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**ARISE AND WALK- A Theology
of Exercise for Healthy Living**

By

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Professor of Cardiopulmonary Physiotherapy



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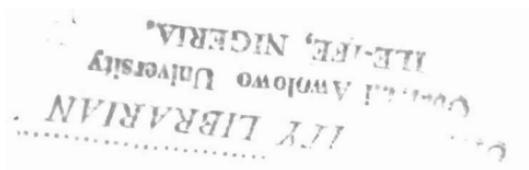
ARISE AND WALK- A Theology of Exercise for Healthy Living

**An Inaugural Lecture Delivered at Oduduwa Hall,
Obafemi Awolowo University, Ile-Ife, Nigeria,
On Tuesday, 9th May 2017.**

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INTRODUCTION

Mr Vice-Chancellor, Sir, I am privileged to stand before this wonderful audience to present today's inaugural lecture which is the 3rd from the Department of Medical Rehabilitation after that of Late Emeritus Professor V.C.B. Nwuga and Professor M.O.B. Olaogun. However, this is the first inaugural lecture from an alumnus of the Department of Medical Rehabilitation, Obafemi Awolowo University. My interest in the academics and love for the Obafemi Awolowo University could be traced to my early days in the primary school at All Saints School Abiri, a village of a few kilometers from Ile-Ife. I came first in the very first examination that I wrote in life during my primary school education. This success attracted several gifts from the school management and my grandma then killed a big fowl to celebrate the success of her grandson with the fellow villagers. The memory of the occasion is still fresh in my mind and has been helping me to always be the best.

During my secondary days, my friends and I decided to hunt for bats inside the Obafemi Awolowo University Campus after a long break. We were armed with catapults and stones for our expedition. We were deeply engrossed in the hunting of bats at the Faculty of Agric Biological Garden, when some security officers suddenly appeared from nowhere and gave us a hot chase. The pace at which the security men were running could not match our youthful sprint as we disappeared into the bush in the speed of light. Even Hussain Bolt could not have been able to run past us. Suddenly we hit the staff quarters somewhere on Road 10.

The atmosphere and serenity of the environment were quite different from that of the town from where we came. It was our first time in such an environment that could be described as a mini London. After securing a good position in the jungle, I started appraising the beauty of the staff quarters. Right there a seed was sown into my spirit, that I would not only study but would also be a staff of the institution one day. Mr Vice Chancellor sir, I'm sincerely grateful to the Almighty God who has given me the grace

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and favour to realise my ambition and to stand before this distinguished audience today as a Professor in one of the best Universities in Africa and the world at large.

My coming into Physiotherapy profession is a divine call from God as Physiotherapy was not a popular course some decades ago. As a believer that believes in divine direction, I committed my career into the hands of God and indeed I'm blessed and fulfilled to have chosen a right course. It couldn't have been so better!

Disease of Lifestyle

It is a known fact that chronic diseases (CDs) are the leading cause of mortality worldwide. While efforts are directed to reduce the prevalence of chronic diseases in advanced nations, prevention of CDs and other chronic non-communicable diseases (NCDs) are rarely on the public health agenda in Africa. Priority has been on infectious diseases. The World Health Organization's African Regional Office documented that chronic non-communicable diseases are on the increase and already represent a significant burden on public health services.

The epidemiologic transition to chronic disease is said to be happening at a much faster rate in sub-Saharan Africa than ever witnessed in other regions of the world. Nigeria, being the Africa's most populous country with over 170 million people, probably has the highest prevalence of chronic diseases in Africa. Inactivity or a sedentary lifestyle, poorly functioning digestive system, poor dietary habits, tobacco consumption amongst other things, are the common risk factors for cardiovascular diseases and other chronic disease **Figure 1**.

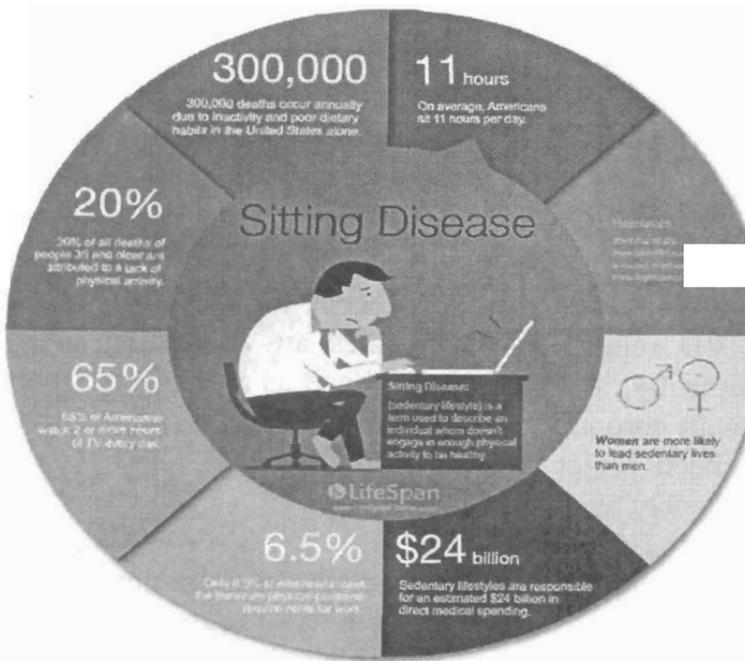


Figure 1: Sedentary Lifestyle Statistics Infographic

Source: <https://www.lifespanfitness.com/workplace/resources/articles/sitting-all-day-is-taking-a-toll-on-your-body>

<https://www.lifespanfitness.com/workplace/resources/articles/sitting-all-day-is-taking-a-toll-on-your-body> (April 19, 2017)

Non-communicable diseases especially cardiovascular disease was reported to be an emerging health issue in Sub-Saharan Africa (SSA) region some decades ago. The condition was not considered as a major public health issue in SSA at this period. In fact, the world congress that was saddled with the prevention and control of CVD in SSA demanded for explanation and justification for the action on CVD prevention. Concern was placed on the major infectious diseases such as HIV/AIDS and other diseases including maternal mortality and nutritional deficiencies. This might be partly due to the fact that cardiovascular disease was not listed among the top 7 leading factors which accounted for more than 45 percent of the total disability adjusted life years in SSA region. Unwin et al (2001) later reported that many urban centres in SSA are witnessing adverse pattern in risk factor profile and that significant population has made the epidemiological transition to non-communicable disease. Recent evidence is now suggesting that CVD related mortality rates are increasing in the region. Consequently, it is being recognized as an important public health issue with coronary artery disease shown to rise in incidence; and it has been projected that mortality from CVD would increase tremendously by year 2030.

