SD
30. My spouse or significant other does not encourage exercising SA A D SD
31. Exercise takes too much time from family relationships. SA A D SD

32. I think people in exercise clothes look funny. SA A D SD
33. My other family members do not encourage me to exercise. SA A D SD
34. Exercise takes too much time from my family responsibilities. SA A D SD
35. Exercise is hard work for me. SA A D SD
36. There are too few places for me to exercise. SA A D SD
37. I do not involve myself in exercise because of security concerns SA A D SD
38. Previous injuries/health problems discouraged me from exercise SA A D SD