UNIVERSITY OF PORT HARCOURT

PREVENTIVE AND SOCIAL MEDICINE: THE SCIENCE AND THE ART OF PREVENTING UNTIMELY DEATH

AN INAUGURAL LECTURE

By

PROF. BEST ORDINIOHA
MBBS (UPH), FMCPH

Department of Preventive and Social Medicine
Faculty of Clinical Sciences, College of Health Sciences
University of Port Harcourt

INAUGURAL LECTURE

SERIES NO. 152

AUGUST 30, 2018

University of Port Harcourt Printing Press Ltd.
University of Port Harcourt,
Port Harcourt,
Nigeria.
E-mail: uniport.press@uniport.edu.ng

ISSN: 1119-9849
INAUGURAL LECTURE SERIES NO.152
DELIVERED: AUGUST 30, 2018

Designed, Printed and Bound by UPPL.

DEDICATION

This inaugural lecture is dedicated to the blkessed memories of:

My mother: **Late Mrs. Evelyn Ordinioha nee Onwuadi**
Eze Nwanyi, Nwanyi Obuoma

And

My mentor: **Late Dr. SBS Afiesimama**

ACKNOWLEDGEMENTS

It is almost impossible to acknowledge all who made it possible for me to train and become a professor of Community Medicine and Public Health. I know several persons would feel under-appreciated for not making the list; I sincerely apologise for the omission, and pray that God would acknowledge them even more for the role they played in my success.

I want to start by thanking my father, Chief Sunday Nwalor Ordinioha, for making me his favourite son, which ensured I had more resources for my education in a family of four wives and more than 30 children.

I can't thank my now rested mother enough, for inculcating in me the spirit of selflessness and community service that influenced my decision to specialize in community medicine. Evelyn, Eze-Nwanyi, Nwanyi Obuoma, I know you are at the right hand of God, smiling at what your Umunnakwe has become.

To my siblings, I say big thanks. To Duke Aaron, my mother's first son (*Okpara ile*), thanks for being a *good okpara ile*; to Sylvester Iweka Aaron, thanks for your counsels and sacrifices; to Stella Chituru Enwereonye, the first daughter of my mum (*Ada ile*), thanks for being a surrogate mum, because mum was always busy with her pregnant women and deliveries; to Nnamdi Ordinioha, my immediate elder brother, thanks for not spoiling my fun as a favourite child; and to my younger sisters, Nkemjika Obed, Rejoice Ebere Ordinioha and Jennifer Ndudi Ejekwe, thanks for standing solidly behind me in all my travails, which unfortunately have been many.

My step-brothers and step-sisters also deserve my gratitude, for the healthy sibling rivalry. I especially wish to thank our first son (*Okpara nna*) Evangelist ThankGod Aaron, for galvanising all the other children to strive for academic excellence.

I also acknowledge with thanks the contributions of my classmates in secondary school, especially Charles Ogbeifun, Nduka Ohaeri and Ogbete Whyte, for the healthy, but fierce competition for the first position; and to Arthur Pepple, the Reggae General, for shielding me from the "panickers".

My classmates in the medical school hold a special place in my life. This is because they made medical school a great fun, and have become lifelong friends. Space would not let me mention every member of the U88 class of the University of Port Harcourt Medical School, but I won't be forgiven if I fail to mention Dr. Friday Aaron, the baron; Prof. Seiyefa Brisibe and his brother Malcolm; Dr. Zachariah Nte, The Apostle; Dr. Dennis Wogu, Chief Wogu; Dr. Raymond Alete, Chief Alete of Rundele clan; Dr. Livingstone Solomon, Mucostony; Dr. Golden Owhonda, the Bishop; Dr. Selepiri Orubibi, the Prime Stuff Storer; Dr. Kingsley Opara, Igbigbino; Dr. Wisdom Sawyer, "professor Wizzy"; Dr. Kennedy Nyegidiki, The Tiger, Prof. Jeremiah Israel, Okorodudu, Dr. Christopher Ekwunife, Rambo; Dr. Amabara Dodiyi, the man with the lordotic gait, and Prof. Chituru Orluwene, my roommate.

My lecturers in the medical school were all colossuses, persons we held in awe as medical students, and reverence as medical doctors. I especially want to thank Prof. ND Briggs, whom we preferred to call by his middle name, Dimkpa, mighty man, albeit in private; Prof. KEO Nkangienime, whom we called Guru also in private; Prof. R. S. Oruamabo, Prof. T. Francis, Prof. C. John, Prof. A. R. Nte, Prof. R. S. Jamabo, Dr. PNC Abuwa, Prof. O. Ebong, Prof. B. Didia, Prof. A. Obianime and my personal favourite Prof. Ndu Eke.

I also owe a big gratitude to my trainers during my residency training in Public Health and Community Medicine, especially Prof. MC Asuzu of University of Ibadan, Prof. C. Onwuasigwe of the University of Nigeria, who supervised my Part II dissertation, Prof. Onayade of OAU Ife, Prof. Onajole and Prof. Akin Osibogun both of the University of Lagos, Prof. Odusanya of Lagos State

University, Prof. Okojie and Prof. Ofili both of the University of Benin, and Dr. Edet Edet of SPDC.

This day won't have been possible without the efforts of Dr. SBS Afiesimama of blessed memory, who used his enormous goodwill to ensure I was admitted into the residency training programme against enormous odd. I am sure the recording angel took note of this, and has used it to grant him a place at the right hand of God.

I am also grateful to my former lecturers and later colleagues in the Department of Preventive and Social Medicine, especially Dr. PNC Abuwa and Dr. MM Mezie-Okoye. To my other colleagues, Dr. O.B. Babatunde, Dr. C. Tobin-West, Dr. I. Alabere, Dr. B.M. Moore, Dr. I. Ojule, Dr. K. Douglas, Dr. D. S. T. Ogaji, Dr. O. Maduka, Dr. F. Adeniji and Mrs. E. Asuquo; and to the residents of the department over the years especially Dr. Nduka, Dr. Nwadiuto, Dr. Ufuoma and Dr. Ikpe.

I want to also use this opportunity to thank past Provosts of the College of Health Sciences, for the various roles they played in my academic career. I am especially grateful to Prof. OJ Odia, the Provost that employed me, for the mentorship he provided when I assumed the headship of my department, three months after my employment, following the retirement of the then HOD, Dr. Afiesimama; to Prof. B. Didia, thanks for being so accessible to a colleague who was your student a few years back; and to the current Provost, Prof. Christie Mato, a Provost like no other!!

I am also grateful to the past and present deans of the Faculty of Clinical Sciences, especially Prof. Ndu Eke, Prof. Ikimalo and Prof. Uzoigwe, for the various roles they played in my career progress. Prof. A. Ihekwaba of Internal Medicine and Prof. R. S. Jamabo of Surgery also deserve special thanks for the mentorship they provided when we served together as the head of our various Departments; and to Prof. A. R. Nte, for the mentorship right from my medical school days.

I also want to thank the past and present Vice Chancellors of the university, especially Prof. Don Baridan, the VC when I was employed, who encouraged us to do our best for our students without compromising standards; to Prof. Joseph Ajienka, the engineer with the gift of the word; and the present VC, Prof. NES Lale, for being the VC that gave the Department of Preventive and Social Medicine its first professor.

How can I forget those that made it possible for me to carry out the various environmental studies that contributed significantly to my professorship? I must thank Mr. Adebisi Adeosun, who gave me the first opportunity; Mr. Olukayode Onabanjo, for providing the right environment; Prof. Mensah, Prof. Harry, Eng. Sunny Okonkwo, Mr. Christopher Green, Prof. Ohimain, and Late Prof. Akomeah, for being good team members; and Mr. Godswill Bornu and Mr. ESK Uzoma of SPDC, for the opportunities.

I also owe a lot of gratitude to editors and reviewers of the various academic journals I published my articles in, for the opportunity provided by their journals, and for sundry assistances. I especially wish to thank the editors of *Port Harcourt Medical Journal*, Prof. N. Eke and Dr. RC Echem, Lord Echem, for going beyond the usual to see that the articles attain the premium standard of the journal; and to Dr. D.D. Alasia, former Editor of the NMA Rivers State owned *The Nigerian Health Journal*, for providing the platform for me to communicate my views which are not always mainstream.

I have saved the best for last, my gratitude to God, and to my wonderful family. God has been partial to me right from birth. First, he ensured that I wasn't born during the Nigerian civil war, for had I been born; I would have suffered from kwashiorkor like my immediate elder brother, and possibly would have been damaged. He saved me from the worst of sibling rivalry, ensuring that I suffered more like Joseph, the son of Jacob, and not like Abel, the son of Adam; and He knows that my intentions are noble and selfless, and have continuously rescued me from the troubles that

come from doing things in a different way. I cannot thank God enough for His blessings and protections.

I cannot thank my wife, Dr (Mrs) Joyce Chinyere Ordinioha nee Uzor enough for the unique ways she has motivated me to academic and professional excellence. Day by day she instigated me with her words and deeds to do something, and to act fast to achieve the desired paradigm shift in health beliefs and practice in Nigeria.

To my lovely children, Blest, Treasure, Best Junior, Solomon and William, I say big thanks, for letting me have the quiet time to think through my many projects. They give me a lot of joy, for I see a lot of me in them. A single life time is not enough for me to do all that I intend to do, so I count on them to carry on after my active years, into the 22nd century and beyond.

ORDER OF PROCEEDINGS

2.45P.M. GUESTS ARE SEATED

3.00P.M. ACADEMIC PROCESSION BEGINS

The procession shall enter the Ebitimi Banigo Auditorium, University Park, and the Congregation shall stand as the procession enters the hall in the following order:

ACADEMIC OFFICER
PROFESSORS
DEANS OF FACULTIES/SCHOOLS
DEAN, SCHOOL OF GRADUATE STUDIES
PROVOST, COLLEGE OF HEALTH SCIENCES
LECTURER
REGISTRAR
DEPUTY VICE-CHANCELLOR [ACADEMIC]
DEPUTY VICE-CHANCELLOR [ADMINISTRATION]
VICE CHANCELLOR

After the Vice-Chancellor has ascended the dais, the congregation shall remain standing for the University of Port Harcourt Anthem. The congregation shall thereafter resume their seats.

THE VICE-CHANCELLOR'S OPENING REMARKS.

The Registrar shall rise, cap and invite the Vice-Chancellor to make the opening Remarks.

THE VICE-CHANCELLOR SHALL THEN RISE, CAP AND MAKE HIS OPENING REMARKS AND RESUME HIS SEAT.

THE INAUGURAL LECTURE

The Registrar shall rise, cap, invite the Vice-Chancellor to make his opening remarks and introduce the Lecturer.

The Lecturer shall remain standing during the Introduction. The Lecturer shall step on the rostrum, cap and deliver his Inaugural Lecture. After the lectures, he shall step towards the Vice-Chancellor, cap and deliver a copy of the Inaugural Lecture to the Vice-Chancellor and resume his seat. The Vice-Chancellor shall present the document to the Registrar.

CLOSING

The Registrar shall rise, cap and invite the Vice-Chancellor to make his Closing Remarks.

THE VICE-CHANCELLOR'S CLOSING REMARKS.

The Vice-Chancellor shall then rise, cap and make his Closing Remarks. The Congregation shall rise for the University of Port Harcourt Anthem and remain standing as the Academic [Honour] Procession retreats in the following order:

VICE CHANCELLOR
DEPUTY VICE-CHANCELLOR [ADMINISTRATION]
DEPUTY VICE-CHANCELLOR [ACADEMIC]
REGISTRAR
LECTURER
PROVOST, COLLEGE OF HEALTH SCIENCES
DEAN, SCHOOL OF GRADUATE STUDIES
DEANS OF FACULTIES/SCHOOLS
PROFESSORS
ACADEMIC OFFICER

PROTOCOLS

- The Vice-Chancellor
- Previous Vice-Chancellors
- Deputy Vice-Chancellors (Admin and Academic)
- Previous Deputy Vice-Chancellors
- Members of the Governing Council
- Principal Officers of the University
- Provost, College of Health Sciences
- Dean, Graduate School
- Deans of Faculties
- Heads of Departments
- Distinguished Professors
- Directors of Institutes and Units
- Visiting Academics and Colleagues
- Esteemed Administrative Staff
- Captains of Industries
- Cherished Friends and Guests
- Unique Students of UNIPORT
- Members of the Press
- Distinguished Ladies and Gentlemen.

PREAMBLE

I feel highly honoured for the opportunity to give my inaugural lecture, the first from the Department of Preventive and Social Medicine. This has been late in coming, considering that the department is one of the founding departments of the medical school. It took the department close to forty years to produce its first professor, mainly because it had problems recruiting and retaining lecturers. These problems stem from the fact that our specialty was considered not prestigious and lucrative enough, and therefore did not attract enough interest from young doctors. I can still remember how difficult it was to explain my specialty to my mother, even when she was a health worker.

Our department also had problems retaining its lecturers, because politics, the WHO, other UN agencies and international NGOs offered more lucrative opportunities, and therefore lured away our lecturers. So the few lecturers left in the department literally sacrificed their career progress to keep the department running. I therefore salute the sacrifices of these lecturers, who incidentally were also my lecturers in the medical school – Dr. PNC Abuwa, Late Dr. SBS Afiesimama and Dr. MM Mezie-Okoye.

Our department is called different names in medical schools across Nigeria, arising from the need to reflect the changing emphasis in our specialty. Our department was called the department of Preventive and Social Medicine, when Nigeria's first medical school, the University of Ibadan was established. It was so named to reflect the dominance of preventive medicine and social medicine in the practice of our specialty, especially with the enactment of the 1946 NHS Act in Britain.