Two public health revolutions, called epidemiologic revolutions as analyzed by Terris (2001) have been discussed extensively in the literature. The first began more than a century ago and addressed communicable diseases. The second public health revolution concerned non-communicable diseases. It was heralded by the launch of Healthy People in 1979 in which the concept of health promotion was juxtaposed with disease prevention.

There was no joint action taken to combat CVDs in the Sub-Saharan Africa until 2003 when international experts were raised from 16 countries world-wide to draw up the road map for reducing the burden of CVDs in the region. The programme took place in Accra Ghana with notable Nigerians such as Prof A.O. Falase and Prof M.O. Balogun among others in attendance. The experts believed that the emergence of a double burden of

communicable and non-communicable diseases increasingly threatens the African region and by acting promptly cardiovascular diseases could be prevented from becoming the same burden in Africa as it is elsewhere around the globe. Follow up to this initial meeting was a programme sponsored by the Centre for Disease Control and International Union of Health Promotion and Education (CDC/IUHPE) Annual Seminars on Cardiovascular Health Promotion which were developed to address this identified need to build capacity and increase knowledge. The course was designed to help establish strategies that contribute to preventing and controlling CVD in the Sub-Saharan Africa. In addition, the initiative was intended to build in-country capacity and a locally-sustainable infrastructure for CVD and risk factor disease surveillance, and cardiovascular health promotion development.

I was opportune to be among the first Nigerian team led by Prof M.O. Balogun and Prof Adesola Ogunniyi to the maiden CDC/IUHPE seminar in 2004 in Accra, Ghana, **Plate 1**. This unique experience has stimulated my interest in cardiovascular health promotion and disease prevention. As part of the seminar, our team developed health promotion and CVD prevention projects which were executed at Ipetumodu, Moro and Gbongan towns. A live TV programme was hosted with the National Television Authority, Ile-Ife where the public was enlightened and sensitized on the risk factors for cardiovascular disease and how citizens could live a healthy life.



Plate 1: CDC/IUPHE Workshop Participants, Accra, Ghana 2004

Physical inactivity is one of the leading problems in international health watch. It is reported by WHO to be the fourth leading cause of death with most of those deaths in low and middle income countries. Hundreds of millions of people are leaving inactive lifestyles and therefore putting themselves at risk for numerous chronic diseases. According to Sallis (2011) changes in technology are making profound alterations to people's activity patterns where mechanization and computerization at work over many years have dramatically reduced occupational physical activity. **Figure 2.** In the same vein automobiles have become the dominant form of transportation in most countries, severely reducing active modes of transportation. Adoption of this western lifestyle coupled with increase rate of smoking, poor diet, high salt intake have contributed significantly to the reasons for increase in the prevalence of CVD in Sub-Saharan Africa.



Figure: 2: Evolution of Physical Inactivity

Source: <https://riversong.wordpress.com/health-impacts-of-a-grain-based-agriculture/> (April 19, 2017)

Cardiovascular Disease

Cardiovascular diseases (CVDs) are a group of disorders of the heart and blood vessels which include:

- i. **Hypertensive heart disease**- disease of the heart due to hypertension
- ii. **coronary heart disease** – disease of the blood vessels supplying the heart muscle;
- iii. **cerebrovascular disease** – disease of the blood vessels supplying the brain;
- iv. **peripheral arterial disease** – disease of blood vessels supplying the arms and legs;
- v. **rheumatic heart disease** – damage to the heart muscle and heart valves from rheumatic fever, caused by streptococcal bacteria;
- vi. **congenital heart disease** – malformations of heart structure existing at birth;
- vii. **deep vein thrombosis and pulmonary embolism** – blood clots in the leg veins, which can dislodge and move to the heart and lungs.

Heart attacks and strokes are usually acute events and are mainly caused by a blockage that prevents blood from flowing to the heart or brain. The most common reason for this is a build-up of fatty deposits on the inner walls of the blood vessels that supply the heart or brain. Strokes can also be caused by bleeding from a blood vessel in the brain or from blood clots. The most important behavioural risk factors of heart disease and stroke are unhealthy diet, physical inactivity, salt, tobacco use and harmful use of alcohol. The effects of behavioural risk factors may show up in individuals as raised blood pressure, raised blood glucose, raised blood lipids, and overweight and obesity.

Cardiovascular diseases are very costly diseases economically, both in terms of medical related expenses and the costs of lost productivity. A 2012 American Heart Association report estimated that the direct and indirect cost of cardiovascular disease was

\$297.7 billion nationally in 2008. Direct costs include the cost of physicians, physiotherapy and other professionals, hospital and nursing home services, the cost of medications, home healthcare, and other medical durables. Indirect costs include the lost productivity that results from illness and death.

Symptoms of cardiovascular diseases

Often, there are no symptoms of the underlying disease of the blood vessels. A heart attack or stroke may be the first warning of underlying disease. However, symptoms of a heart attack include: pain or discomfort in the centre of the chest; pain or discomfort in the arms, the left shoulder, elbows, jaw, or back. In addition, the person may experience difficulty in breathing or shortness of breath; feeling sick or vomiting; feeling light-headed or faint; breaking into a cold sweat; and becoming pale.

