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# Exercise, a Veritable Tool for Prevention and Control of Obesity and Overweight

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**ABSTRACT**

Exercise is a physical or mental exertion to increase skill or strength. It is also defined as activity requiring physical effort carried out especially to sustain or improve health and fitness. Overweight however, refers to an excess amount of bodyweight that may come from muscles, bone, fats, and water, obesity refers to the excess amount of body fat. Keeping active can help people stay at a healthy weight or lose weight. It can also lower the risk of heart disease, diabetes, stroke, high blood pressure, osteoporosis and certain cancers as well as reduce stress and boost healthy mood. Experts measure the intensity of physical activity in metabolic equivalents or METs for short. One (1) MET is defined as the calories burned while an individual sits quietly for one (1) minute for average adult, that is about one (1) calorie per every 2.2 pounds of body weight per an hour. Worldwide, people are less active today than they were decades ago. While studies have shown that sports and leisure activity levels have remained stable or increased slightly. Physical activity seems to work best when combined with a lower calorie eating plan in controlling overweight and obesity. Treatment for obesity and overweight may include a mix of behavioural treatment which include; diet, exercise and sometimes weight loss drugs. In some cases like extreme obesity, weight loss by surgery may be an option. In making recommendations, it is important to bear in mind that staying active is not purely an individual choice. Therefore, the following recommendations were proffered; provisions of parks, playing grounds, within neighbourhood; and provision of side- walks, bike paths in Nigerian roads to serve as source of motivation to those that desire to exercise and lose weight.

**Keywords:** Obesity, Overweight, Exercise, Body Mass Index (BMI).

## INTRODUCTION

Though people often use "physical activity" and "exercise" interchangeably, the terms have different meanings or definitions. Physical activity refers to any body movement that burns calories, whether it is for work or play, daily chores, or daily commute (Caspersen *et al*, 1995).

Exercise is a physical or mental exertion to increase skill or strength. It is also defined as activity requiring physical effort carried out especially to sustain or improve health and fitness. When we talk of exercise, we nearly always refer to physical activity. Exercise is the physical exertion of the body. In other words, exercise makes the body to do a physical activity which results in a healthy or healthier level of both physical and mental health. Exercise is aimed at maintaining or enhancing our physical fitness and general health (www.wikipedia.com).

Overweight however, refers to an excess amount of bodyweight that may come from muscles, bone, fats, and water, obesity refers to the excess amount of body fat (NIH, 1998). The body mass index (BMI) is the tool most commonly used to estimate overweight and obesity in both adults and children. For adults, overweight and obesity ranges are measured by using weight and height to complete the persons BMI. The BMI is used because, for most people, it correlates with the amount of fat in their bodies. But for children, they grow at different rates at different times, so it is not always easy to tell if a child is overweight. Therefore, BMI charts for children compare their height and weight to other children of their same sex and age.

According to World Health Organisation WHO (2012), obesity and overweight result from energy imbalance: too many calories in, and too few calories burned. A number of factors influence how many calories (or how much energy) people burn each day. Among these factors include but not limited to the following; Age, body size, amount of activities and genetic factors. However, the most variable factor and the most easily modified is the amount of activity people get every day (WHO, 2012).

Keeping active can help people stay at a healthy weight or lose weight. It can also lower the risk of heart disease, diabetes, stroke, high blood pressure, osteoporosis and certain cancers as well as reduce stress and boost healthy mood. However, inactive or sedentary lifestyle just do the opposite of the above mentioned health benefits (WHO, 2004).

Despite all the health benefits of physical activity, people worldwide are doing less of activities at work, at home and even as they travel from place to place. Globally, about one (1) in every three (3) gets little or no activity (NIH, 1998). Physical activities are declining not only in wealthy countries such as United States (US), but also in low and middle income countries such as China and Nigeria. It is therefore

clear that these declines in physical activities are key contributors to the global obesity epidemic and in turn contribute to the rising rates of chronic diseases everywhere in the world.