The department was rechristened the department of Community Medicine in several medical schools in Nigeria, to reflect the greater emphasis in community practice in the late 1960s; while a few universities added Primary Health Care to their name, to emphasize the primary health care philosophy, after the 1978 Alma Ata declaration. In recent years, there have been calls for yet another

change in name to Department of Public Health Medicine. Our department in the university has so far remained faithful to the name Preventive and Social Medicine, especially as the practice areas of our specialty have remained the same, in spite of the name changes.

Our specialty, in spite of its numerous names is basically in the business of reducing malady and misery, and preventing untimely death, not just for a single person, as is the case in clinical medicine, but for every person in the community, irrespective of their place of residence or socio-economic status. I have therefore titled this lecture, *Preventive and Social Medicine: the science and the art of preventing untimely death*, to explain the science and the art of our specialty, in the context of my own contributions.

1. The origin of life and disease

Christians and astrophysicists are unanimous in their belief that in the beginning, there was a big bang that set the laws of nature (Physics), followed by reactions between the molecules created by the big bang (Chemistry); and then came life (biology) with more complex chemical reactions; for this sequence of events seem to tally with the creation story in Genesis 1: 1 – 21.

*In the beginning… God said, Let there be light: and there was light.…… (**Physics**) And God said, Let there be a firmament in the midst of the waters, and let it divide the waters from the waters….. (**Chemistry**) And God said, Let the earth bring forth grass, the herb yielding seed, [and] the fruit tree yielding fruit….. Let the waters bring forth abundantly the moving creature that hath life…. (**Biology**).*

The smallest unit of life is called cell, which is basically a self-contained bundle of chemical reactions, able to reproduce and take in nutrients from the external environment, yet capable of resisting unwanted interferences from the external environment.

Cells in higher life forms, including humans aggregate to form tissues. These tissues often specialize to form organs that carry out functions that are vital to the survival of the entire organism. For instance, the tissues of the brain specialize to enable them control the

other cells of the body; those of the digestive tract specialize to take in and process food for the use of the other cells of the body; those of the liver are able to detoxify the toxins contained in food; while the tissues of the kidney acquired excretory abilities, to help the body in getting rid of waste products.

The aggregation of cells to form tissues and organs cuts off the access of the cells to the external environment, which is the main source of nutrients. This encouraged the development of the digestive system, to bring in the nutrients, in forms that are usable by the other tissues; the development of the respiratory system to bring in oxygen, necessary for the conversion of the nutrients into energy; and a circulatory system – the heart, arteries and veins that convey the nutrients and oxygen to the tissues, no matter how deeply embedded in the body they are.

The cells of the body thus depend on each other for nourishment and sustenance; but the life of the entire cells is dependent on how well they maintain the integrity of their internal environment, even in their interaction with the nourishing, but oftentimes disruptive external environment.

The internal environment of cells was called the milieu interior by the renowned French physiologist Claude Bernard (1813 – 1878). Everything is done by the cells of the body to maintain the milieu interior within narrowly defined limits, because any deviation results in disease.

The body uses a variety of homeostatic mechanisms to ensure that the milieu interior is kept within the narrowly defined limits. These mechanisms include behavioural responses such as those that seek out nutritious foods, to keep the nutrient levels of the body at a certain range; the seeking out of shade in the afternoon sun, to avoid heating up the body to dangerous levels; immune reactions that fight off invading germs; the detoxification carried out by the liver to neutralize the toxins in foods; and the excretory actions of the kidneys that rid the body of its wastes[1].

2. The science of preventing untimely death

Disease results when the homeostatic mechanisms of the body fail to the extent that the body is unable to maintain the milieu interior. This usually results from toxic exchanges with the external environment, failures of the internal regulatory mechanisms, or a combination of the two.

Diseases that result from toxic exchanges with the external environment are said to be due to nurture. They are related to the type of environment the organism resides in. Those due to faulty internal mechanisms are called genetic diseases; they result from serious faults in the DNA blueprints of the organism that make it difficult for the cells of the body to maintain their milieu interior; while the diseases that result from a combination of both are called familial diseases; they result from slightly defective DNA blueprints, unable to cope with the toxic exchanges with the external environment.

2.1. Diseases that arise from fault in the internal regulatory mechanisms

Faulty internal regulatory mechanisms are responsible for genetic diseases such as sickle cell disease. They are usually transmitted from parents to child, and were first developed to enable an ancestor cope better with certain stress in the environment. For example, the sickle cell gene was developed for a greater resistance to malaria infection, but the double dose of the gene is so disruptive to the milieu interior that it results in the sickle cell disease.

Faulty internal regulatory mechanism is also responsible for the tendency of some individuals to easily gain weight, which served their ancestors very well in the time of famine, but predisposes them to obesity and its numerous associated diseases, in this era of cheap and concentrated calories. It also explains the hypertension that runs in some families, because of the changed internal regulatory mechanism that increased the ability of members of the families to retain salt. This served the ancestors of these families well in a period when salt intake was very poor and loss from sweating very high, but detrimental in the present time when a kilogram of salt can

be purchased with a few Naira, and added salt is the preferred method of enhancing taste.

These inherited diseases are difficult to treat; even traditional medicine practitioners that claim to cure everything recognise them as incurable. However, medical science has in some instances been able to moderate the effects of the faulty internal regulatory mechanisms with drugs, which in most cases are only able to provide momentary reliefs to the affected persons. Serious research studies are however on-going to develop gene therapy that would provide total cure for the diseases.

As at the moment, the most effective way of managing these diseases of faulty internal regulatory mechanism is in preventing the transmission of the faulty gene from parents to child, especially if the gene is Mendelian in its transmission. This is usually carried out with premarital screening, carried out before the couple ties the nuptial knots, so that separation can be advised if the intending couple are both found to be carriers of the gene, and therefore more likely to pass on a double dose of the defective gene to their children.

We carried out a study on premarital screening for sickle cell trait amongst Christian couples in Choba community, Rivers State[2] and found that more than 70% of the couples carried out the test when they got married, mainly because it was one of the conditions given by their church. Out of these, 9% were of the same HbAS genotype as their intended spouses; most of whom did not continue with the marriage plan, while about a fifth (21.05%) went ahead and got married, citing as reasons the difficulty of jettisoning their intended spouses (25%); and the power of God to prevent the birth of a child with sickle cell disease (75%).

2.2. Diseases that arise from stressful interactions between the internal regulatory mechanisms and the external environment

Cells are not designed to live forever, as the several life processes in them cause so much wear and tear that the internal regulatory mechanisms cannot fully repair the damages.

Wear and tear cause the cells to age. Most of them are caused by the oxidants generated when oxygen is used to convert food into energy. It is therefore believed that the cells of the body are only able to tolerate the 'burning' of a certain quantity of food, after which comes the diseases of old age and then death. This explains the observed relationship between the quantity of food a person has eaten, as signified by waist circumference and life expectancy, and the effectiveness of calories restriction and certain types of diet in achieving longevity. A public health physician once remarked that "*the longer the belt, the shorter the life*" to emphasize the macabre relationship between food and life expectancy that has been established in several studies[3].

Diets such as those eaten in the Mediterranean region and the people of Okinawa, Japan have been found to increase longevity through the greater protection they give to the body's internal regulatory mechanisms, especially to the cardiovascular system[4]. Most of the protection provided by these diets stem from the fact that they provide the right nutrients, in the proportions they are needed by the body. This spares the body the stress of converting a surplus nutrient into a needed nutrient, and the stress of coping with the deficiency of a needed nutrient. All these generate vast amount of oxidants that accelerate the aging of the cells of the body, and should therefore be avoided as much as possible.

It has been established that meals that contain the right amount of nutrients are those in which:

- Carbohydrates provide not more than 55% of the total calories content of the meal

- Fat and oil provide not more than 30% of the total calories, with saturated fatty acids providing just 5% of the 30%, and unsaturated fatty acids providing the rest.

- Protein provides not more than 15% of the total calories of the meal, preferably from protein of plant sources and/or lean sources of animal protein.

- The total cholesterol in all the meals consumed in a single day should not exceed 300mg.

- The salt content of all the meals eaten in a single day should not be more than 100mmol (approximately 6 g of salt)

- The meals should be able to provide 1,000 to 1,500 mg of calcium in a day; and

- The meals eaten in a day should contain a minimum total of 20g of dietary fiber

These recommendations guide the regular dietary guidelines given to Americans by the United States departments of Agriculture and Health and Human Services[5]. There are no similar guidelines for Nigerians; fortunately the nutritional contents of our staple foods make it very easy for Nigerians to eat according to the expert recommendations. The table below shows the proximate nutritional content of the common Nigerian staple foods.

Table 1: Nutritional content of the common Nigerian staple foods

	Water	Calories (KJ)	Carb	Protein	Fats and oil	Dietary fiber	Glycaemic Index
Rice white, long-grain (100g)	12%	1,528	80	7.13	0.66	1.3	73 (boiled)
Brown rice, long grain (100g)	10%	1,549	77	7.85	2.92	3.52	68 (boiled)
Beans (100g)	12%	336	49.43	23.52	1.26	10.6	(Cowpea, 52) (Brown beans, 24)
Cassava, (100g raw)	60%	670	38	1.4	0.3	1.8	56 (Garri)
Yam, dry	70%	494	23.8	1.5	0.17	4.1	67, white yam
Plantain	65%	511	32	1.3	0.37	2.3	64.9, (boiled)
Sweet Potato (100g)	77%	360	20	1.6	0.05	3	46 when boiled, 94 when baked

Yellow maize (100g)	10%	1,528	74	9.4	4.74	7.3	71 (maize meal porridge)
Sorghum (Guinea corn)	9%	1,419	75	11.3	3.3	6.3	32
Millet (100g)	8%	1,582	72.8	11	4.2	8.5	Less than 55
Groundnut (100g)	4.46%	2,385	12	25	48	9	7

Table 2: Nutritional content of the commonly consumed animal products

	Carbohydrate	**Protein**	**Fats and oil**	**Dietary fiber**	**Glycaemic Index**
White fish	0	23	1, including 0.5mg of omega-3	0	0
Oily fish (110g)	0	23	12, including 2g of omega-3	0	0
Crayfish	0	14.9	0.8	0	0
shrimps	0	23.8	2.4	0	0
Egg (large, 53g)	1	6	5	0	
Full cream cow milk	4.8	3.2	3.9	0	39
Chicken breast (110g)	0	28	7	0	0
Beef (110g)	0	36	7	0	0

Table 3: Nutritional content of the commonly consumed vegetables and soup thickeners

	Carbohydrate	**Protein**	**Fats and oil**	**Dietary fiber**
Fluted pumpkin (*Telfairia occidentalis*)	19.47	8.72	14.27	20.17
Ewedu *(Corchorus)*	24.6	11.24		6.7
Okazi leaf (*Gnetum Africanum*)	45.29	10.9	2.79	7.10
Bitter leaf (Vernonia Amydalina)	38.03	23.25	3.53	16.05
Waterleaf	10.87	3.52	3.52	12
Okra	7.45	1.9	0.19	3.2
Tomato (100g), 90% water	2.7	0.9	0.2	1.2
Egusi (*Citullus vulgaris*) (100g)	5.5	28.4	52.0	2.7
Ogbono (*Irinvigia*)	18.7	8.9	68	

It indicates that garri/cassava foofoo/pounded yam eaten with any of the traditional Nigerian soup meet the recommendations. The same can be said for plantain/yam porridge cooked with meat/fish and other condiments; and the *fura du nunu* and *tuwo* that constitute the staple meals of the people of northern Nigeria.

Native intelligence ensured that the staple food crops are not eaten alone, but often cooked in combination with the other staple food crops, with generous helping of condiments. This is very important because the individual staple crop is often deficient in some of the needed nutrients, and therefore cannot meet the nutritional recommendations when eaten alone.

Nutrition experts agree with our traditional cooking practices and recommend that meals should contain ingredients from all the five classes of foods, but in the proportion they are needed in the body. It is therefore advised that meals should consist of generous quantities of complex carbohydrates as found in grains, legumes and root crops like cassava, yam and potato; significant quantities of fruits and vegetables; moderate quantities of protein, preferably of plant sources or lean animal products; small quantities of fats and oil, preferably from sources like groundnut oil that are low in saturated fatty acids; and just enough condiments like table salt, spices and sugar to bring to the preferred taste.

Condiments like table salt and sugar are to be added in very small quantities, because of their adverse health effects, but traditional condiments and spices such as pepper, onion, curry leaf, scent leaf, ginger and soup thickeners can be used in more generous quantities, because they contain vitamins and dietary fiber that have the ability not only to lower the blood sugar level, but also have blood pressure lowering properties with their good sodium: potassium ratio[6].

Calorie restriction is another dietary regimen that is capable of delaying aging. It involves the intake of very small quantity of balanced diet that supplies the body with all the essential nutrients, but with little calories that is barely enough to meet the person's energy needs. Calories restriction is therefore similar to the fasting of the Biblical Daniel mentioned in Daniel 10:2 – *I ate no choice*

food; no meat or wine touched my lips. Daniel in this three-week fast probably subsisted on vegetables (Daniel 1:8 – 16) which provided the nutrients and the calories in the quantities that deliver the benefits of calories restriction.

Calories restriction is however not achieved with "dry fast" or the various versions of fasting that severely limit the intake of food. These versions of fasting supply the body with neither essential nutrients nor energy, and therefore compel the body to "eat itself" to survive, a process that generates large quantities of oxidants that accelerate the aging process. Studies carried out in a number of species, including yeast, fish, rodents, dogs and monkeys have clearly shown that calorie restriction slows the biological aging process, resulting in longer maintenance of youthful health, increase in both median and maximum lifespan, and delayed onset of age-related diseases[7].

Although these benefits have not been conclusively established in humans, there are however strong indications to their effectiveness, especially in reducing the damages done to DNA by the metabolism of food[8, 9].