Statistics show that:

- At least three quarters of the world's deaths from CVDs occur in low- and middle-income countries.
- People in low- and middle-income countries often do not have the benefit of integrated primary health care programmes for early detection and treatment of people with risk factors compared to people in high-income countries.
- People in low- and middle-income countries who suffer from CVDs and other non-communicable diseases have less access to effective and equitable health care services which respond to their needs. As a result, many people in low- and middle-income countries are detected late in the course of the disease and die younger from CVDs and other non-communicable diseases, often in their most productive years.
- The poorest people in low- and middle-income countries are affected most. At the household level, sufficient evidence is emerging to prove that CVDs and other non-communicable diseases contribute to poverty due to

catastrophic health spending and high out-of-pocket expenditure.

- At macro-economic level, CVDs place a heavy burden on the economies of low- and middle-income countries.

How to reduce the burden of cardiovascular diseases

Cost effective interventions that are feasible to be implemented have been identified by WHO for prevention and control of cardiovascular diseases. They include two types of interventions: population-wide and individual, which are recommended to be used in combination to reduce the greatest cardiovascular disease burden. Examples of population-wide interventions that can be implemented to reduce CVDs include: comprehensive tobacco control policies, taxation to reduce the intake of foods that are high in fat, sugar and salt, building walking and cycle paths to increase physical activity, strategies to reduce harmful use of alcohol, providing healthy school meals to children.

At the individual level, for prevention of first heart attacks and strokes, individual health-care interventions need to be targeted to those at high total cardiovascular risk or those with single risk factor levels above traditional thresholds, such as hypertension and hypercholesterolemia. The former approach is more cost-effective than the latter and has the potential to substantially reduce cardiovascular events.

Under the leadership of the WHO, all member states (194 countries) agreed in 2013 on global mechanisms to reduce the avoidable NCD burden including a "Global action plan for the prevention and control of NCDs 2013-2020". This plan aims to reduce the number of premature deaths from NCDs by 25% by 2025 through nine voluntary global targets. Two of the global targets directly focus on preventing and controlling CVDs. In addition, the World Heart Federation has developed roadmaps to help in reducing premature mortality from cardiovascular disease. The roadmaps translate existing knowledge of best practices,

barriers and solutions in three priority areas; secondary prevention, tobacco control, and raised blood pressure into practical strategies for improved cardiovascular health. The roadmaps can serve as models for countries to meet their commitments to develop or update national non-communicable disease plans using the framework provided by the World Health Organization Global Action Plan (GAP). I was opportune to be among the people enlisted by the World Heart Federation as one of the Emerging Leaders to serve as THINK TANK for Chronic disease prevention in 2015. I was part of the delegates that participated in the Think

Tank Seminar in Lima, Peru in March 2015 to provide solution to the problem of raised blood pressure in the world. Many countries have developed national programmes in reducing NCDs with good results, but we are yet to see this in operation in our country Nigeria.

Plate 2.



Plate 2: World Heart Federation Emerging Leaders Think Tank Seminar, Lima, Peru 2015

A few cases of sudden death resulting from heart attacks among the students and staff of the Obafemi Awolowo University (OAU) over some decades ago stimulated a study I conducted with my colleagues in 2006. We randomly recruited 600 participants which comprised of students and staff of the university and assessed their level of cardiovascular disease risk. None of the participants was found to be in the high risk stage of cardiovascular disease, however, majority (80%) were in the low risk zone. When the study was repeated 7 years later in 2013 within the OAU community, we recorded (4.1%) of people to be in the high-risk stage. **Table 1.**

Even though the percentage appears to be small, but the proportion showed that over 6,000 people are at the high risk of CVD within the campus. Percentage of the low risk had dropped to 61.1%. Stress (77%), inactivity (55%) and poor diet (36%) in that order were the strong factors attributed to the increase in the risk of CVD in the OAU community (Adedoyin et al 2006&2013) **Table 2.** The findings of this study have potential implications. A routine assessment of cardiovascular risk and blood pressure measurement could help to detect persons that are at the risk of cardiovascular disease. Thus, preventive measures should be put in place to reduce the morbidity and mortality rates.

Table 1: Risk level distribution among participants

	2006	2013
	%	%
High (40+)	0	4.1
Moderate	20	29.9
Low (0-19)	80	66.1

Table 2 Cardiovascular risk factor analysis (subsection)

Variables	Maximum score	Average score	Percentage
Smoking	25	8.2± 3.6	33
Diet	12	4.3± 4.3	36
Exercise	6	3.73± 1.06	55
Stress	6	4.6± 6.5	77

Overweight and Obesity: A Lifestyle Out of Balance

Studies have shown that two thirds of the adult population in the United States and at least half the populations of many other developed countries are currently overweight or obese. Thus it is well established that obese people — defined as having a body-mass index (BMI) (the weight in kilograms divided by the square of the height in meters) of 30.0 or more — have increased death rates from heart disease, stroke, and many specific cancers. The authors concluded that in white adults, overweight and obesity (and possibly underweight) are associated with increased all-cause mortality. All-cause mortality is generally lowest with a BMI of 20.0 to 24.9. The BMI is highly correlated with body fat.

Obesity is a chronic and multi-factorial disease and one of the most important causes of morbidity and premature mortality worldwide. Currently, over a billion people are overweight and half a billion are obese. In more than half of the European countries one in two individuals are overweight or obese. In the United States, obesity has been declared the number one health threat. Two of our studies conducted at Odo Ogbe Community of Ile-Ife confirmed the high prevalence of overweight and obesity in Nigeria. Women are more overweight than men (25.3% vs 20.9% vs) and also more obese (13.8% vs 9.8%) **Table 3.**

When we considered the relationship between socioeconomic status and obesity among the semi-urban communities, participants in the lower socioeconomic stratum were found to have a higher weight and BMI than the participants in the middle and higher socioeconomic strata. Our study showed that the relative risk of developing obesity among individuals of lower SES is twice that of individuals in the middle SES and thrice that of individuals in the higher SES based on obesity classification. **Table 4.** Obesity is regarded as one of the diseases of civilization; it is adduced that the prevalence of obesity and the trend of its relation with SES may indicate the level of economic and social development of a society. Developing countries like Nigeria are regarded as transitional societies undergoing acculturation and Westernization with consequent changes in lifestyle (dietary pattern and physical activity).