The World Health Organisation (WHO), US Department of Health and Services (USDHS) and other authorities recommend that for good health, adults should get the equivalent of two and a half hours of moderate exercise each week. Children should get even more at least one hour a day (Flegal *et al,* 2012). How much activity people need each day to maintain a healthy weight or to help with weight loss and the most recent studies suggest that a total of two and a half hours ($2\frac{1}{2}$) in a week is simply enough (Haskel *et al,* 2007).

It should be worthy of note here that being moderately active for at least thirty (30) minutes a day on most days of the week can help lower the risk of chronic disease. But to stay at a healthy weight or to lose weight, most people will need more physical activities at least an hour a day to counteract the effects of increasing sedentary lifestyles as well as the strong societal influences that encourages obesity and overweight.

The professional objective of this paper is however, to create awareness among the general public especially those that shall have the privilege of coming across this write-up *"on the importance of physical activities as a veritable tool in preventing, controlling and management of obesity and overweight"* which has been identified by researchers as one of the predisposing risk factors for other diseases such as diabetes, stroke, hypertension, osteoporosis, and other non communicable diseases.

## METHODOLOGY

In this paper, secondary sources of data collection like books, journals, government publications and other documents relating to public health and nutrition were utilized. However, like all material sources, the element of subjectivity cannot be absolutely erased but efforts were made to be as objective as possible in the use and application of these documents.

## RESULTS AND DISCUSSION

### Why People Do Exercise and Why They Don't

People exercise for many reasons. Some of them include but are limited to the following;

- Strengthening the muscles
- Optimizing the cardiovascular system

- Practicing specific athletic skills
- Controlling body weight
- For the fun of it
- To win a sports competition
- To socialize.

A study found that stress levels and cultural considerations affect people's attitude to exercise or exercise motivation. According to research presented by Lusk *et al,* (2010), at the College of Sports Medicine's 56th Annual Meeting in Seattle, he asserted that college aged woman who do not exercise regularly are even less likely to be physically active when under stress. But those with consistence exercise levels accumulate more physical activity when experiencing similar emotions. They also purported that "someone who is not regularly active may see new exercise as more burden especially when stressed. Whereas, those who make it part of their daily lives may view it as stress reliever and an escape from pressure".

Lee *et al,* (2010) in his own study examined exercise differences between more than 400 students (American and Chinese origin); he found that Americans typically exercise for weight control and physical appearance, while the Chinese exercise for health and enjoyment reasons.

**Benefits of Exercise**

Regular exercise or physical activity helps many of the body's function better, keeps heart disease, diabetes and the hosts of other diseases at bay, and is a key ingredient for losing weight. According to the 2008 Physical Activity Guidelines for Americans;

1. Regular exercise improves your chances of living longer and healthier.
2. It helps protect you from developing heart disease and stroke or its precursors, high blood pressure and undesirable blood pressure and undesirable blood lipid patterns.
3. Exercise helps in protecting you from developing certain cancers including colon and breast cancer and possibly lung and endometrial (uterine lining) cancer.
4. Helps prevent type 2 diabetes and metabolic syndrome.
5. Helps prevent the insidious loss of bone known as osteoporosis.
6. Reduces the risk of falling and improves cognitive function among older adults.
7. Relieves symptoms of depression and anxiety and improves mood.
8. Prevents weight gain, promotes weight loss (when combined with low calorie

diets) and helps keep weight off after weight loss.
9. Improves heart lining and muscle fitness.
10. Finally, it improves sleep in insomnia patients, especially the aged.

Exercise is a subcategory of physical activity. It is planned, structured, and may be repetitive activities aimed at improving physical fitness and health of people. Researchers sometimes use "leisure- time physical activity" or "recreational physical activity" as synonyms for exercise (Caspersen *et al,* 1995).

**Measurement of Intensity of Physical Activity**

Experts measure the intensity of physical activity in metabolic equivalents or METs for short. One (1) MET is defined as the calories burned while an individual sits quietly for one (1) minute for average adult, that is about one (1) calorie per every 2.2 pounds of body weight per an hour. For example, a man that weighs 160 pound would burn approximately 160 pounds divide by 2.2 multiply by 1 hour, which equals 73 calories per an hour while sitting or sleeping. Moderate intensity physical activity is defined as activities that are strenuous enough to burn three (3) to six (6) METs. Vigorous intensity activities burn more than 6 METs.