Calorie restriction is suspected to aid longevity through the "famine situation" it creates that forces the body to repair damaged cells, instead of destroying them to form new ones, as is the case in surplus situation. This re-tuning of the body system primes the oxidant moping systems of the body, and strengthens the DNA of cells enough to prevent cancer, organ damage and other aging processes.

2.2.1. Aging can be accelerated

Aging or the deterioration of the cells of the body can however be hastened by certain interactions between some defective genes and the external environment. For instance, type 2 diabetes, the type of diabetes that mostly affects people of more than 40 years arises because some inherited defective genes failed to stop fat cells from hastening the destruction of the insulin-producing cells of the pancreas[10].

Certain external factors have also been found to hasten aging, even in individuals with normal genes. The most well-known of these aging accelerators are cigarette smoking and exposure to ultraviolet and other radiations. Studies have found that cigarette smoking ages the body at the rate of 5 to 20 minutes per stick of cigarette smoked, while exposure to a dose of ionizing radiation has been shown to shorten life expectancy by an amount proportional to the radiation dose[11].

The prevention of familial diseases is currently hinged on protecting the susceptible individuals from the adverse environmental condition. This is typified by the Diabetes Prevention Programme that gets persons with family history of diabetes to lose 10% of their body weight, as a way of preventing or delaying their diabetes[12].

Screening programmes are also instituted for the early detection of the diseases, especially as the damages caused by the environment to the genes are sometimes severe enough to cause cancer, which are best managed when they are detected early. Screening programmes are tests carried out on persons without symptoms, who because they are not sick are often times not willing to suffer even the least inconvenience to carry out the test.

Yet, screening test is the best option available to a cancer patient for a cure. My colleagues, Dr. Babatunde and Prof. Ikimalo carried out a study on the uptake of cervical cancer screening amongst patients attending the antenatal clinics of the two tertiary hospitals in Port Harcourt, and found that whereas the patients had good knowledge of the screening test, and were positively disposed to the test, yet only 8.3% of the patients had carried out the test, citing lack of time and the inconveniences of accessing the service in the tertiary hospitals[13].

The poor uptake of screening tests is believed to be responsible for the low cancer survival rate in Nigerian hospitals. Improving the uptake of screening tests, in spite of the constraints, to improve the survival chances of patients is an art possessed by the properly trained Public Health Physician that would be divulged later in this lecture.

Poor uptake of screening services is sometimes due to the fear of a positive test result. This is because a positive test result is capable of converting an infected person with no symptoms into a mental wreck, scared stiff of his/her impending death. This is the reason why screening programmes are not instituted for incurable diseases, and the reason for coupling screening programme with treatment programme that offers effective treatment for the disease being screened, often at no or subsidized cost to the patient.

This coupling of screening with treatment programme was sadly not done when mandatory HIV test was first introduced in Nigeria in the early 2000s. I cried out over this unethical practice[14], and went on to assess the effects of such mandatory screening programmes on the uptake of other important services in the health facility. The study found that the introduction of mandatory HIV test in the health center resulted in a 250% decrease in the uptake of ANC services, and a 200% decrease in ANC visits in the health center, two years after the introduction of the mandatory test[15].

2.3. Diseases that arise from toxic exchanges with the external environment

Every human being interact with his/her environment which consists of living things such as germs, disease vectors, animals, plants and fellow human beings; and non-living things like rivers, mountains and the weather.

Human beings exist in a give-and-take relationship with the environment. The environment provides human beings with the basic necessities of life – food, oxygen, warmth, water and companionship; while man in return generates wastes, which are discharged into the environment. Human wastes are basically of two types:

- The wastes generated in the course of the basic human existence, such as faeces, garbage and the air pollution from the use of fire; and

- The wastes generated due to the technological advancement of man, and the unsustainable consumption of the earth's natural resources

These wastes are hazards capable of causing diseases, but they do so in very different ways. The wastes generated in the course of basic human existence are very fast in causing ill health, such as the diarrhoea that results from the drinking of faeces contaminated water. The diseases are however mostly curable, oftentimes with cheap and readily available medications.

On the other hand, the wastes generated from human technological activities typically take months and years to cause diseases like cancer and organ damage that are mostly incurable. They are therefore not easily recognized as dangerous to health, especially by lay people, because of the difficulty in linking them to the diseases they cause.

Although the wastes cause diseases in different ways, they are however mostly deleterious when they are allowed to accumulate in the environment beyond the safe limit, when pollution is said to have occurred. Thus, air pollution is not just the presence of the pollutants in the ambient air, but the presence of the pollutants in concentrations that have been shown to cause disease. The presence of very strong carcinogens like benzene is however considered as pollution, no matter their concentration, because even a single molecule of a carcinogen can technically cause cancer.

The accumulation of pollutants in the ambient environment beyond the safe limit is related to the rate of generation of the pollutants, and the rate at which they are removed from the ambient environment. Measures are therefore usually put in place for the removal of the pollutants, to ensure that they do not accumulate to dangerous levels in the ambient environment. For instance, an average human being excretes about 128g of faeces every day; provisions are therefore made for the safe collection and treatment of the faeces, in the form of the various types of toilet, to prevent the fouling of the ambient environment. This explains why the WHO advises that toilets should be within a 50 meter distance of one's house, to discourage open defecation that fouls the environment.

Also, an average urban resident generates between 200g and 3kg of solid waste every day, depending on several factors. This means that up to 3,000 tons of solid waste are generated every day in a town of one million inhabitants that would need to be evacuated from the immediate environment. It is therefore obvious why governments all over Nigeria are struggling to cope with municipal waste disposal services.

Furthermore, firewood is used by 63.7% of households in Nigeria, according to the 2013 National Demographic and Health Survey[16]. It is however estimated that the burning of 1kg of firewood in an indoor kitchen, as is common in the Niger delta region releases more than 3,000mg/m^3 of soot into the ambient air, thirty times the WHO guideline value for PM_{10} of 100mg/m^3, for indoor environment[17]. This high level is because of poor ventilation, especially as the kitchens are often without windows and chimney.

The rate of removal of the wastes from the ambient environment is often influenced by such features in the physical environment as terrain and weather. This is particularly true in the Niger delta region that has four distinct ecological zones that influence the management of wastes in their own unique ways. These ecological zones are:

- Coastal barrier islands,
- Mangrove forests,
- Freshwater swamp forests, and
- Lowland rainforests

The coastal barrier islands are located at the Atlantic coast of the Niger delta region, but are up to one meter above sea level, such that they are sufficiently protected from the tidal waves of the ocean. They have a top soil that is able to support freshwater forests, associated flora and fauna, and dense human habitation. Members of the communities in the coastal barrier islands get their drinking water from very shallow wells dug in the top soil. Water from these hand-dug wells are often contaminated, because they are exposed to contaminants from the top soil, and the short depth of the wells is only able to filter out a little of the contaminants.

The quality of drinking water in the coastal barrier islands is particularly threatened by the difficulty faced by members of the communities in disposing their sewage and solid wastes. The high population density of the islands, the small landmass that provide little room for the construction of the required sanitation facilities, and the high groundwater level that make the construction of pit latrine and other toilet facilities difficult force members of the communities into the use of the unhygienic pier toilet.

Communities in the mangrove forest ecological zone are on the other hand located below sea level, and are therefore constantly flooded by tidal waves, even as they are separated from the Atlantic ocean by the barrier islands. Groundwater in the mangrove forest zone is very salty, such that the inhabitants mostly rely on rain water for their drinking water. This reduces the ability of the mangrove zone to support human population, hence the tendency to use the zone as temporary settlements such as the "fishing ports".

The over-reliance of the inhabitants of the mangrove forest zone on rainwater means that residents of the zone lack drinking water during the dry season; and are often faced with the problem of rainwater contamination from the air pollution caused by the gas flares of the oil companies, and the activities of illegal refiners of crude oil.

The freshwater swamp ecological zone of the Niger delta encompasses most of Bayelsa State, the Ijaw areas of Delta State, and the riverine communities of the Orashi region of Rivers State. The zone is flooded during the rainy season by the tributaries of river Niger, such that most of the dense human habitations in the zone are located along the highland of the levees of the territories.

Communities in the freshwater swamp ecological zone have enough drinkable water, from several sources, to meet the commended daily per capita water need of at least 20 liters. These water sources are however contaminated by the use of pier toilets, which the inhabitants of the zone are forced to use, because of the high groundwater level that makes it difficult and expensive to build and use the right toilet facilities[18].

The lowland rainforest zone is the least swampy of the ecological zones of the Niger delta; the most densely inhabited part of the region, but technically outside the dense river and creek network that make up the geographical Niger delta. The zone has the big tributaries of river Niger, before they broke up to form the geographical Niger delta, and encompasses most of the so-called upland region of the Niger delta States.

Because the lowland rainforest ecological zone is the driest in the Niger delta region, inhabitants of the zone trek greater distance to access water from the big tributaries of river Niger located in the zone. This forces them to fetch water from unsafe sources, thus exposing them to water-borne infections such as diarrhoea and typhoid, water-chemical diseases as methaemoglobinaemia, water impounding diseases such as schistosomiasis and water-shortage diseases like skin diseases[19].

The adverse environmental conditions of the various ecological zones of the Niger delta are responsible for the higher prevalence of several diseases in the region, compared to the comparable regions of southern Nigeria. The two-week period prevalence of acute respiratory tract infection among under-five children, a proxy measure of air pollution, according to the 2013 National Demographic and Health Survey is 1.7% in the Niger delta region, higher than the 0.8% in the south-west region, and comparable to the 2.1% in the south-east region. The national average is 2%[16].

Also, the period prevalence of diarrhoeal diseases among under-five children, a proxy measure of the microbiological quality of drinking water was found to be as high as 26.97% in some communities in the freshwater swamp ecological zone of the Niger delta region[18], which is significantly higher than the national average is 10.2%

2.3.1. The oil and gas companies and the Niger delta environment

Vice Chancellor Sir, we observed that the harsh environmental conditions of communities in the Niger delta region are further compounded by oil exploration and exploitation activities in the region. The oil companies operating in the Niger delta region have been noted to contaminate the environment of the region with their

industrial wastes, mishaps and social vices, with significant health impacts.

The oil companies are known to indiscriminately dump their unprocessed wastes into the Niger delta environment, even as they are statutorily required to process and properly dispose the wastes[20]. These wastes are known to contain mercury and other heavy metals, endocrine disruptors, carcinogenic aromatic hydrocarbons, and Naturally Occurring Radioactive Materials (NORMs) [20].

Avwiri GO, Ononugbo CP and others of the department of Physics of this university recorded high levels of background radiation in several Niger delta communities, as a result of the NORM produced by the oil companies[21, 22]. Exposure to the levels of radiation recorded in these studies can increase cancer rates in the communities, although no community-based study has so far been carried out to quantify the extent.

For now, we don't know how many cancer this has caused, but I suspect the number would be high, because of the number and types of unwitting exposures such as the one suffered by my primary school headmaster. He grew up in a farm settlement, drinking water from the Sombreiro river, but became so "enlightened" that even the water from our community's water borehole was not clean enough for him. He felt that the water borehole of the Whiteman at Ebocha would be cleaner, and therefore decreed that his drinking water be fetched from the public tap outside the Ebocha flowstation, about two kilometres from our community. He didn't know that the water is contaminated with NORM, as shown by the study of Ononugbo and co[21], at a level so high and dangerous that the oil company, knowing the risks was forced to resort to the use of bottled water as early as the early-1970s.

Exposures to the other contents of the wastes of the oil companies have also been found to cause several other diseases including infertility, menstrual irregularity, spontaneous abortion, psychosomatic ailments and mercury poisoning[23]. The risk of mercury poisoning is very interesting, because of its link to the big fishes that are eaten with pride and relish in the Niger delta region.

Mercury is a component of the drilling waste of the oil companies. A study carried out in the Gulf of Mexico found that mercury level in the muds and sediments beneath oil platforms can be as high as 12 times the approved level [24].

It can therefore be assumed that the levels in Nigeria would be significantly higher. Nevertheless, fish and shellfish have the capacity to bio-accumulate mercury in their bodies several times the concentration of mercury in the water in which they live, and is often enough to cause widespread poisoning, as was noted in the Minamata bay in Japan[25].

Big, carnivorous fish like shark and sword fish, preferred by the affluent people of the Niger delta region are known to contain particularly high levels of mercury, such that the United States Food and Drug Administration had to advise that pregnant women and women of childbearing age who may become pregnant should limit their consumption of these fish to no more than one meal per month, to protect the foetus[26].

Alkylmercury poisoning present as Minamata disease, named after Minamata Bay, Japan where the phenomenon was first noticed. Mercury is a neurotoxin, and Minamata disease is characterized by such severe neurological symptoms as slurred speech, unsteadiness of gait and limbs, muscle weakness, irritability, memory loss, depression and sleeping difficulties; as well as kidney damage and heart problems. It is also capable of causing birth defects, hence the advice given to women of child-bearing age[26].

Oil companies operating in the Niger delta region are said to flare more associated gas than any other place in the world[20]. The health effects of gas flaring are numerous, but mostly linked to its capacity to cause acid rain, contribute to climate change, and emit pollutants such as the particulate matter (black soot) that has caused so much public outcry in Port Harcourt in recent years.

Although the gas flares of oil companies in Nigeria have been noted to emit a lot of black soot into the atmosphere, most of the black soot in Port Harcourt were however believed to emanate from the activities of illegal artisanal refiners of crude oil, and worsened by

the meteorological factors that caused temperature inversion and reduced wind speed that prevented the dispersal of the soot.