Table 3: OBESITY PREVALENCE USING BODY MASS INDEX-ADULT RESIDENTS IN ILE-IFE

	Male % n=638	Female % n=443
Underweight	4.7	3.113
Normal	55.5	59.0
weight	20.9	25.3
Overweight	9.8	13.8
Obesity		

Table 4: Classification the Body Mass Index (BMI)

BMI	Classification of body weight
<18.5	Underweight
18.5-24.9	Normal weight
25.0 –29.9	Overweight
30.0-34.9	Class I obesity
35.0-39.9	Class II obesity
40 and above	Class III obesity

Morbidity and mortality related to overweight and obesity

Obesity is an important risk factor for hypertension, dyslipidaemia, diabetes, cardiovascular diseases, obstructive sleep apnoea, fatty liver disease, osteoarthritis and asthma. It has been estimated that the global burden attributable to increased BMI were 12% for colon cancer, 8% for postmenopausal breast cancer and 32% for endometrial cancer in women. In terms of diabetes, it has been estimated that 64% of cases of diabetes in men and 77% of cases in women can be attributed to excess weight gain.

Perhaps one of the advantages of obesity could be traced to an Italian man named SF who was released from jail to house arrest because he was too fat, weighing 210kg. The guards at the prison said they constantly need to dress and undress, move him about and go to the bathroom with him. There was no bed big enough to contain him. He was allowed to go home when the amount of food he consumed was stretching the purse of the prison authority.

In one of our studies, we assessed and compared the blood pressure levels and the anthropometric parameters of both teaching and non-teaching staff of the Obafemi Awolowo University. The study determined the prevalence of hypertension among teaching and non-teaching staff using the 140/90 mmHg cuff-point **Table 5**. The result showed that the prevalence of hypertension was higher among the academic staff than non-teaching staff. The total prevalence rate of hypertension among teaching and non-teaching was 34.9% with an academic-to-non-academic distribution of 20.1% to 14.8% respectively. Furthermore, percentage of systolic

hypertension among teaching and non-teaching staff was 25.4% and 17.4% respectively. Similarly, the percentage of diastolic hypertension in both groups was 14.7% and 12.1% respectively. **Table 6.** It has been reported that a high level of psychological stress during certain occupational activities (public speeches like lectures in class and at meetings and seminars) contributes to blood pressure increase among certain professionals predominantly those with high intellectual activity like university lecturers. The psychological stress is related to high blood pressure as well as unfavourable cardiovascular profile. Our follow up studies on the prevalence of hypertension among the adults within the Ile Ife and Ipetumodu communities showed the cases of undiagnosed high blood pressure were high with 36.5% and 34% respectively.

Table 5: Classification of Blood Pressure in Adults (Age ≥ 18 years)

	Blood Pressure (mmHg)		Blood Pressure (mmHg)
Normal	<120	AND	<80
Prehypertension	120-139	OR	80-89
Stage 1 HTN	140-159	OR	90-99
Stage 2 HTN	≥ 160	OR	≥ 100

Table 6: Prevalence of hypertension and comparison of blood pressure profile between teaching and non-teaching staff.

Variable	Teaching staff	Non-teaching staff		
Blood Pressure	%	%		
SBP (mmHg)	25.4	17.4		
DBP (mmHg)	14.7	12.1		
	Teaching staff	Non-teaching staff		
Blood Pressure	Mean ± S.D	Mean ± S.D	t-cal	p-value
SBP (mmHg)	130.94±14.6	126.97± 18.8	2.268	0.025*
DBP (mmHg)	77.7±10.7	75.7 ± 11.3	1.326	0.187

*Significant at $p < 0.05$. Key: SBP; Systolic blood pressure. DBP; Diastolic blood pressure.

Physical Activity

The World Health Organization estimates that 2 million deaths per year can be attributed to physical inactivity, making physical inactivity one of the leading global health challenges. **Table 7.** Physical inactivity is a risk factor for three of the four leading chronic diseases such as cardiovascular disease, type 2 diabetes and cancers. Physical activity is defined as "bodily movement produced by skeletal muscles that requires energy expenditure" and produces health benefits, while exercise is a type of physical activity, defined as "a planned, structured, and repetitive bodily movement done to improve or maintain one or more components of physical fitness." Physical inactivity denotes a level of activity less than that needed to maintain good health.

Table 7: Physical inactivity is the 4th leading risk factor for death globally

Rank	Cause of Death	Percent of Deaths
1	High Blood Pressure	12.8%
2	Tobacco Use	8.7%
3	High Blood Glucose	5.8%
4	Physical Inactivity	5.5%
5	Overweight & Obesity	4.8%
6	High Cholesterol	4.5%
7	Unsafe Sex	4.0%
8	Alcohol Use	3.8%
9	Childhood Underweight	3.8%
10	Indoor Smoke Solid Fuels	3.3%



The health benefits of physical activity include improvements in longevity, CVD risk factors, diabetes, obesity, osteoporosis, and mental health. Although CVD is reported to be evident in middle age, its onset starts from youth. In United States emphasis has been placed on achieving national objectives for improving eating and physical activity behaviors of adolescents to prevent chronic diseases. This is because the proportion of children and adolescents who are overweight has increased. Adolescence appears to be the most important period of risk for predicting adult obesity. Adolescent obesity increases the long-term risk of adult morbidity and mortality, independent of adult obesity status and over 70% of obese youth become obese adults.

Recommendation for physical activity in the adolescents consists of moderate to vigorous intensity movement through organized sports, play, walking, and cycling for at least sixty minutes daily. However, only about 30% of this age group meets the 60-minute exercise per day guideline. Studies have shown that walking to school is associated with higher overall physical activity. In

Nigeria proliferation of tokunbo cars (fairly used imported cars) and operation of Okada (motor bikes) for commercial purpose has reduced walking and biking as mode of transportation.