It is challenging however for researchers to accurately measure people's usual physical activities, since most studies rely on participants' report of their own activity in a survey or daily log. This method is not entirely reliable. Studies that measure physical activity more objectively using special motion sensors called accelerometers suggest that people tend to overestimate their own level of activity (Troniano *et al,* 2008).

**Trends in Physical Activities**

Worldwide, people are less active today than they were decades ago. While studies have shown that sports and leisure activity levels have remained stable or increased slightly (Juneau *et al*, 2010). These leisure activities represent only a small part of daily physical activity. Physical activity associated with work, home and transportation has declined due to economic growth, technological advancements and social changes (Ng *et al,* 2009). Some examples from different countries:

**United States**

In 1950, 30% of Americans worked in high activity occupations. By 2000, the proportion dropped to 22%.

Conversely, the percentage of people working in low activity occupations rose from about 23% to 41% (8). Driving cars to working places increased from 67% in 1960 to 88% in 2000, while walking and taking public transit to work dropped in the same year under review. Also about 40% of US school walked or rode their bikes to school in 1969; by 2001 only 13% did so (McDonald, 2007).

**United Kingdom (UK)**

Over the past few decades, it is becoming more common for UK households to own second cars and labor-saving appliances. Work outside the home has also become less active. In 2004, about 39% of men worked in active jobs, down from 43%, down from 43% in 1991 to 1992 (Stamatakis *et al,* 2007).

**China**

Between 1991 and 2006, work-related physical activity in China dropped by about 35% in men and by 46% in women. Women also cut back on physical activities around the house- washing clothes, cooking and house cleaning dropped by 66%. Transportation related physical activity has also dropped. No surprise, perhaps, given that car ownership is on the rise. Sales of new cars in China have gone up by about 30% per year in recent years (Kjellstrom *et al,* 2007). The flip side of this decrease in physical activity is an increase in sedentary activities like watching television, playing video games and using the computer. Add it up, it is clear that globally, the "energy utilized" side of the energy balance equation is tilting to the "weight gain side" (Ng, *et al* 2009).

**Causes of Overweight and Obesity**

Overweight and obesity result from an energy imbalance. The body needs a certain amount of energy (calories) from the foods we eat to keep up the basic life functions or biological activities. The body weight tends to remain the same when the number of calories eaten or derived from the food equals the amount of calories the body uses or burns. Over time, when people eat and drink more calories than they utilize or burn, the energy balance tilts towards overweight, and it continues, it results eventually to obesity.

Children need to balance their energy too, but they are also growing and that should be considered as well. Energy balance in children happens when the amount of energy taken in form of food, drink and the energy that is used by the body to support natural growth without promoting excess weight gain.

According to NIH (1998) many factors can lead to energy imbalance and weight gain. They include;

- The eating habit of an individual
- The environment where people live
- The attitude and emotions of people
- Availability of recreation facility
- Life habit and finally
- Income status.

Sallis (2009), however, posited that staying active is not purely an individual choice. The so called "built environment" buildings, neighborhoods, transportation systems and other human made elements of the landscape influences how active people are. People are more prone to be active for example if they live near parks or play grounds in neighborhoods with side-walks or bike paths, or close enough to work, schools, shopping to safety, travel by bike or on foot. People are less likely to be active if they live in a sprawling suburbs designed for driving or in neighborhoods without recreation opportunities.

**BMI an Indicator of Obesity and Overweight Classification**

BMI is a simple index of weight for height that is commonly used to classify underweight, overweight and obesity in adults. It is defined as the weight in kg divided by height in Meters ($kg/m^2$). Example a man was weighing 70kg and had a height of 1.7m. His BMI is calculated thus:

$BMI = Weight\ (kg) \div height\ (m)^2$
$BMI = (70 \div 1.7^2)\ kg/m^2$
$BMI = (70 \div 2.89)\ kg/m^2$
$BMI = 24.22 kg/m^2$

This man in question is considered normal based on the classification below (Table 1).