The health problems associated with the inhalation of the soot include:

- the triggering of asthmatic attack in asthmatic patients;
- the increased susceptibility to respiratory infections, especially among children;
- the increased susceptibility to chronic bronchitis among adults
- The sickening of patients with pre-existing cardio-vascular diseases, resulting in their hospitalization; and
- Excess mortality, especially amongst patients with pre-existing cardiorespiratory ailments.

Exposure to the black soot is probably carcinogenic, as feared during the Black Soot crisis in Port Harcourt. This is because the Working Group of the International Agency for Research on Cancer (IARC) in 2014 classified particulate matter from outdoor air pollution as carcinogenic to humans (IARC Group 1), based on sufficient evidence of carcinogenicity in humans and experimental animals, and strong mechanistic evidence [27].

However, also in the IARC Group 1 of confirmed carcinogens in humans are[28]:

- Processed meat like dry meat, suya and hotdogs, because they have been found to contain some amount of some known carcinogens

- The toasting of bread, because the toasting process produces ethyl carbamate, a known carcinogen

- The drinking of beer, palm wine and other alcoholic beverages, because the processes of brewing and fermentation result in contaminants such as nitrosamines, mycotoxins, ethyl carbamate, and benzene that are known carcinogens

Although the black soot might not cause as many cancers as was expressed by the black soot campaigners, there is absolutely no reason why the presence of the soot should be tolerated, considering that the suspected causes are illegal and a big waste of the resources of the country.

The activities of the oil companies in the Niger delta region are also plagued by incessant crude oil spills. It is estimated that more than 7,000 oil spill incidents have occurred in the Niger delta over a 50-year period, resulting in the spillage of more than 15 million barrels of crude oil into the environment[20, 29].

Crude oil spills pollute the air, causing respiratory and neurological symptoms; contaminate the water supply, causing diarrhoea in the short term, and possibly cancer in the long term; destroys the food supply, causing hunger and leading to malnutrition in children, which compromises their future wellbeing[29].

We assessed the effects of a crude oil spill on members of Etiama community, Bayelsa State and recorded significant increases in the incidence of diarrhoea, eye and skin irritation, cough and occupational injuries amongst the residents of the community[30]. We also recorded a significant deterioration in household food security and increased prevalence of childhood malnutrition in the community following the oil spill[31]. We also reviewed other studies and found that the spilled crude oil caused the bio-accumulation of the various constituents of crude oil in food crops grown in the region, often to levels that are detrimental to human health[29].

Vice Chancellor sir, perhaps the less obvious harmful effect of the presence of the oil companies in the Niger delta region is the social vices they created and encouraged, which are responsible for the poor reproductive health indices in the region. The oil company workers are about the best paid in the country. Sadly, the oil companies are only able to employ only a few persons, creating a distinct community of affluent oil company staff in the midst of very impoverished host communities. This situation created among other things, the exchange of sex for financial and other gratifications, especially as the oil company workers usually come to work without their families.

According to 2012 Nigerian National HIV/AIDS and Reproductive Health Survey[32]:

- The age at first sexual intercourse in the Niger delta region is 17 years, which is the lowest in southern Nigeria.

- 41.4% of women in the region had sex with a non-marital partner in the 12 months before the study, which is much higher than the national average of 25%.

- Similarly, 25% of men in the region had sex with a non-marital partner in the 12 months before the study, compared to the national average of 12.2%,

- 12.8% of women aged 15 – 29 years in the region exchanged sex for gift or favour, compared to 1.4% in the North-west zone, and 8.4% in the South east zone. The national average is 5.3%

- 6.4% of women in the region had sex with multiple partners in the 12 months before the study, compared to 1.6% in the North-West zone and 7.1% in the South west zone. The national average was 5.7%

These sexual behaviours are not without any adverse health effects, as clearly shown in the Sexually Transmitted Infections and HIV/AIDS infection rates of the region in the 2012 Nigerian National HIV/AIDS and Reproductive Health Survey[32]:

- 8.0% of sexually active persons in the South-South region experienced symptoms of STIs in the 12 months that preceded the survey, compared to the South-East average of 6.3%, the South-West average of 3.4% and the national average of 6.6%.

- The prevalence of HIV amongst sexually active persons of the South-South region of 5.5% is the highest in the country, and significantly higher than the 1.8% of the South-East region, the 2.8% of the South-West region, and the national average of 3.4%

- The prevalence of HIV amongst girls who have sex for money is highest in the South-South region at 7.1%, which is significantly higher than the prevalence of 3.0% in the South-East region, 0.0% in the South-West region, and the national average of 4.9%.

- 6.1% of HIV positive men, and 5.8% of HIV positive women in the South-South region had sex with a non-marital partner in the 12 months that preceded the survey, compared to 1.3% and 3.2% of the South-East region, the 2.9% and 2.3% of the South-West region, and the national average of 3.6%.

- 4.5% of HIV positive men in the South-South region used condom with a non-marital partner, compared to 2.4% of the South-East region, the 1.7% in the South-West region, and the national average of 3.5%.

Other studies showed very high prevalence of teenage pregnancy that can be traced to the oil company-induced sexual behaviour. Prof. Anochie of our Paediatrics Department found a pregnancy rate of 27.0% among sexually active female secondary school students in Port Harcourt, with 24.8% of the pregnancies ending in induced abortion[33].

Although abortion is a common recourse in the event of unwanted pregnancy in Nigeria, especially amongst young and single women; the situation in the Niger delta is such that even widows and divorcees routinely carry out the procedure. This is because even older women in the Niger delta exchange sex for financial and other gratifications. A cross-sectional study we carried out in Port Harcourt found that more than 17% of the women who procured abortion were widowed, divorced, or separated[34].

The widespread exchange of sex for gratification has resulted in a change in the attitude towards sex in most Niger delta communities. Historically, traditional communities do not condone sex outside wedlock, and have severe sanctions for abortion. All these have changed in the Niger delta. In a study we carried out in a semi-urban

community in Rivers State[35], we found that although the youths of the community had the powers to investigate, arrest, detain, try and sentence people found to have gone against the customs and traditions of the community, more than 70% of them would advise their sisters to procure an abortion in the event of an unwanted pregnancy.

2.3.2. Remedial measures for a better environment

At present, environmental sanitation is the standard method of ridding the environment of wastes and the hazards they constitute. Environmental sanitation is defined by the WHO as the control of factors in the environment that exercises, or may exercise a deleterious effect on the physical development, health and survival of humans. The environment of the Niger delta region can therefore be sanitized, and made more conducive for health, with the concerted efforts of the government, residents of the Niger delta region, and the oil companies that operate in the region. The target is at the minimum attain the guideline value set by the WHO for each of the environmental hazards. Guideline value can simply be defined as the maximum concentration of the hazard that has been found to be safe for an average person.

2.3.2.1. Government's role in ensuring a better environment in the Niger delta region

It is clearly enshrined in the Nigerian constitution that the welfare of the people is the primary function of the government. Government at all levels therefore need to play a more active role in solving the environmental problems of the Niger delta, especially as the region is currently the goose that lays the golden eggs. The best way of playing this role is in funding the development and adoption of appropriate technologies for the better management of the environment. For example, the riverine communities of the Niger delta region are forced to use the pier toilet, because of high groundwater level that creates enormous difficulty in the construction and use of a more hygienic toilet. This problem can easily be solved with a modular sewage treatment plant that can be

constructed at a very affordable cost, with almost any water-tight container, pipes and plumbing fittings.

Similar low-cost technologies are needed to improve the quality of the numerous sources of water in the Niger delta region, to ensure that every inhabitant of the region can access potable water within the recommended 30 minutes. This would include technologies that can disinfect and retain the portability of the faeces-contaminated waters of the freshwater swamp ecological zone of the region, as well as low-cost desalination facility that can tackle the increasing problem of saline intrusion into the drinking water sources of communities in the Niger delta region. A low-cost desalination facility is of utmost public health importance because the prevalence of hypertension and other cardiovascular diseases have been found to be higher in communities whose drinking water supply has high salt (sodium) content[36].

Appropriate technologies are also needed to improve the housing condition in the Niger delta communities, and for the better management of solid waste, especially the plastic waste that has blighted the environment, and is worsening the flooding situation in the region.

Communities in the Niger delta have over the years evolved forms of shelter that are well suited to their natural environment, both in terms of the materials used, and in the adequacy of protection from the elements. These traditional houses however have a lot of defects - thatches made with the leaves of the raffia plant are not durable and can be leaky, the floors of the houses are often not impermeable enough to keep away pathogens, while the designs of the houses grant free access to disease vectors like mosquitoes.

Efforts were made in the 1980s to correct the defects in rural housing, through the defunct Directorate for Food, Roads and Rural infrastructure (DFFRI), but the successes recorded were not sustained. A more sustained success was however recorded in the Malawian rural housing programme that won the 1987 World Habitat Award. The programme funded the development and use of low-cost building materials, construction techniques, and simple house designs capable of being extended in stages, to ensure that

Malawians are able to build their own healthy houses, at very affordable cost.

Government also need to introduce a recycling scheme for plastics, to reduce the huge quantity of discarded plastics. This should be made part of the conditions for the licensing of food and beverages companies that make use of the plastics. This is urgently needed because of the shift from the use of re-usable glass bottles to single-use pet bottles, by soft drinks companies in Nigeria.

Government and its agencies also need to emphasize the human health aspects of their regulatory activities, something that is ignored in the subsisting EIA Act and other legislations on the environment. This is very sad, because, whereas principle one of Agenda 21 released at the end of the 1992 United Nations Conference on Environment and Development in Rio de Janeiro clearly stated that human beings should be at the center of concerns for sustainable development, Nigerian environmental laws put more emphasis on plants and wild animals than on human beings, such that the human health implications of the operations of oil companies are often not considered in the regulatory activities of the Ministry of Environment and the Department of Petroleum Resources (DPR). The folly of this was exposed in the Ogoni UNEP report[37] that drew huge public outcry, because it rightly linked the levels of benzene in the drinking water of the communities to the risk of cancer; something that was not done by similar studies carried out in the communities, but with the Terms of Reference (TOR) provided by the MDAs. There is therefore an urgent need to amend the subsisting environmental laws and the regulatory activities of the MDAs, to ensure that they give greater emphasis to human health.

2.3.2.2. The role of the oil companies in ensuring a better environment in the Niger delta region

The oil companies operating in the Niger delta region on their part need to shun sharp practices, and use international best practices in their operations, even when the laws are very lenient, and regulation poor or compromised, for according to Sir Thomas Morrison Legge (1863 – 1932), a foremost and pioneer occupational physician, "*If you can bring an influence to bear external to the workman, you will*

be successful; and if you cannot or do not, you will never be wholly successful". I must acknowledge that many of the oil companies, especially the SPDC have done well in this aspect, by incorporating health impact assessment in all their environmental studies, even when they are not under obligation to do that. I will therefore urge the other oil companies to follow the SPDC example, for they can be held to account, probably not by the government, but by activists able to input the health implications into the publicly accessible reports they submit to the regulatory agencies of government.

2.3.2.3. The role of the residents of the Niger delta region in ensuring a better environment

Residents of the Niger delta region have a huge role to play in ensuring a health environment. There is however a need to educate them on the dangers in their environment. They also need to be encouraged to do their part, and mobilised to put pressure on the government and the oil companies to adopt international best practices.

Most residents of the Niger delta region, including very educated persons do not fully appreciate the health implications of the hazards in their environment. The reasons are both cultural and causal. For instance, the use of pier toilet in the riverine communities of the Niger delta region is seen as a cultural thing, sometimes eulogised, but it contaminates the environment with raw faeces, and is responsible for the frequent epidemics of diarrhoeal diseases in the communities; yet most people in the communities are indifferent on the need to change to a more hygienic toilet.

The causal reason relates to the fact that a lot of the hazards in the Niger delta region, especially those produced by the oil industry are slow poisons that take years to fully manifest their lethal potential. It is therefore very difficult for the untrained mind to link them with the cancer and organ damage that occurred decades after the exposure to the hazard.

3. The art of preventing untimely death

The art of preventing untimely death relates to how the science is applied to get the desired objective of promoting health, and

preventing and treating diseases. The expression of the art is mainly to get the patient to deploy the innate extra-ordinary force that is often reserved for life and death situations in the fight against an ailment, no matter how trivial the ailment is. It is the innate force that propels a person with a fractured leg out of a burning house; and the force that transforms a father into a Sampson in defence of his family. These are the forces that are teased out of the patient by the master health practitioner, using various methods, but all are believed to act mostly through suggestion, hypnosis and mesmerism.

The art of preventing untimely death is often times as important as its science, but there is however a tendency for those that know the science to abandon the art, and for those with little knowledge of the science to elaborate the art, knowing that they are ordinary without the art. Modern medicine has effectively abandoned the art of medicine, placing its confidence in science, and treating its patients similar to how a mechanic repairs a car. Modern medical practice has largely lost the art of healing.

Faith healers on the other hand, like medieval physicians have little knowledge of the science of healing, but have earned great success by perfecting the art of healing, through the countless hours they spend in the wilderness, Bar Beach and similar places, experimenting, practising and perfecting their healing art, gaining "powers" and becoming miracle workers once they clock 10,000 hours of deliberate practice and experimentation, according to the 10,000 hour rule made popular by the English-born Canadian journalist, author and motivational speaker, Malcolm Gladwell in his book, *Outlier: The Story of Success*. Medical doctors and faith healers are currently the two most successful health practitioners in Nigeria, in spite of their different healing methods.

Vice Chancellor Sir, the methods used by clinicians and faith healers are suitable for single patients; practitioners of my own specialty of medicine have responsibility over everybody in a given community, LGA or State, and are charged to have something for everybody, according to their need. Our methods are therefore different.