Several organizations have identified environmental and policy interventions as the most promising strategies for creating population-wide improvements in eating, physical activity, and weight. Ecological models of behavior predict that the most effective interventions should work on multiple levels to change in psychological, social, policy, and physical environmental factors. Behavioural and social factors including environments can promote unhealthy food choices and discourage physical activity. A recent report on physical activity on WHO STEPwise approach to chronic disease risk factor surveillance in 22 countries in Africa concluded that Physical activity levels varied greatly across African countries and population subgroups. Leisure time activity was consistently low in most of the countries.

We assessed the physical activity level of the Obafemi Awolowo University Students in relation to environmental and socioeconomic factors. Results showed that 29.1% of the participants were somewhat active, while 27.2% were highly active. Only 3.9% were sedentary. **Table 8.** Half of the participants engage in walking (50.5%) and 2% ride bicycles around the campus. while 25.7%, and 21.8% use bus and motorbike as their means of transportation around the campus respectively. **Table 9.**

Students resident on campus are more significantly active than the students off campus. Students on campus may commute more actively than those that reside off campus because the environmental characteristics on campus appear more favourable for physical activity participation. Also, accessibility to facilities and proximity of destinations such as lecture theatres, shopping centres and hall of residence and eateries could increase active commuting.

Positive relationship between accessibility of destination and physical activity has consistently been documented in previous studies. The university authority may encourage building of hostels within the campus premises to encourage physical activity participation.

Table 8. Grouping of participants according to physical activity levels

Physical activity level	Percentages (%)
Sedentary	4 (3.9%)
Low active	53 (51.4%)
Highly active	46 (44.4%)
Total	103 (100.0%)

Table 9. Means of transportation around campus

Means of Transportation	Percentages
Bus	26 (25.7%)
Motorbike (Okada)	22 (21.8%)
Bicycle	2 (2.0%)
Walking	51 (50.5%)
Total	101 (100.0%)

Walking as a form of Exercise

Walking is an automatic, intrinsic human function, and it serves many practical roles. Walking is one of the least expensive forms of exercise, and the easiest to perform. It is a proven weight loss strategy that not only reduces weight, but also reduces stress and tones the body. Studies have shown that 10,000 steps are sufficient enough to lose weight. Hippocrates (c. 460-c. 370 BC) the father of Western Medicine stated that, "*Walking is a man's best medicine.*" Walking is not only vital to weight loss, but it is also effective in diminishing symptoms of hypertension and diabetes.

The first study to determine how much walking is effective in weight reduction was conducted by the Center for Physical Activity and Health at the University of Tennessee. The study involved eighty female participants with a median age of 50. Respondents wore a pedometer for a seven-day period, and recorded their results nightly. The result showed that participants who recorded 10,000 steps had the highest decrease in body fat, body mass as well as waist and hips reduction. A 10-year study of 229 postmenopausal women randomly assigned the volunteers to walk at least one mile a day or to continue normal activities. At the end of the trial, the walkers enjoyed an 82% lower risk of heart disease.

American Cancer Society's study on walking found that women who walked seven or more hours a week had a 14% lower risk of breast cancer than those who walked three hours or fewer per week.

Theology of Exercise

Theology is the study of religious faith, practice and experience, the study of God and God's relation to the world, a system of religious or idea. According the scripture, Man is made up of the Sprit, Soul and Body. While the Spirit and Soul are more related to spirituality, the body is physical. The Bible stated that bodily exercise profiteth a little as written in 1Timothy 4:8. God's blessing of good health begins with our souls.

Dear friend, I pray that you may enjoy good health and that all may go well with you, even as your soul is getting along well (3 John 1:2).

The Bible has much to say about how we should treat our physical selves: Treating the body as a temple, disciplining the body, taming the tongue and running the race.

The Bible has used the principle of Exercise Physiology and its chronic adaption to explain scriptural truths about exercise. The following verse states:

But those who hope in the Lord will renew their strength. They will soar on wings like eagles; they will run and not grow weary, they will walk and not be faint (Isaiah 40:31).

The above verse has identified two types of exercise. Running is considered to be anaerobic, power or strength training type of exercise while walking is aerobic or endurance exercise. The strength training improves and builds muscles strength to allow man to be able to perform the activity of daily living without fatigue. The aerobic exercise improves the cardiovascular endurance and allows man to perform an activity for a long duration without getting fatigue.

The Theology of Stress

Study has shown that stress can cause hypertension through repeated blood pressure elevations as well as by stimulation of the nervous system to produce large amounts of vasoconstricting hormones that increase blood pressure. Factors affecting blood pressure through stress include white coat hypertension, job strain, race, social environment, and emotional distress. Furthermore, when one risk factor is coupled with other stress producing factors, the effect on blood pressure is multiplied (Kulkami et al, 1998)

God warns against stress and anxiety which could lead to hypertension and other health challenges as recorded in the scriptures:

Do not worry about your life, what you will eat or drink; or about your body, what you will wear. Is not life more important than food, and the body more important than clothes? Look at the birds of the air; they do not sow or reap or store away in barns, and yet your heavenly Father feeds them. Are you not much more valuable than they? Who of you by worrying can add a single hour to his life (Matthew 6:25-27).

The way many of us handle life issues affect our health negatively. We worry about food, economy, marriage and worldly materials. Many a times people act beyond human capacity and by so doing injure their soul and body. Let us take life easy. As we plan for tomorrow let us enjoy today. After eating healthy food, exercising, maintaining proper weight, taking little salt and avoiding tobacco use, getting adequate sleep is very important. According to the literature, individuals who sleep less than 5 hours a night has a 3-fold increased risk of heart attacks.

Allah has appointed the night as the time for resting and the day as the time for working as recorded in the Quran.

“He is the One who made for you the night so that you may rest in it, and the day with light; most surely in these are signs for the people who hear.” (10:67).

After much work, we should find time to rest and relax. Many of us are fond of using part or all of our leave to work elsewhere. The Bible recorded that:

On the seventh day God ended his work which he had made, and he rested on the seventh day from all his work (Genesis 2:2).

God tagged the seventh day as the Sabbath day that should be used to rest and worship Him. This is where the concept of sabbatical leave in the academics originated from.