**Table 1: Showing the Classifications of BMI**

| Classifications | Principal Cut-Off Points ($kg/M^{2)}$) | Additional Cut-Off Points ($kg/M^2$) |
|---|---|---|
| Underweight | <18.50 | <18.50 |
| Severe underweight | <16.00 | <16.00 |
| Moderate underweight | 16.00-16.99 | 16.00-16.99 |
| Mild underweight | 17.00-18.49 | 17.00-18.49 |
| Normal range | 18.50-24.99 | 18-50-22.99 |
| | | 23.00-24.99 |
| Overweight | ≥25.00 | ≥25.00 |
| Pre-obesity | 25.00-29.99 | 25.00-27.49 |
| | | 27.50-29.99 |
| Obese | ≥30.00 | ≥30.00 |
| Obese class 1 | 30.00-34.99 | 30.00-32.49 |
| | | 32.50-34.99 |
| Obese class 2 | 35.00-39.99 | 35.00-37.49 |
| | | 37.50-39.99 |
| Obese class 3 | ≥40.00 | ≥40.00 |

**Source:** Adapted from WHO 1995, WHO 2000, WHO 2004.

BMI values are age independent and the same for both sexes. BMI may not correspond to the same degree of fatness in different populations due, in part to different body proportions. The health risks associated with increased BMI are continuous and the interpretation of BMI grading in relation to risk may differ for different populations. However, WHO BMI cut off point (table 1) above should be retained as the international classification (WHO Expert, 2004)

## Concept of Energy Balance in Nutrition

The concept of energy balance depends on energy input and energy output. This in turn influences the energy store (energy in the adipose tissue). The energy consumed minus the energy expended gives you the energy balance. There are three types of energy balance;

- Positive Energy Balance
- Negative Energy Balance
- Equilibrium

Positive energy balance is the state in which energy intake is greater than the energy expended generally, resulting in weight gain. You are in positive energy balance when the energy consumed is greater than the energy expended. The result of positive energy balance is the storage of excess energy. For example during pregnancy, there is excess energy stored during pregnancy especially when the pregnant woman was adequately fed.
Negative energy balance is the state in which energy intake is less than the energy expended resulting in weight loss. Negative energy balance results from an energy deficit. In other words, the energy intake is or was less than the energy that was

expended. Example is during starvation or emaciation.

Finally, energy balance is in equilibrium when the energy intake and the energy expended are equal or in equilibrium. Energy balance therefore, is the state in which energy intake in form of food and/other drinks matches the energy expended through basal metabolism and physical activities.

$$Change\ Es = \pm (E_1 - E_0)$$

Where;

S = The store mainly in the adipose tissue

I = The food intake

O = Output of which the main variable is the amount of physical activity (NIH, 1998).

**Table 2: Showing Types of Energy (Equilibrium, Positive and Negative) Balance**

| Energy Intake (Calories) | Energy Expended (Calories) | Type of Balance |
|---|---|---|
| 3570 calories | 35570 calories | Equilibrium |
| 5000 calories | 3000 calories | Positive E energy Balance |
| 3000 calories | 5000 calories | Negative Energy Balance |

**Source:** Nwezeh, G.O. 2010

**How Much Activity Do People Need To Prevent Weight Gain**

Weight gain during adulthood can increase the risk of heart disease, diabetes and other chronic conditions. Since it is so hard for people to lose weight and keep and keep it off, it is better to prevent weight gain in the first place.

Encouragingly, there is strong evidence that staying active can help people slow down or stave of ageing in middle age (Warenham *et al,* 2007). The more active people are, the more likely they are to keep their weight steady. The more sedentary the more likely they are to gain weight over time (Mekary *et al,* 2009).