Our specialty formally started in Britain, with the enactment of the 1848 Public Health Act. This Act appointed Medical Officers of Health for each local council, and gave them police powers to enforce the sanitary reforms, and carry out anything needed to control the frequent epidemics of infectious diseases. The equivalent Act was enacted in Nigeria in 1917, soon after the amalgamation of the Southern and Northern protectorates in 1914, to create the Nigerian nation. When Dr. Isaac Lapido Oluwole (1892–1953), the first African MOH in Nigeria was appointed in 1925, he found it difficult to single-handedly enforce the provisions of the 1917 Public Health Act, so he recruited and trained the sanitary inspectors to help him in looking out for nuisances in homes and workplaces, throughout his area of jurisdiction, which was the whole of the present south-west geo-political zone of Nigeria.

The sanitary inspectors by extension had police powers, and they were dressed like the Police, as can still be observed in the uniform of their present incarnate, the Environmental Health Officers. But Police are never the friend of the policed, as the MOsH and their foot soldiers – the sanitary inspectors soon became unpopular, even as safeguards were later introduced to curtail their powers. This made the discharge of the other responsibilities of the MOH that required the cooperation and participation of the general public difficult, as reflected in the following comments of Dr. Charles V. Chapin, one of the foremost practitioners of public health in the early 20th century:

> *"Thus far the promotion of public health has been largely a matter of compulsion. The state took away men's property and men's liberty . . . The rigorous enforcement of isolation took away man's most cherished right, his personal liberty. Police work is not pleasant work. It is slow work, and he who does it finds it difficult to obtain the good will of those whom he coerces"*

The problems created by the use of police powers encouraged a change in strategy in favour of health education, in which people are convinced, rather than coerced to carry out the sanitary reforms, and

other things necessary for disease prevention and control. The use of health education in preventing diseases was given a big boost with the validation of the germ theory in the 18th century that clearly defined the causes of diseases as micro-organisms that can be controlled through certain hygienic practices.

Health education was used as a means of disease control very early in Nigeria. Dr. Henry Strachan, the Chief Medical Officer of the Lagos Colony in 1901 started a series of lectures that taught hygiene practices, child care and the advantages of vaccination to housewives, domestic staff and students in the colony; while Mr. William Sellers, who later became the head of Health Propaganda unit of the colonial government produced a short instructional film in 1929 titled *Anti-plague operations in Lagos* to help out with the control of the frequent epidemics of plague in Lagos at that time. Dr. Oluwole later employed health visitors to visit the homes of discharged patients, to check on their welfare and promote good health practices. He also formalized the teaching of skill-based health education to students in schools under his jurisdiction, to help out in disease control.

I have also played my part in health education since my days in medical school, in this unique institution. I edited a campus health magazine, *the X-ray* as a medical student, and I have given several public lectures and participated in several health programmes in the mass media, as a medical doctor. More significantly, my friend, Prof. Brisibe and I have written a series of patients' education books designed to teach patients of non-communicable diseases what to do about their disease, how to do them, and when to do them. Such self-help books have been found not only to reduce the cost of treatment, but also to add vibe and years to the life of the patient, especially for diabetic patients that provide up to 95% of the total health care given to the patient.

Health education is however currently an all comers affair in Nigeria, carried out by nearly everybody with the least knowledge of the health sciences. This is even as health education needs to be delivered with the skillful application of communication and behavioural change theories to be truly effective. This sad scenario

was displayed during the 2014 Ebola epidemic that saw the invasion of the mass media by 'health educators' chorusing the fact that the disease is incurable. The disease is indeed incurable, but emphasizing this fact does not encourage patients to go to health facilities, but instead drives them towards faith healers that claim to heal all diseases, including Ebola.

Epidemics of highly infectious and fatal diseases like Ebola are best controlled when patients are admitted in health facilities, where they are isolated, and therefore not able to transmit the disease to members of their households and the general public. One can imagine what would have happened, if one of the Ebola patients had sought healing from any of the popular faith healers in Nigeria. The success of the Ebola control effort in Nigeria owes a great deal to the commitment extracted from faith healers not to accept any patient for healing, especially those from the severely affected countries of Liberia, Sierra Leone and Guinea.

Vice Chancellor Sir, the practitioners of our specialty of medicine are brave and courageous with their methods, in the control of deadly epidemics of infectious diseases. It is often said that when an epidemic of deadly disease is reported in a community, public health physicians would be running into the community, while the other doctors would be running out of the community, for their dear lives. Such is the bravery and courage of public health physicians that were especially demonstrated during the immediate colonial period in Nigeria, when epidemics of deadly diseases were rampant.

One of the instances was the steps taken by Oguntola Odunbaku Sapara (9 June 1861 – June 1935), in the control of the incessant epidemic of smallpox in his medical division[38]. Dr. Sapara was one of the first western-trained Nigerian doctors. He was appointed an Assistant Colonial Surgeon in the colonial medical service in 1896, and in 1897 posted to serve the Epe medical district, at the height of an epidemic of smallpox. He tried everything in the books to control the epidemic in the division, all to no avail. Exasperated, he turned his attention to the priests and worshippers of *Sopona*, the Yoruba god of smallpox whom he suspected to be actively spreading the disease, for their own material benefit. Although he believed in the

potency of juju, the desire to end the epidemic of smallpox was enough for him to dare the wrath of the dreaded *Sopona*. He got himself initiated into the *Sopona* cult not to worship the deity, but to fully understand the modus operandi of the worshippers in spreading the smallpox, which he got after a few interactions. Dr. Sapara's report to the colonial government in 1919 led to the enactment of the "Witchcraft and Juju Ordinance" law that made the worship of smallpox punishable by imprisonment, which contributed in no small way in the control of the epidemics of smallpox in the whole of Yoruba land. Dr. Sapara was in June 1923 awarded the Imperial Service Order by King George V, in recognition for this and others.

3.1. Dealing with non-communicable diseases

Vice Chancellor Sir, epidemics of deadly infectious diseases are no longer as rampant as they were during the colonial period. Nigerians however face new disease epidemics that are not as dramatic in killing their victims, but nevertheless torment their patients with ill health, drain their resources, before taking their life. These new epidemics are epidemics of non-communicable diseases that emerge once a community or country becomes more prosperous, and is better able to control communicable diseases[39].

Studies indicate that this epidemiological transition has already taken place in Nigeria. For instance, the prevalence of malaria among under-five children has decreased from 42% in 2010 to 27% in 2015[40]; while the prevalence of hypertension has increased from 11.2% in the 1990s, to 27.9% in 2010, in Barako community, a rural Ogoni community in Rivers State[40]. We got a prevalence of 21.33% amongst the lecturers of our medical school[41], 24% amongst the Christian clergy of Port Harcourt; and a prevalence of 68.87% amongst the traditional chiefs of an oil-bearing community in Rivers State[42].

Non-communicable diseases unlike communicable diseases are not curable, but treatable, though not as amenable to modern medicine as the communicable diseases, even in the best hospitals. For instance, good hypertension control was achieved for just 24.2% of the patients seen at the Medical Out-patient clinic of the University of Port Harcourt Teaching Hospital; as many as 25.3% of all patients

admitted into the medical wards of the Aminu Kano Teaching Hospital, Kano died while on admission; while a multi-center study that involved several tertiary hospitals in Nigeria found that most diabetic patients seen in the hospitals were unable to control their blood sugar level, were also hypertensive, and also had the other chronic complications of the diabetes[44].

The poor treatment outcome for non-communicable diseases though recognized globally is believed to be responsible for the increase in medical tourism in Nigeria, and the increasing incidence of discharge against medical advice, even in the "supreme court of hospitals" – the university teaching hospitals. We carried out a two-year review of the records of all the patients that were discharged against medical advice in the medical wards of the University of Port Harcourt Teaching Hospital, and found that the patients were 5.4% of the total patients admitted into the wards during the period[45]. Most (75.4%) of the patients were being managed for non-communicable diseases, and they spent an average of 12.9 days in the hospital before asking to be discharged for reasons ranging from poor treatment outcome (42.4%), financial constraints (28.0%) and a desire to seek other treatment options (22.0%). It is interesting to note that 17% of the DAMA form of the patients were signed by the religious leaders of the patients.

3.1.1. Working with faith healers

Doctors and faith healers need to work together to tackle the emerging epidemic of non-communicable diseases, instead of their current penchant for demarketing each other. Patients with non-communicable diseases fare better when they come to the hospital early, with or without symptoms. Studies have however shown that Nigerians rarely do this, for a variety of reasons that revolve round their religious beliefs. Some religious denominations in Nigeria believe that non-communicable diseases are "not their portion", and therefore do nothing to prevent them; while several others believe in miracle and in the potency of prayers, and therefore forsake modern health care. These beliefs have been found to be partly responsible for the poor uptake of preventive services and the late presentation of patients to hospitals for treatment[46 - 48].

Also detrimental is the quest to secure divine healing after receiving a "horrible report from the doctor". This is because studies have shown that it benefits neither the faith healer nor the patient in the long run. Pastors who minister to patients with incurable diseases have been found to have higher burnout rate, due to the poor outcomes of the patients[49]; while patients that sought for divine healing before accessing medical care fare worse than patients that access medical care as soon as they receive the diagnosis. This is clearly captured by the following poem written by a diabetic patient:

My quest for healing[50]

My doctor gave me a diagnosis of diabetes
Reject the result!
You are not so sick,
As to have a disease,
As serious as diabetes, says an inner voice

But you thirst and drink,
And then piss and piss,
Which the doctor said are the signs of the disease

Na true-o, I said to agree with the second voice
But, how can I agree to become a diabetic?
A disease that debilitates and incapacitates,
And requires a sacrifice of a limb, every few years

I must seek for a divine cure!
I assure myself
And off to Lagos I went
To seek out the bearded Pastor,
With the healing anointing

Days turn to weeks and months,
As I queue among the multitude
Waiting to be healed
All to no avail,
As I continuously lose my place on the queue,
No thanks to the pissing and pissing
That comes with diabetes

Now my condition is worse
I weighed a hundred kilos,
Now I weigh a half
I drank four bottles of water a day,
Now I drink a score of it
I didn't have foot ulcer,
Now I have giant ulcers on both feet,
Developed as I queued to be healed
My wife said the ulcers smell like rotten corpse
And advise that I see a doctor
But, am afraid to do that
Cos Uncle Ike did, and had his feet amputated

Sadly, my vision is now very poor
I now see my children only in their voices,
Like the biblical Isaac
My mind tells me my days on earth are numbered,
That it is time to gather my children,
To have a mess of pottage,
And pass on my blessing
But, is my life really coming to an end?
Just months after my doctor diagnosed my diabetes?

Patients diagnosed to have an incurable disease have the tendency to reject the diagnosis, and to seek confirmation from persons with optimistic opinion. This is because human beings have been shown to mourn the loss of their health the same way they mourn the death of a loved one[51]. Elisabeth Kubler-Ross studied terminally ill patients and found that they go through five stages in mourning their impending death[51]. The stages start with denial and ends with acceptance, unfortunately the disease does not require the acceptance of the patient to cause harm, which is how the patient that comes late to the hospital meets his ill.

To prevent this, and improve the chances of survival of the patient, public health physicians engage in behavioural change communication, to improve the health literacy and health seeking behaviour of members of the public. Health literacy is defined as the ability to obtain, read, understand and use healthcare information to

make appropriate health decisions and follow instructions for treatment; while health seeking behaviour is defined as a sequence of remedial actions that individuals undertake to rectify perceived ill health.

It is however unfortunate that academic attainment does not always translate to health literacy in Nigeria. This is exemplified by a General Overseer of a large Pentecostal church in Nigeria, with a doctorate degree in genetics, and over 70 research papers on the subject who preaches that genetic diseases are family curses that can be broken with fasting and prayers. This discourages the uptake of the relevant preventive services, and makes the task difficult for the public health physician.

The clergy in Nigeria render essential health services, with their counselling and healing ministrations, and regularly give health instructions to their followers, which are strictly complied with, much more than the ones given by medical practitioners. They can therefore be called health practitioners, bearing in mind that health is not just physical wellbeing, but also includes social and mental wellbeing.

As health providers, contemporary faith healers should follow the path once tread by the missionaries that brought Christianity into Nigeria, who used medical care as a powerful tool of evangelism, and built their churches around the dispensaries they established to provide western medical care to the people.

The pioneer Christian missionaries did not however provide health care with their lay medical knowledge, or with the inspiration they received from God, as is often claimed by the present Christian faith healers in Nigeria. Most of the foreign Christian missionaries sent to Nigeria received basic training in medicine in specially established institutions such as the Livingstone Medical College that was established in 1893 by Dr. Charles Harford-Battersby. The graduates of the Livingstone Medical College such as Rev. PA Bennett were responsible for some of the earliest dispensaries established in Nigeria, such as the dispensary built by the Church Missionary Society in Obosi in 1890, and the ones built in Onitsha and Ibadan in 1896. The medical education received by Father Coquard and Father

Francois of the Roman Catholic Mission in one of such institutions were also enough for them to establish the first General Hospital in Nigeria, the Sacred Heart Hospital, Abeokuta in 1895.

The medical education of missionaries was such a priority that the Church Missionary Society of the Anglican Church had to incorporate significant medical education into the syllabus of its first Theological Institute in Abeokuta, to ensure that locally trained native church officials had the necessary medical knowledge to complement their work. This curriculum was developed by Dr. A. A. Harrison, and consisted of lectures in anatomy, physiology, chemistry, botany, materia medica among others[52].

It is sad that most of the present clergy in Nigeria do not have any formal training in the health sciences, nor have they engaged in any significant self-study, but nevertheless practice medicine with the knowledge they claim to have acquired through divine inspiration. It is almost impossible to receive through divine inspiration the type of knowledge capable of addressing the medical needs of the present society; if it is possible, then Moses Maimonides (1135 – 1204), the renowned Jewish rabbi, physician and philosopher won't have had any need to study secular medical texts, to enable him practice medicine, in the 12th century when medicine was mostly a philosophical endeavour.