Food and Nutrition

A diet is said to be poor when an individual is under- or over-eating, not having enough of the healthy foods needed for each day, or consuming too many types of food and drink, which are low in fibre or high in fat, salt and/or sugar. An unhealthy diet is therefore, one of the major risk factors for a range of chronic diseases, including cardiovascular diseases, cancer, diabetes and other conditions linked to obesity. Specific recommendations for a

healthy diet include: eating more fruit, vegetables, legumes, nuts and grains; cutting down on salt, sugar and fats.

Nigeria is currently witnessing a fast growth in the fast food industry. The industry has grown rapidly due to affordability and convenience for majority of people. Fast foods often contain too many calories and too little nutrition. Fast food contains highly processed and large amounts of carbohydrates, added sugar, unhealthy fats, and salt (sodium). Most people underestimate the number of calories they're eating in a fast-food restaurant. Evidence showed that children and adolescents take in more calories in fast food joints and other restaurants than at home which added between 160 and 310 calories a day.

The best food as recommended by our creator is fruits and vegetables:

And God said, "Behold, I have given you every plant yielding seed that is on the face of all the earth, and every tree with seed in its fruit. You shall have them for food. Genesis 1:29.

To corroborate this, the Book of Quran stated:

"And it is He Who produces gardens trellised and untrellised, and date palms, and crops of different shape and taste (its fruits and its seeds) and olives, and pomegranates, similar (in kind) and different (in taste). Eat of their fruit when they ripen..." (Quran 6:141)

A case study in the Bible about Daniel and his friends proved this as written in *Daniel 1:8, 12,13.*

"But Daniel resolved not to defile himself with the royal food and wine, and he asked the chief official for permission not to defile himself this way... 'Please test your servants for ten days: Give us nothing but vegetables to eat and water to drink. Then compare

our appearance with that of the young men who eat the royal food, and treat your servants in accordance with what you see.' At the end of the ten days they looked healthier and better nourished than any of the young men who ate the royal food"

The Garden of Eden-- A Place of Exercise

And the Lord God planted a garden eastward in Eden; and there he put the man whom he had formed. And out of the ground made the Lord God to grow every tree that is pleasant to the sight, and good for food... (Genesis 2: 8-9).

We now know that gardening is the world's best-kept exercise secret. The health benefits of gardening are impressive. Gardening uses all the major muscle groups, the muscles that do most of the calorie burning in the human body. Legs, buttocks, shoulders, stomach, arms, neck, and back all get a workout. Gardening also increases flexibility and strengthens muscles. Turning of compost is essentially lifting weights. Raking is like using a rowing machine and pushing the mower is similar to walking on a treadmill. The exercise machines that replace gym equipment are shovels, rakes, push mowers, and wheel-barrows. Recent research indicates that 30 minutes daily of moderate exercise such as gardening lowers blood pressure and cholesterol levels, helps prevent diabetes and heart disease, and prevents or slows osteoporosis (<https://garden.org/learn/articles/view/126/> April 21, 2017). Those who may want to start gardening should start slowly and build up endurance. Those who haven't been exercising before must do medical screening before starting.

My Contributions to Cardio-respiratory Health and Rehabilitation

Cardiovascular disease, as has been said, is reported to be a leading cause of morbidity worldwide. Although, the prevalence rate of cardiovascular diseases is increasing rapidly in the sub-Saharan Africa compared to that of advanced nations, therefore, proactive measures are critical to the prevention of cardiovascular disease in Nigeria. Epidemiological data are vital for adequate intervention

and implementation of health policy. This information is lacking in Nigeria as in other developing countries. Therefore, data from developed nations are usually extrapolated to Nigeria. In many cases, the data are either under or over estimated. My works have been channeled towards cardiovascular health assessment in our community in order to have a baseline data that could be useful for immediate health planning and policy formulation. The prevalence of hypertension, obesity, and metabolic syndrome has been investigated in my studies. These papers with studies on randomized control trials have been cited by many authors and are available in several data bases such as Pubmed, CINAHL, HINARI, PEDro and others.

Socioeconomic status is a strong determinant of health worldwide. Therefore, the socioeconomic status of Nigerian adults was assessed in relation to their blood pressure. We were able to demonstrate that people with low socioeconomic factor are at risk of having high blood pressures. This has provided a baseline data for this community and the results have been used as a reference for the country by many authors. My colleagues and I conducted a baseline cardiovascular risk assessment using Obafemi Awolowo University Community. The study revealed a low risk of cardiovascular disease. However, changes in lifestyle such as tobacco consumption, sedentary lifestyle as a result of proliferation of motorbike (okada) and vehicles in the recent times; and stress have changed this pattern in our follow up studies. Adequate health promotion initiatives are necessary to reverse this trend.

Socioeconomic status is also reported to have a relationship with lung function in studies published abroad. I was able to initiate a study in collaboration with Chest physicians on the association between SES and lung functions. The study has not only established reference values for adult Nigerians of age 40 years and above, but also establish reference equations for predicting lung function during patient assessment. This study has become a major material for researchers worldwide in the area of lung function assessment. The study was able to establish that African

Americans have relatively the same lung function values with Nigerians but that Peak expiratory flow rate of Nigerians is higher than that of African-Americans. Furthermore, the study re-emphasized that the Lung function of the white population is higher than the blacks.

My contributions to the area of respiratory care have earned me the award of International Fellow by the American Association of Respiratory Care in 2008. I am the first Nigerian and third in Africa to receive this prestigious award.

Cardiopulmonary Rehabilitation

Cardiopulmonary Rehabilitation is still at its infancy stage in the developing nations. Many patients with cardiopulmonary dysfunction are encouraged to rest as exercise is believed to worsen the condition. Studies have however shown that inactivity contributes to exacerbation and poor quality of life of the patients. The role of exercise in improving the condition of the patients is gaining popularity. Despite the evidence for the positive role of exercise in cardiac rehabilitation, physicians do not often refer patients with cardio-pulmonary dysfunction to physiotherapists for rehabilitation in our environment. This might be due to lack of local studies on cardiopulmonary rehabilitation, poor knowledge of physiotherapy roles among the medical experts and few cardiopulmonary specialists in this field. My studies have been able to bridge this gap. Due to my interaction with cardiologists and pulmonologists in our institution, I have been able to initiate interventional studies on patients with respiratory and cardiac challenges with remarkable results.