However, it is still a matter of debate exactly how much activity people need to avoid gaining weight. The latest evidence suggests that the recommended two and a half hours a week may not be enough. The women's health study, for example, followed 34,000 middle aged women for 13 years to see how much physical activity they needed to stay within five (5) pounds of their weight at the start of the study. The researchers found that women in the normal weight range at the start needed the equivalent of an hour per day of moderate to

vigorous physical activity to maintain a steady weight (Lee *et al,* 2010).

Vigorous activity seems to be more effective for weight for weight control than slow ones like slow walking (Mekary *et al,* 2009). The Nurses' health study 2 for example, followed 18,000 women for 16 years to study the relationship between changes in physical and weight gain or loss. Although, women gained weight, on average about 20 pounds over the course of the study, those who increased their physical activity by 30 minutes per day gained less weight than those whose activity level stayed steady. And the type of activity made the difference; bicycling and brisk walking helped the women avoid weight gain but slow walking did not.

**How Much Activity Do People Need To Lose Weight**

Exercise can help promote weight loss. But it seems to work best when combined with a lower calorie eating plan. If people do not curb their calories, however, they likely need to exercise for long periods of time with high intensity in order to lose weight (WHO, 20011). In a study for example, researchers randomly assigned 175 overweight, inactive adults to either a control group that did not receive any exercise instructions or to one of the three exercise regimens –low intensity (equivalent to walking 12 miles per week), medium intensity (equivalent to jogging 12 miles per week), or high intensity (equivalent to jogging 20 miles per week).

All study volunteers were asked to stick to their usual diets. After six months, those assigned to low and medium intensity exercise regimen lost abdominal fat, whereas, those assigned to low and medium intensity exercise regimens had no change in abdomen fat (Stentz *et al,* 2005).

More recently researchers conducted a similar trial with 320 post menopausal women, randomly assigning them to either 45 minutes of moderate to vigorous aerobic activity, five days per week, or to a control group. Most of the women were overweight or obese at the start of the study. After one year, the exercisers had significant decreases in body weight, body fat, and abdominal fat, compared to the non exercisers (Freiedenreich *et al,* 2007).

**How Does Activity Prevent Obesity**

Researchers believe that physical activity prevent obesity in multiple ways (Hu, 2008). Physical activity increases peoples total energy expenditure, which can help them say in energy balance or even lose weight as long as they don't eat more to compensate for the extra calories they burn. Physical activity decreases fat around the waist and

total body fat, slowing the development of abdominal obesity.

Weight-lifting, push-ups and other muscle strengthening activities build muscle mass, increasing the energy that the body burns throughout the day; even when it is at rest and making it easier to control weight. Physical activities reduce depression and anxiety but boost mood which motivates people to stick with their exercise regimen over a long period of time (US DHHS, 2008).

**CONCLUSION AND RECOMMENDATION**

It has been established fact that overweight and obesity are risk factors for type 2 diabetes, heart diseases, high blood pressure, and other health problems. Since, there is no single cause of overweight and obesity, there is also no single approach as well that can help treat overweight and obesity.

However, according to NIH (1998), treatment may include a mix of behavioural treatment which include; diet, exercise and sometimes weight loss drugs. In some cases like extreme obesity, weight loss by surgery may be an option.

In conclusion, the bottom-line for weight control is aimed at an hour of activity per day. Being moderately active for at least 30 minutes a day on most days of the week can help lower the risk of chronic disease. But to stay at a healthy weight or to lose weight, most people will need more physical activity at least an hour a day to counteract the effects of increasingly sedentary lifestyles as well as the strong societal social influences that encourage overeating.

In making recommendations, it is important to bear in mind that staying active is not purely an individual choice. Therefore, the following recommendations are proffered;

- There should be provisions of parks, playing grounds within neighborhood to serve as a source of motivation to those that desire to exercise and lose weight.
- Government (federal, states, and local governments) should take into consideration, the creation of side-walks, bike-paths during the construction of roads in the country.
- Government should also provide a transportation system that should not encourage sedentary lifestyle among the citizenry.
- Finally it will be a good policy from the authority of education ministries to inculcate recreational programs in their curriculum

to encourage change of sedentary lifestyles among the workers.

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