Maimonides was not an ordinary person, for he was held by the Jews in higher esteem than several of the prophets of the Bible, and sometimes mentioned in the same breath as the Biblical Moses, as shown by the popular Jewish expression of the Middle Ages: *"From Moses [of the Torah] to Moses [Maimonides] there was none like Moses."* Surely, none of the present Christian Faith healers can claim to have an anointing greater than that of Moses Maimonides, but he didn't claim to have been educated by God, but instead became a student of

the distinguished Muslim philosopher and physician, Abdulwalid Mohammed ibn Rushd, known to the west as Averroes; and supplemented this with extensive study of the relevant medical manuscripts, including the ancient Greek texts and the works of such Arab writers as Avicenna.

Maimonides worked initially as a rabbi, but was forced into medical practice to earn a livelihood, following the loss of his and his family's fortune in a disastrous trade deal that also took the life of his half-brother, in a shipwreck. In turning to medical practice, Maimonides chose not to feed from his congregation, but instead combined medical practice with his work as a rabbi, in a way that benefitted both his patients and his congregation. He was the court physician of one of the greatest Muslim Caliphs of all time, Sultan Saladin, but he still found time to attend to ordinary patients, and members of his Judaism flock.

As a physician, Maimonides improved his knowledge not by receiving the knowledge directly from God, even as he spent hours in deep contemplation, but by perusing secular medical texts. He gained enough knowledge from his studies to write commentaries on Galen and Hippocrates, and his own medical texts on subjects as diverse as haemorrhoids, sexual intercourse, asthma, poisons, and fits. He even compiled a regimen of health and a glossary of drug names.

As a polymath, Maimonides was not a "twoface", but used his knowledge of one to improve the practice of the other. His patients benefitted from his deep knowledge of religion, especially in the treatment of psycho-somatic diseases. This prompted the impressed Muslim poet, Alsaid ibn Sina Almulk, to pen the following lines in praise:

"Contrast Maimon's with famed Galen's art
Health to the body Galen can impart,
But the wise Hebrew with the two-fold skill
Relieves both mind and body of ill!
Shows how base ignorance can hurt the soul
While wisdom counteracting it makes it whole."

Even with his deep knowledge of religion, Maimonides was not a fan of miraculous cure of diseases, and was actively against the use of charms and amulets in healing; and was particularly against the literal interpretation of the Bible expression the "finger of God" (Exodus 8:19, 31:18, Deuteronomy 9:10, Luke 11:20) that was popular with several Jewish mystics.

Maimonides did not say one thing as a physician, and another as a rabbi, but tried to resolve the conflicts in his religion and science, clearly stating the areas of conflicts, and then reconciling them in a rational, logical manner. This prompted some rabbi to forbid anyone not of mature years from studying one of Maimonides' books, *the Guide for The Perplexed*. An old joke has it that these rabbis feared that a Jew could start reading a section in T*he Guide* in which Maimonides summarized a rationalist attack on religion, and fall asleep before reading his counterattack, thereby spending the night as a heretic.

It is in the interest of all and sundry, if religious organizations align their doctrine to those of modern medicine, to ensure that the health of their members is not jeopardized in anyway. History is replete with examples, and studies carried out in the US indicate that members of religious organizations who are able to forge a close relationship with modern medicine live a longer and healthier life. Members of Faith Tabernacle Church that rely entirely on faith healing have the least life expectancy amongst the Christian denominations in the US, whereas the Mennonites and members of the Seven Day Adventist Church who abstain from alcohol, eat a balanced, almost vegetarian diet and use modern health care have one of the highest life expectancy rate.

Several of the most prestigious hospitals in the US were started by religious organizations, while the City of Faith Medical and Research Center, established by Oral Roberts to emphasize faith healing collapsed after a few years, without achieving any significant cure rate. The Jehovah Witness realized the problem caused by their no blood transfusion doctrine, and responded by working with surgeons to create blood-less surgical techniques. Members of the SDA church abstain from certain foods, which put

them at risk of malnutrition. In response to this, the church encouraged research into nutritious plant-based meals that resulted in the creation of such popular foods as cornflakes.

Religious organizations in Nigeria are therefore encouraged to follow these examples, and collaborate with medical scientists, to find solutions, at least to the peculiar health problems of their members. Let them fund medical research, build and operate hospital, and generally have compassion on medical wisdom and be kind to it, as members of one family feel kindly towards each other, for as it is said "*say unto wisdom thou art my sister; and call understanding thy kinswoman*" (Proverbs 7:4).

3.2. Social marketing of health products and services

Working with religious leaders would increase the uptake of life-saving medical services, but there is still need to remove the inconveniences associated with accessing the services in Nigerian hospitals. For instance, it can take almost forever to carry out all the required screening tests in an average Nigerian teaching hospital. This is because the tests are ordered by different doctors, paid for at different pay points, carried out in different laboratories, interpreted by different doctors, and corrective actions given by different set of doctors.

These inconveniences can be removed through the social marketing of the services. Social marketing is a skill adopted from commercial marketing, but has been adapted to serve the important purpose of encouraging persons to patronize health services that are of benefit to them and the society. Social marketing is able to achieve this by packaging the health service in a way that is very convenient for the client; promoting it in ways that catches the attention of the client enough for him to patronize the service; providing the service in places that can easily be accessed by clients, and at a cost that most clients can afford.

Social marketing has been successfully used in Nigeria by the Society for Family Health, in increasing the use of contraceptives. I have also used social marketing in increasing the ownership and use of insecticide-treated bed net (ITN) in my hometown, as part of my

research project for the Part 2 fellowship examination in Public Health of the National Postgraduate Medical College of Nigeria. The project sold the ITN in 2003, when ITN was still relatively new in Nigeria, and achieved an uptake of 1.10 ITN per month per 1000 population, and a 6.5% coverage of the target population within six months of operation[53]. This compared well with better funded ITN social marketing projects, especially as the programme was carried out during the rainy season, when the ability to pay is very low in agrarian communities such as mine.

Further studies revealed that those that bought the ITN sold by my social marketing programme had a better knowledge of malaria and malaria prevention methods than those that received the free mass distributed ITNs that were later provided by the Rivers State government[54]. They were also more judicious in the use of the nets[55]; and were rewarded with increased haemoglobin levels and reduced malaria burden[56].

Vice Chancellor Sir, my colleagues in the department of Preventive and Social Medicine and I are about to start a Preventive Medicine Clinic in the University of Port Harcourt Teaching Hospital, and we intend to use the social marketing technique in removing the inconveniences in accessing clinical preventive medicine services in the hospital. We have therefore aggregated all the clinical preventive services into a single product that can be accessed at the clinic, following the payment of a single fee. The product consists of:

- A Health Risk Appraisal questionnaire that collects the vital health information of the patient
- A clinical examination that assesses the current state of health of the client;
- A battery of screening tests that are appropriate for the age and other risks of the client; and
- A personalized health plan for the client that would be developed by physician, taking into full consideration the results of the other components.

We have developed a software that enables the seamless integration of all the aspects of the health risks assessment. We are optimist that this would be a big hit with the patients, not only because we have addressed all their concerns, using the social marketing template, but also because the patients have told us so, through a series of studies we have carried out. We studied a group of patients at the GOPD of UPTH[57], and they advised that the clinical preventive services should be thorough (66.44%) and have short waiting time (28.19%). Most (89.57%) of the respondents were willing to pay for a single package of clinical preventive services; a quarter were willing to pay the prevailing cost of assessing the services from the multiple service points in the hospital, while 34.28% were willing to pay even more for the services.

Vice Chancellor Sir, we are not only working to make coming to the hospital easier for patients; we have also done a lot of work in our *Methuselah Project* to make it easier for Nigerians to prevent and/or treat the non-communicable diseases. Under our aptly tagged *Methuselah Project*, we have reprocessed the staple Nigerian food items and beverages of cassava[58], palm wine[59] and palm oil[60] into forms that can be used in the prevention and treatment of non-communicable diseases. This makes it easier for patients such as diabetic and obese patients to comply with their dietary prescriptions, and therefore better able to manage their conditions.

We found that palm oil contains 50% saturated fatty acids, which have been shown in several studies to increase the risk of hypercholesterolemia and coronary heart disease. A study carried out in Mauritius[61] found that the average cholesterol level of the people of the country decreased within five years from 5.5 mmol/l to 4.7 mmol/l, after palm oil was substituted with soybean oil as the main cooking oil in the country. This is remarkable, because coronary heart disease is uncommon in societies with mean serum total cholesterol level of less than 4.6 mmol/l. It was estimated in another study[62] that a 1% reduction in the consumption of saturated fat in 15 European Union countries, and its replacement with equal proportion of monounsaturated and polyunsaturated fat would lower blood cholesterol levels by about 0.06 mmol/l; resulting in approximately 9800 fewer deaths from coronary heart disease and

3000 fewer deaths from stroke in every given year. A meta-study[63] also revealed that every 5% energy for which saturated fat is substituted with polyunsaturated fat, there could be a 10% decrease in the risk of coronary heart disease.

We however also observed that palm oil would be very difficult to abandon in Nigeria, because it would put millions of persons in Nigeria at risk of unbalanced diet. It is estimated that an annual per capita consumption of 20 – 24kg of edible fats and oil is required to meet the WHO dietary recommendations. This would be difficult to meet without palm oil in Nigeria, especially in southern Nigeria where several people subsist on a diet of cassava, yam and vegetable, with little meat or fish.

Besides this, palm oil is a valuable source of vitamin A, vitamin E and several other phytonutrients. Vitamin A deficiency is estimated to affect 190 million preschool-age children and 19 million pregnant women in the world, including several persons in Nigeria; and palm oil is the richest naturally occurring source of beta-carotene, containing up to 800 mg of provitamin A carotenoids/kg oil, which is 15 times higher than the carotenoid content of carrots, on a weight-by-weight basis. The bioavailability of the vitamin A in palm oil is so high that its ability to reverse vitamin A deficiency has been found to be comparable to the vitamin A capsules used in clinical setting[64]. Vitamin E and the other anti-oxidant contents of palm oil have been shown to have anti-aging and anti-cancer properties, enough to be considered for therapeutic purposes.

Considering the nutritional value, and the sentimental attachment to the use of palm oil as cooking oil in Nigeria, the abandonment of palm oil as suggested in western countries won't be a viable option in Nigeria; the best alternative is to find a way of reducing the saturated fatty acids content of the oil. Thankfully, the technologies for achieving this already exist, and include genetic engineering and the fractionalization of the oil.

The fractionalization of palm oil is particularly easy to carry out, because palm oil is a mixture, and thus can easily be separated into its component fatty acids, using the different melting points of the fatty acids. The melting point of fatty acids increases with the length

of the hydrocarbon chain, and decreases with the number of double bonds. Unsaturated fatty acids have lower melting points, because they contain more double bonds than the saturated fatty acids. They are thus more likely to be liquid at Nigeria's ambient temperature. Palmitic acid; the main saturated fatty acid in palm oil on the other hand is mostly semi-solid at Nigerian ambient temperature, because it lacks double bonds and has a long carbon chain.

We have been able to produce what we have called a heart-friendly palm oil by using this difference in melting points, to filter out the unhealthy palmitic acid[60]. We have done this with very crude technology, and have produced a palm oil that contains no more than 25% saturated fatty acids. We believe that a palm oil containing less than 15% saturated fatty acids can easily be profitably produced, when we collaborate with colleagues in the faculties of Science, Agriculture and Engineering.

Vice Chancellor Sir, we found that palm wine, the original alcoholic beverage of our ancestors, serenaded in several folksongs, and celebrated in several African novels is much more than a social lubricant, because it contains polyphenol in a concentration that is comparable with those of conventional wine[59]. This means that regular intake of moderate quantity of palm wine can be protective against the emergent non-communicable diseases, and capable of recreating the French paradox that shielded the French from several non-communicable diseases, in spite of their high saturated fat diet[65]. Palm wine also has several other health benefits including being a good rehydration fluid, with its excellent composition of potassium and magnesium; and its ability to cause up to a 21.8% decrease in gastric acid secretion, and therefore beneficial for certain peptic ulcer patients[59].

We are not unaware of the dangers of alcohol consumption, and the fast pace of fermentation of palm wine. We took note of all these, and created a palm wine we can safely recommend as a health drink[59]. Our palm wine has a low alcoholic content of less than 2%, enough to provide a healthy dose of alcohol, but more difficult to intoxicate. We were able to achieve this because we found a way of getting very fresh palm wine from the tappers; and we were able to

pasteurize and bottle the palm wine within a few hours of collecting them from the palm wine tappers. We also bottled the palm wine in hygienic packages, containing no more than one standard unit of alcohol (10g) which guarantees regular, long term use, but further makes it difficult to exceed the recommended alcohol intake[59].

I must acknowledge that the use of alcohol for health reasons is not widely advised, because it is like riding a tiger. The WHO does not recommend it; and my former teachers and now senior colleagues, Prof. Ihekwaba and Prof. Stanley warned against it in their separate inaugural lectures. But despite all these, the words of Abraham Lincoln about alcohol still ring true to me: "*the problems with alcohol relate not to the use of a bad thing, but to the abuse of a good thing*". I fully subscribe to the views of Abraham Lincoln, and the WHO alcohol limits, which explains the safeguards we introduced into the palm wine we have recommended.

Vice Chancellor Sir, we also found that the often maligned staple cassava food products can be reprocessed, and made the fulcrum for the prevention and treatment of non-communicable diseases, including diabetes[58]. Cassava contains deadly cyanogens, rich only in carbohydrates and grossly deficient in other nutrients; and the common cassava food items of garri and fufu have moderate glycaemic index (the speed with which the blood sugar level is raised). In spite of these, an average Nigerian consumes 120kg of cassava products every year, which predisposes him/her to several diseases including malnutrition, konzo, goitre, tropical ataxic neuropathy and diabetes.