I was able to initiate a cardiopulmonary unit in collaboration with the clinical physiotherapists in the Physiotherapy Department of the Obafemi Awolowo University Teaching Hospitals Complex, Ile-Ife (OAUTHC), where I am appointed as a honorary cardiopulmonary consultant physiotherapist. The OAUTHC is probably the first in Nigeria where Cardiopulmonary Rehab combined with fitness programme started. Patients with

cardiovascular and metabolic disorders such as hypertension, diabetes and obesity are now being referred for management. I have trained at least 10 experts at postgraduate levels across the nation who are now specialists in cardiopulmonary physiotherapy.

I have also raised a cardiopulmonary specialty group with the main objective of improving cardiopulmonary physiotherapy practice in Nigeria both in the clinics and among academics through sharing information and resources, uniting practice and developing guideline, training and networking. This group has conducted several health outreaches in some states in Nigeria.

Community Services and Grassroot Sport Development

One way to increase leisure time physical activity is to stimulate the interest of people to participate in sporting activities. Participation in sport is important, not only because of the health benefits, but also because involvement in sport enhances mental wellbeing and social interaction, and can contribute to economic development in different geographical, cultural, and political contexts. The UN Inter-Agency Task Force on Sport for Development and Peace recognizes that mass participation in sport is a powerful strategy, not only for health promotion and disease prevention, but also for education, peace building, trauma relief, and economic development.

In line with this vision of promoting physical activities, recreation and development of grassroots football I have initiated and sponsored an annual football competition in Osun State tagged *Professor Rufus Adedoyin Peace Football Competition*. The first edition of the competition was organized in 2016 with 16 teams in participation. The three weeks long events involved 320 footballers, 80 officials and over 3,500 spectators. The events also attracted coaches from the Nigerian football leagues searching for young talents. The 2nd edition of the football competition has commenced. The final of this year competition is scheduled for tomorrow May 10, 2017 by 4 pm at the OAU Sport Complex. Important dignitaries in the sports arena are expected to grace the

occasion. Distinguished audience, you are all cordially invited. Apart from sponsoring a football competition, I have also raised a football club known as Successful Christian Mission Football Club (SCM FC). The club is presently making great impact locally in Osun State.

Mr Vice Chancellor, Sir, as I bring this lecture into conclusion, I wish to reiterate that heart disease and stroke are among the most widespread and costliest health problems facing the nation today, accounting for huge cost in health care expenditures and lost productivity annually. At individual level, families who experience heart disease or stroke not only have to deal with medical bills but also lost wages and the real potential of a decreased standard of living.

History reveals that as modern technology improves, human bodies slows down; mechanization and computerization at work over many years have dramatically reduced occupational physical activity. Automobiles have become the dominant form of transportation, severely reducing active modes of transportation. Many homes are filled with labour saving devices (*washing machines, pounding machines and blenders*), largely eliminating another vital source of daily physical activity. Electronic entertainment has replaced dancing, active games and walking as frequent leisure time activities. Globalization is taking these technologies into every country, and perhaps eventually into every town and village. Most people welcome these technological advancements because they are associated with economic progress and improved standards of living. For example, they avoid hard physical labor, pay to ride vehicles instead of walk, and in some countries, watch 3-4 hours of television per day.

The only way to combat cardiovascular problem in our country is prevention. The key to prevention of the risk factors such as inactivity is promotion of active transportation (walking and biking). The benefits of physical activity depend on three elements: the intensity, duration, and frequency of exercise.

Because walking is less intensive than running, it requires a longer period. Able-bodied adults should do moderate-intensity exercise (such as brisk walking) for at least 30 minutes on five days each week or intense aerobic exercise (such as running) for at least 20 minutes three days each week. Walking is better done in the morning or in the evening time. Riding of bicycle is encouraged where it is safe to do so. Consumption of healthy food is critical to the prevention of CVDs. Salt intake must be reduced in our food. Food containing fats and sugar (*Fufu, garri, pounded yams, starch, rice, soft drinks, biscuits, fries and bread*) should be reduced in our meals while fruits and vegetables, Fibres (*Maize, garden eggs, carrots, wheat and cucumber*), and minerals (*Mushrooms, Nuts, Beans, fish and seeds*) should be taken regularly.

All the tiers of governments should support policy formulation which may include road construction to suit physical activity, schools and built environments to promote active transport, such as walking or cycling to and from schools, and safe supportive settings for recreational activity.

The Obafemi Awolowo University is endowed with good natural and built environment that is conducive for walking and other physical activities. The facilities for sporting activities are adequate for the students and staff to explore. However, our study has revealed that less than 15% of the OAU community is making use of the facilities. Rather, the facilities have been turned into religious centres for spiritual exercise. The management must make sure that the sporting activity is given a priority on campus. The annual inter faculty staff game competition which was last organized in 2011 should be resuscitated. Our Health Centre and the College of Health Sciences must continue to play a major role in routine health screening for the staff and students to reduce morbidity and premature mortality in the community.

Closing Remarks

Mr Vice Chancellor, Sir, I want to thank the Almighty God for the wisdom, grace, favour and supernatural strength He gives me to reach this level of my professional career. I am grateful to the Oyo-

Osun States governments under the old Oyo State for the free education I enjoyed during my secondary school education. I am equally grateful to the Federal Republic of Nigeria for the support to acquire university education with a minimal cost of which would have cost up to \$120,000.00 in the United States of America. My Thanks also go to the authority of the Obafemi Awolwo University under the leadership of a great icon and exemplary leader, Professor Anthony Elujoba, the acting Vice Chancellor of this great institution for providing the enabling environment and platform for me to grow to this height in academics. I owe a lot of gratitude to the Ile-Ife kingdom my place of birth. This is the place I have lived all my life and have had good achievements. Special thanks to the late Imperial Majesty, Oba Okunade Sijuwade and the present Imperial Majesty Oba Enitan Adeyeye Ogunwusi, Ojaja II for the encouragement and support given to Ife indigenes to aspire to greater heights.