Most of these diseases can be prevented with the cultivation of cassava varieties with lower cyanide content, the enrichment of cassava with the deficient nutrients, possibly using genetic engineering, and the fermentation of the cassava for at least three days. All these are currently being done in Nigeria, except the problem of moderate glycaemic index, which we decided to tackle.

Although the glycaemic index of our cassava-based staples is not significantly higher than those of grain staples like wheat, corn and rice; what makes the cassava staples more predisposing to diabetes is the fact that they are consumed in very high quantities, in one-course

meals. This means that the cassava staples are able to raise the blood sugar level beyond the normal, for a longer period of time (high glycaemic load), which is predisposing to diabetes.

We solved this problem of moderate Glycaemic Index and high Glycaemic Load by processing the cassava staples to retain more chaff, creating products that contain at least 50% more fiber than the standard products, without significantly affecting the moulding abilities of the products. We are encouraged with the two-hour post-prandial blood sugar results we got from the diabetic patients that ate the foods. We hope to conduct a larger scale study to validate the effectiveness of the products in the near future.

3.3. Manipulation of the social environment

Vice Chancellor Sir, although practitioners of public health now prefer to convince people to adopt healthy lifestyle and patronize health services, they also manipulate the social environment, to further put pressure on people to do the needful. This is because social factors have been identified as both the cause of and the solution to several health problems. Two British social epidemiologists, Kate Pickett and Richard Wilkinson had in their book[66], *The Spirit level: Why equality is better for everyone* clearly shown the relationship between life expectancy of countries and inequality between the rich and poor, clearly showing that people live longer and healthier in countries such as the Scandinavian countries, where the gap between the rich and the poor is minimal, and significantly less in countries such as the United States, where the gap is much wider, despite the huge amount of money spent in the United States on health and health services.

Also, Thomas McKeown, a British public health scientist and health care critic had in his book[67], *The role of medicine: Dream, mirage or nemesis?* shown that the significant decrease in morbidity and mortality recorded in Western Europe in the 19th century were achieved not through medical interventions, as many would believe, but through improvements in sanitary and housing conditions, and the general condition of the poor and labouring population.

Practitioners of public health manipulate the social environment through deliberate policies, programmes and legislations. For instance, preventive health services are made more enticing by being provided free or hugely discounted; social health insurance scheme, in which people pay according to their ability, not according to their health risks are implemented to ensure that the rich subsidizes the health services of the poor, and in so doing ensure health care for all; while taxes and excise duties are placed on unhealthy commodities like alcohol, to increase their retail price and discourage their consumption.

4. Other research works

Vice Chancellor Sir, I want to at this juncture seek your permission to tell this august gathering of my other research studies that are not particularly related to the topic of this inaugural lecture, as is the tradition of inaugural lectures.

I am a Community Physician. Community Physicians unlike other medical doctors model their professional activities after Hygiea, the Greek goddess who worked in the community, teaching people how they could stay healthy. Community Physicians therefore spend more time in the community than in the hospital, working with members of the community to identify and address their health problems. My interest in environmental health further afforded me the opportunity to visit nearly every community in the four ecological zones of the Niger delta region, working with a multidisciplinary team, on several EIA studies. I was often the only medical doctor in the EIA team, and I learnt several things from the other members, so much that I can say a lot about a community simply by looking at the vegetation of the community.

I applied the knowledge I got from the other members of the EIA team, and used the rule of thumb developed by Hippocrates, the father of medicine in his treatise, *On Air, Water and Places* in carrying out research studies that are published in several academic articles. These articles are considered by many as markedly different, for their unique blend of basic science and the health sciences. Permit me Sir, to share some of the research studies with this august gathering.

4.1. Studies on drinking water supply in the Niger delta

I noted the sources of drinking water in the various Niger delta communities I visited in the course of the EIA studies, and observed a relationship between the environmental condition and the type and quality of drinking water in the communities. Communities in the rainforest and freshwater swamp ecological zones of the Niger delta region typically have several community water facilities, provided by government and its agencies and the oil companies that operate in the zones, but the water facilities are non-functional most of the time, due to poor maintenance, such that members of the communities are forced to fetch their drinking water from the river and other un-improved sources[18, 68, 69].

Communities in the mangrove swamp ecological zone in contrast have very poor access to safe drinking water, because both the surface and groundwater in the communities are salty and therefore undrinkable. This forces members of the communities to rely predominantly on rain for their drinking water.

We analysed the water samples collected from the communities, and observed that several of them are contaminated with lead, nitrate, and cadmium to the extent that can be detrimental to health[70, 71].

4.2. Studies on sanitation facilities in the Niger delta region

I observed the types of toilet facilities used in the Niger delta communities, and noted a relationship with the groundwater level. The inhabitants of the riverine communities were forced to use the pier toilet, because of the high groundwater level in the communities[18]; while the inhabitants of the upland communities are better able to utilize pit latrine and flush toilets, but are mostly constrained by lack of money to build the facilities[72].

4.3. Studies on solid waste disposal in the Niger delta

I observed the solid waste disposal practices in the communities, and noted that most of the wastes generated in the communities are garbage, but there is an increasing level of generation of electronic wastes in the communities in recent years, following the increased use of second hand personal electronic products[73]. Electronic waste are known to contain high level of toxic metals, and are believed to

be responsible for some of the toxic metals found in the drinking water supply of several Niger delta communities, especially riverine communities where wastes are commonly dumped into water bodies that are also used for drinking purposes[74, 75].

The disposal of solid waste into water bodies, as is common in the riverine communities[75] have also been found to be partly responsible for the high level of the toxic metals found in the fish caught in the water bodies. We assessed the levels of some of the metals in commonly consumed local fish species displayed for sale in the major fish markets in Port Harcourt, and found high levels of cadmium and arsenic, especially in the light tilapia fish (*Oreochronis niloticus*) displayed for sale at the Mile One market[76].

Vice Chancellor Sir, my colleagues and I also studied the health-related behaviours of members of several communities in the Niger delta region, including their use and abuse of alcohol; child and elder abuse in the communities; the use of ITN for malaria control; and the participation of members of the communities in health care delivery.

4.4. Studies on alcohol use and abuse in the Niger delta region

Alcohol is the oldest and most widely used intoxicating substance known to man. In the Niger delta region, alcoholic beverages are used for various social and religious activities. They are used to entertain visitors, at engagement and marriage ceremonies, to signify the settlement of a quarrel, drank during funerals, and form an important part of ancestral worship, amongst other social and religious purposes. They are sometimes used for personal hygiene, to cleanse the mouth at dawn; and believed to be a health tonic, often as an aphrodisiac, and for the treatment of chills[77].

However, alcohol consumption, according to the 2002 World Health Report is linked to more than 60 different types of disease and injury, and responsible for 3.2% of all deaths, and 4% of the global disease burden measured in DALYs. This is higher than the 3.7% attributed to poor water and sanitation, and compares well to the 4.1% attributed to tobacco use[77].

Most of the health problems associated with alcohol is however linked to its abuse. The International Classification of Diseases (ICD-10) defines alcohol use as ingestion of alcohol in any form, and alcohol abuse as all forms of risk and malfunction associated with hazardous alcohol drinking. Hazardous drinking of alcohol is the consumption of alcohol in quantity or pattern that places the person at risk of adverse health events. This includes binge drinking which is the consumption of large quantity of alcohol over a short period of time; and drinking of alcohol beyond the quantity considered safe for the age, sex and circumstance of the person.

In view of the widespread consumption of alcohol in the Niger delta region, and the fact that the adverse health effects of alcohol consumption is often not recognized in the region, we decided to carry out a study to find out the pattern, prevalence and factors associated with alcohol use and misuse in Okoloba, a community in Bayelsa State[77]. The study found that alcohol consumption is widespread in the community, with more than 90% of the respondents in the community reporting taking alcohol in the preceding year, with most of them preferring the locally produced alcoholic beverages. More than a third of the respondents were classified as engaged in harmful drinking, while 12.73% had alcohol dependence problem, a medical problem characterized by inability to function without alcohol, even in the presence of multiple social and physical problems that are caused by the intake of alcohol. Most of the persons found in the community with alcohol problems were poorly educated men, in polygamous marriages, practitioners of the traditional religion, and had palm wine tapping as their occupation.

In a follow up study[78], also carried out in Okoloba community, we tested the hypothesis that the high prevalence of all the types of domestic violence in the Niger delta region[16] is probably related to the widespread consumption of alcohol in the region. Our study confirmed this hypothesis as the various forms of domestic violence were found to be significantly higher amongst persons with alcohol problem, while 77.2% of personally acknowledged domestic violence were reported to have been carried out under the influence of alcohol.

Vice Chancellor Sir, in a region like the Niger delta with such a high level of alcohol consumption; where alcohol consumption is an important part of social and religious life; there are fears that pregnant women might not abstain from drinking alcohol, as advised by medical experts, and therefore put their unborn babies at risk of the toxic effects of alcohol. Babies exposed to alcohol while in the womb have been shown to have multiple health problems later in their lives. They are more likely to have alcohol-related birth defects such as cleft palate; more likely to be born pre-term and under-weight, and often have cognitive and behavioral disorders as adults. This explains the extra effort made in advanced countries to keep alcohol away from pregnant women. But what is the situation in the Niger delta region, where alcohol is an important social lubricant?

We assessed the possible use of alcohol among pregnant women attending the ante-natal clinic of the University of Port Harcourt Teaching Hospital, Port Harcourt[79], and found that the pregnant women not only took alcohol in the index pregnancy, but took it in dangerous quantities. More than half (59.28%) of the women took alcohol during the index pregnancy, a third (39.40%) of whom drank alcohol on a regular basis, taking a weekly average of 6.5 units of alcohol, while more than a quarter were found to be binge drinkers.

Vice Chancellor Sir, while there is no safe limit of alcohol for pregnant women; safe limits however exist for other members of the society. This safe limit is not more than three units of alcohol a day or 21 units a week, for men; and not more than two units of alcohol a day or 14 units a week, for women. A unit of alcohol is about 10g to 14g of pure alcohol, depending on the country, and often contained in measures like one shot of whisky, brandy or our local gin; 33ml bottle of beer and one glass of wine.

Developed countries often insist that alcoholic beverages are retailed in quantities that allow for the easy calculation of the number of units consumed, and for greater compliance to the health directive. Our study however found that this is not the situation in Nigeria. We assessed the volume and concentration of alcoholic beverages offered for sale in Port Harcourt[80], and found that the beer brands were all sold in 60ml bottles containing a minimum of two units of

alcohol, while the stout brands were often sold in 33ml bottles containing a minimum of two units of alcohol. The big bottles (60ml) of the stout brands on sale in Port Harcourt were found to contain close to four units of alcohol. A single 60ml bottle of beer is the maximum quantity of beer that can safely be consumed. This means that the bottling of beer in 60ml bottles in Nigeria forces beer drinkers to constantly drink up to this maximum limit, which predisposes them to addiction and jeopardizes their health. It is therefore recommended that the 60ml bottle of beer be outlawed in Nigeria, as a first step in addressing the worsening alcohol problem in Nigeria.

4.5. Study on the effects of urbanization on food security

Vice Chancellor Sir, I noticed the rapid urbanization of some communities in the Niger delta in course of my study tour, and decided to assess the possible effects of such urbanization on household food security and childhood malnutrition, considering the limited land space of the Niger delta region. We carried out a comparative study in which we compared the situation in Rumuche – Emohua, a semi-urban community and Orowurokwo, a community in Port Harcourt metropolis[81]. We found that household food security and childhood nutrition were better in the urban Orowurokwo community, in spite of having lost all their farmlands to urbanization. Our explanation is what members of Orowurokwo community compensated for the loss of their farmland with better education, and greater opportunity for paid employment and private business.

4.6. Studies on health care delivery in the Niger delta region

The Niger delta is a flood plain crisscrossed by several rivers and creeks, and therefore only able to support small, isolated communities. These make the communities unprofitable for profit-seeking private medical practitioners to establish medical facilities; and encourage truancy among health workers of the public health facilities that serve the communities. The provision of quality health facilities is therefore very difficult in the Niger delta region, because of the problem of attracting and retaining the needed health workers in the communities.

We tried to solve this problem through the use of Community Health Extension Workers (CHEWs) in the provision of primary care services that were traditionally provided by medical doctors. We did this based on the fact that such task shifting has already been successfully used in developed countries; and the fact that the CHEWs being indigenes are more likely to reside and work in the communities. We carried out the study in my hometown Mgbede, a semi-urban community in Rivers State[82], and found that the CHEWs were able to successfully manage most of the patients seen in the private hospital, with close to 90% of the patients satisfied with the quality of care provided by the CHEWs. We however observed the tendency of the CHEWs to introduce themselves as medical doctors, and for them to engage in their own private practice, which robbed them of the safeguards put in place to protect the patient. Although our study proved the effectiveness of the use of CHEWs in the provision of primary care services in a rural community, we would however advice that they are used only with the strictest supervision.

We assessed the participation of members of various Niger delta communities in the provision of immunization services, and in the management of the health facilities that serve their communities[83]. We found that a rural community in Bayelsa State performed better than a community in Urban Yenagoa in mobilizing members of their respective communities for childhood immunization. This indicates that community organizations such as Community Development Committee are more effective in such community mobilizations in rural compared to urban communities.