I am the sum total of what I have learned from all who have taught me, both small and great. I am sincerely grateful to a legend and luminary father of Physiotherapy, late Emeritus Profession V.C.B. Nwuga. He was the fountain from whom many of us draw special inspiration. His technique of Vertical Oscillatory Pressure for managing back pain has been a great blessing to humankind. His vision of starting the Department of Medical Rehabilitation instead of Physiotherapy unlike other institutions before that of Ife is unique. His vision was to train all the professionals offering rehabilitation services together in order to encourage team work. He wrote and got approval for Physiotherapy and Occupational Therapy programmes curricula in 1977. The occupational therapy programme did not start until 11 years ago and OAU is the first institution in the whole of West Africa to start a bachelor degree programme in Occupational Therapy and postgraduate programmes in Physiotherapy. The bachelor degree in Audiology is also under processing presently and would probably become the first degree programme in the whole of Africa. I specially thank our mother, Mama Gladys Nwuga who is also a pioneer staff of the Department of Medical Rehabilitation. Her supporting role as wife

and professional colleague of Professor Nwuga is one of the reasons for the success of Ife programme. Prof. Nwuga was the only academic staff left in the department during my final year. The programme would have been scrapped along with the Environmental Health if not for the grace of God and the doggedness Prof Nwuga.

I give a special recognition and thanks to Professor M.O.B. Olaogun who nurtured and tutored me when I came raw as a Graduate Assistant. Prof Olaogun was the only senior academic staff supported by Prof P.U. Nwoha within the department at that trying period. Among several graduate assistants trained by Professor Nwuga and Prof Olaogun only Dr M.O. Egwu and I are left in the department; others have gone for greener pastures. Many of our senior professionals who have made impact*in my career include Prof Arinola Sanya, a caring and great tutor who challenged me to stepped up on my research and publications; Profs I.O. Owoeye, B.O.A. Adegoke, P.U. Nwoha, S.A. Adeyanju and Ronke Akinpelu. The contributions of Prof M.O. Balogun and Prof G.E. Erhabor to my specialty area of cardiopulmonary physiotherapy are vital to my success. The duo are not only my academic mentors but they also play spiritual leadership roles. God bless you sirs.

I appreciate my mentees, students and those I have inspired who have contributed to my success, notable among them include: Drs Teslim, Onigbinde, Taofeek Awotidebe, Chidozie Mbada, Tunde Adekanla, Lukman Oyeyemi, O.E, Johnson, A.O. Obembe, Rita Ativie, Bola Adeyege, Atilola Adebambo, Adaobi Okonji and host of others. I also thank my colleagues, Dr C.O Odole (Iya Ara), L.A. Bisiriyu, and Col A.I.I. Emechete. I appreciate the contributions of Prof ETO Babalola and Prof O Oladipo for their editorial input. I expressive my appreciation to the class of 92 for being part of this success: Dr. Lukman Ganiyu, Dr. M.O. Egwu , Mr. A.S. Odejide (Baba Ode), Mr. Wasiu Jimoh (Longus), Mr. Femi Adedeji (Brevis), Dr. Mukadas Akindele, Mr. Femi Akinya,

Mr. Frank Igbinovia, Mr. Segun Badejo, Dr. Mrs. Yetunde Adeosun and others.

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I am indebted to Prof J.A. Balogun who I chose as my role model and whose works I used to form the foundation for my studies. For the achievements, I have made in this profession, I feel a sense of gratitude to the following people: Prof. V.A Obajuluwa, Dr O.K. Abereoje, Prof Segun Fatusi, Prof. R.A. Adebayo. I am also inspired academically by Prof Rogers Makanjula and Prof Tope Ogunbodede. Three of us are referred to as non-biological triplets of the College of Health Sciences.

In a special way, I salute all my professional colleagues who are proud ARAITES and have been standing with me and are totally committed to bringing integrity and professionalism back into our noble physiotherapy profession.

My parents laid the foundation of education and teaching career for me. My late father, Lawrence Adedoyin was a passionate and a great teacher during his life time. He was given the name 'Teacher' by the people around him and people called us his children 'Omo Teacher' His last wish was an admonition to me to be a great and renowned scholar worldwide. My aged mother, Bolaji Adedoyin is a great motivator and very caring. She invested great resources in my education and backed it with prayers to produce a professor. I remain eternally grateful to them. My late brother J.A. Adedoyin made tremendous contribution to my academic story through his guidance and financial support for my education. I thank all his family members and pray for their success. My sincere appreciation also goes to my siblings, Mrs.

Foluke Adepeju, Mrs. Romoke Adewuyi, Pastor Tunji Adedoyin, Mrs. Toyin Ekunnusi, Mr. Tope Ogunyemi for their prayer and support.

My Children, Peace, Joy, Segun and Akorede deserve a special recognition. They are part of this success story through their understanding and caring attitude. They always task me with series of questions many of which I don't have readymade answers to, thus driving me to seek for more knowledge. They believe a professor is super human and should know everything! This acknowledgement would not be complete without a special recognition and appreciation to my lovely wife, special made and customized for me by God, Princess, Ile-Ife Queen, Adebukola Abiola (Aya rere loode oko) for her absolute loyalty, emotional and spiritual supports during the challenging periods. She is indeed a pillar of support!

Mr Vice Chancellor, Sir, I am eternally grateful to God for the grace and opportunity I have to be raised and nurtured in this great institution to be one of the notable scholars recognized world wide. I like to conclude this lecture using the words of **Soren Kierkegaard**

Above all, do not lose your desire to talk walk. Every day I walk myself into a state of well-being and walk away from illness. I have walked myself into my best thoughts, and I know of no thought so burdensome that one cannot walk away from it.

Mr Vice Chancellor, Sir, Distinguished Ladies and Gentlemen, I thank you all for your attention and I am using the words of Jesus Christ to issue this command for our healthy living-**ARISE AND WALK!**

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