We found that the presence of the oil companies, and their social responsibility projects do not encourage self-less service in the host communities, as shown by the attitude of members of an oil-bearing community towards the activities of the Community Health Committee (CHC). The formation of Community Health Committee is encouraged by the National Primary Health Care Development Agency (NPHCDA) for the management of health centers. Members of the CHC include non-remunerated members drawn from the catchment communities of the health center, who are expected to ensure equity in the provision of health services in the health center. We however found that members of this committee in the oil-

bearing community we studied saw the membership as an opportunity to gain access to the oil companies operating in the community, for their own interest[84]. We also observed that their participation in the activities of the committee dropped significantly, when the committee could not gain access to the oil company[85].

4.7. Hospital-based studies

Vice Chancellor Sir, we did not carry out our research studies only in the communities; we also carried out studies in hospitals, especially on the environmental condition of the hospitals, the management of health care waste, infection control and the provision of services in hospitals.

We assessed the environmental health condition of the University of Port Harcourt Teaching Hospital in 2006, shortly after it moved from its temporary site[86]. We noted that the hospital was built on a marshy ground; heavily infested with mosquitoes; had enough water for its services, provided from a groundwater source, but not routinely disinfected; had inadequate toilets for patients and their relatives, which encouraged open defecation; and had poorly ventilated out-patient clinics. It is sad that these environmental health problems are still persisting.

We assessed air quality in the clinics, wards and laboratories of the University of Port Harcourt Teaching Hospital, and found that the ambient air contained pollutants at concentrations capable of causing adverse health effects[87]. The microbiological assessment showed the presence in the ambient air of bacterial species such as *staphylococcus, streptococcus bacillus cereus, Klebsiella* and *E.coli;* and fungal species that include *Aspergillus, Penicillium, Fusarium, Trichophyton, Candida and Rhizophus*. We noticed a relationship between the type of patients and services provided in that part of the hospital and the type of organisms present in the ambient air. For instance, we noted a heavy presence of candida at the antenatal clinic and different species of bacteria at the Microbiology laboratory of the hospital.

The physico-chemical assessment of the ambient air at different areas of the hospital showed different concentrations of VOC and nitrogen oxide related to the type of patients, activities in that part of the hospital, and air flow[88]. Both of these were however found at concentrations that are below the regulatory limits.

We assessed the health care waste management practices at the University of Port Harcourt Teaching Hospital[89], and found that the waste were not properly managed due to reasons that include poor knowledge of proper waste management practices, non-enforcement of extant laws by the regulatory agencies of government, and most importantly, poor funding that virtually compelled the hospital into disposing its waste in the nearest municipal dumpsite, against all national and international regulations on the management of healthcare waste.

We also found that the poor management of waste in UPTH is responsible for the high incidence of needle stick injuries among the staff of the hospital. We found that more than half of the clinical staff of the hospital had received at least one needle stick injury in the preceding 12 months, mostly through an attempt to recap used needles, and from carelessly exposed needles[90]. This is scary considering that it is several times easier to get infected with HIV, from a needle stick injury than having sex with a HIV positive person. It is also scary if one considers the fact that hepatitis B virus is resistant to several commonly used disinfectants, and can survive in an injection needle for more than one week. This means that a carelessly disposed injection needle, used for a patient with hepatitis B can infect somebody after a week. It is important to note here that hepatitis B, like HIV is incurable, but is much more deadly than HIV.

We were not just interested in the physical environment of hospitals; we also assessed the services provided in the hospitals. We were bothered about complaints over the perceived high caesarean section rate at the University of Port Harcourt Teaching Hospital, and decided to carry out further research on the complaint[91]. We found out that the complaint was as a result of disparity in the need for

caesarean section between the patients and the doctors at the UPTH. While the doctors carried out the operation for reasons such as the distress of the unborn baby, the patients and their relatives only saw the operation as a last resort, to be used after the labouring woman has been given ample opportunity to deliver the 'Hebrew women's way'. They were also mostly interested in getting the baby out, dead, alive or damaged; anything to save the life of the labouring woman. We found that the aversion of the patients for caesarean section stem from its stigma factor (52.7%), its ability to limit the number of children a woman could have (68.0%), its cost (63.7%), and the likelihood of side effects and death (51.0%). Some (25.1%) of the patients also felt some doctors outside UPTH carry out the operation for their own financial gratification, an opinion actively peddled by some churches and private midwives.

Vice Chancellor Sir, my department runs a primary health care center in Aluu that offers antenatal and maternity services. We became worried that in spite of the huge number of pregnant women that patronize our antenatal services, only about 30% deliver at the health center. We were convinced that this puts the lives of the women and their unborn babies at risk, especially as we suspected that they might be patronizing the TBAs. To reverse this trend, we embarked on a community education programme, reaching out to all the relevant stakeholders in the catchment communities of our health center. We also decided to collect the delivery fee up-front; at the time the women register for antenatal care, to put further pressure on the women to use the maternity service. How much did we succeed with this? Not much, for we were only able to increase the proportion of the women that had their babies in our health center by only 3%[92]. This means that most of the women were willing to forgo the delivery fee, to give birth in places that include the church and maternity homes run by TBAs.

This means that the poor access to skilled birth attendant identified in some reports as responsible for a substantial proportion of maternal and neonatal deaths in Nigeria might not entirely be supply-related. Attention should therefore also be paid to addressing the factors that drive pregnant women to patronize unskilled birth

attendants, such as the preference for birth attendants that attend to the cultural and religious beliefs of the women.

Vice Chancellor Sir, our research studies on hospital infection control were mainly to assess the infection control practices of health care workers[93], and the compliance of the health workers to the infection control policy of the hospital[94]. These studies are very important because, although the infections that sometimes follow surgical procedures often do not kill the patient, they are however a significant source of morbidity, emotional stress and financial cost to the affected patients and health care institutions. Studies carried out in several developed countries showed that Surgical Site Infections result in an average of ten extra days of hospital stay, and add an additional £1780 to the patient's hospital bill.

We carried out our studies in the two multi-specialty, tertiary hospitals in Port Harcourt, the UPTH and BMSH[93]; and we found that the introduction of a hospital infection control policy significantly improved the infection control practices of the health workers; and was able to reduce infection following surgery by more than 20%.

We also noted that the proper observance of the infection control practices was encouraged by the adequate provision of required consumables[94]. This is another reason for the better funding of hospitals, and for the institution of a revolving scheme to ensure the provision of the consumables, in the required quantities.

4.8. Assessment of health-related Millennium Development Goals projects

Vice Chancellor Sir, I had the opportunity of working with colleagues, Dr. Precious Kalamba Gbeneol and Prof. Seiyefa Brisibe, who were given the responsibilities of managing the MDGs projects, under the administration of President Goodluck Jonathan. This involved the establishment of high impact, pro-poor projects, funded by the three tiers of the Nigerian government, but identified by members of the benefiting community and found to be effective in meeting the various MDGs. A lot of data were generated in the quest of establishing and operating these projects; these we analysed

for those in the south-south region, and published in a special supplement edition of the Port Harcourt Medical Journal, to share the experiences with all and sundry.

The articles detailed the processes involved, and the successes recorded by the MDGs projects in providing potable drinking water in communities in the five ecological zones of the Niger delta, to improve access to drinking water in the communities[95, 96]. The articles also highlighted the efforts made by the OSSAP-MDGs in the establishment and management of health-related projects and programmes, to meet the health-related MDGs in the small and isolated communities of the core Niger delta States of Rivers, Bayelsa and Delta[97, 98].

5. Moving forward

Vice Chancellor Sir, I feel strong, so strong that I feel able to do almost everything. But I want to dedicate the rest of my working life in carrying out need-driven research, even in the face of poor research funding; in converting my research findings into innovative health services, to address the changing disease pattern; in health educating the people on health and environment; and in being an advocate, to ensure that the link between health and environment is recognized and reflected in legislations and the affairs of the government.

I will continue my research on health, environment and preventive medicine; and I won't be deterred by the austere conditions researchers increasingly work in in Nigeria, for Prof. Kesley Harrison, the 5th Vice Chancellor of this university was able to attain world acclaim working in even more severe environment. Prof. Harrison's research focus was on maternal anaemia and haemoglobinopathy, when he worked in the more resourced University College Hospital Ibadan, but faced with the more austere and crowded clinics and wards of the Ahmadu Bello University Teaching Hospital, Zaria, he was compelled to change his research interest to finding the causes and solutions to maternal morbidity and mortality; for according to him he met a teaching hospital where

"everything was in short supply, except sick, damaged and dying women and their newborn babies". He started the Zaria Maternity Survey in which he collected information on 22,774 consecutive maternalities, which he published in 1985 in a special supplement edition of the British Journal of Obstetrics and Gynaecology (BJOG). These papers received more international recognition than the cutting-edge research studies he carried out while in UCH, and more importantly, contributed much more to reduction in maternal morbidity and mortality, not only in Zaria, the rest of Nigeria, but all over the developing world. The papers inspired the initiation of the Safe Motherhood Initiative of the United Nations agencies in 1987, and were rated by the BJOG as amongst the top 20 articles of the journal in the decade the articles were published.

I will strive to convert my research findings into innovative health services, because I fully subscribe to the words of Goethe that "*knowing is not enough; we must apply*". To accomplish this, I intend to become a disruptor, changing how health care and health care services are delivered in Nigeria, making use of ICT. I will work to develop softwares to operationalize innovative health care, as we have already done with the *Delphi Health Risk Assessment* software, already being used to provide clinical preventive services. I will work on softwares that would make it easier and cheaper for patients to access quality health care, as we are currently doing with the *Health Panacea* software that works like online sales platforms, but would give Nigerians the opportunity to gift health care to needy patients. I will work on other softwares that would improve the delivery of health services in Nigeria, collaborating with ICT experts.

I will work to educate patients and those at risk of non-communicable diseases, on how they can personally treat or prevent their diseases, to reduce their dependence on health workers. I took this decision because I totally agree with the Bible that "*the excellence of wisdom is that it gives life to those that have it*" Ecclesiastes 7:12; especially as scientific studies have shown that patients' self-management education programme is one of the most

effective ways of dealing with the ever increasing epidemic of non-communicable diseases. Beside these, I feel the great need for a big masquerade to enter the scene that is currently dominated by scaremongers, ignoramuses and spin-doctors, all working for their own pecuniary interest.

Finally, I intend to become a formidable advocate for health, preventive medicine and the Niger delta environment, because public health physicians are renowned only when they are great advocates of issues of public health importance. In doing this, I intend to model my activities after those of the German politician, physician, author and social advocate Rudolf Virchow (1821 – 1902), who believed that politics is nothing but medicine on a large scale, and that medicine is only able to fulfill her great task, when she enters political and social life; after Edwin Chadwick, the British lawyer and civil servant who achieved great success with sanitary reforms in Victorian Britain through his NGO, The Health of Towns Association; and after Prof. MC Asuzu, a compatriot who taught me public health, stirred my passion for public health and led from the front in ensuring that the right public health policies and programmes are implemented in Nigeria.

Vice Chancellor Sir, my to-do list is indeed very long, but I will give them my best shots. I am well aware that they won't be easy to work on; no matter how noble they may appear. Medicine is a fiercely conservative profession, and has been very harsh on those who tried to change the status quo for good, going by the experiences of past medical and public health innovators such as Andrea Vesalius, Ignaz Philip Semmelweis and Edwin Chadwick.

Andrea Vesalius, a 16th century French anatomist and professor at the University of Padua corrected most of the errors in Galen's anatomy, using his richly illustrated book, *De humani corporis fabrica* (on the fabric of the human body), but this did not save him from the caustic abuses he received from his former teachers and even his students, for having the guts to challenge the "infallible" Galen.

Ignaz Philip Semmelweis, a 19th century Hungarian obstetrician in a series of studies discovered the cause of puerperal fever that was responsible for the high number of deaths in his maternity ward, and directed that all health workers should wash their hands before examining the patients. This appears easy to comply with, but Semmelweis was so fiercely resisted by the medical establishment that he became depressed, suffered a mental breakdown, admitted into a mental asylum and died a few days later, from the injuries he sustained while being restrained by the security guards of the mental asylum.

Edwin Chadwick fared a little bit better than Semmelweis. He was a civil servant and lawyer, not a medical doctor, but became convinced that sanitary reform was the best way of controlling the incessant epidemics of infectious diseases in his time. He used every legal means to ensure the passage of the 1848 Public Health Act, and the implementation of all the sanitary reforms the Act prescribed; but his zest angered people with vested interests, and he was forced out of his job as Sanitary Commissioner, and retired from the civil service years before the official retirement age.

I am well aware of all these, but I am convinced that the good Lord would grant me success according to my intentions, not according to my ability, for my intentions are completely self-less and devoid of self-glorification. I have no reason to do otherwise, for my present life is not mine, but a spare life specially given to me by God to attend to His flock, after my near-death experience on 1st March, 2011 in the hands of ?Niger delta militants while on a field study.

6. Conclusion

The human body is an engine
That needs the right fuel,
for proper function
And regular checkups,
to detect and prevent fault
Long life is to be cherished

Achieving it shouldn't just be a prayer
We must work hard by ourselves to achieve it
Not to rely solely on divine providence
That helps mainly in our discipline to do the right things
Doing the right things requires the wisdom of the serpent,
To discern people that claim to speak from the divine
But dispense more harm than heal
May we recognize the devil they are from their voices,
And rebuke them as Lord Jesus did,
Saying loudly without mincing words
Depart from me satan!!
Ye worker of iniquity!!!

Thank you very much for listening

References

1. Mackenbach JP. The origins of human disease: a short story on "where diseases come from" *J. Epidemiol. Community Health* 2006; 60: 81 – 86.

2. Gbeneol PK, Brisibe SF, **Ordinioha B**. Knowledge, attitude and uptake of premarital screening for the sickle trait among married couples in a semi-urban community in south-south Nigeria. *European Journal of Preventive Medicine*. 2015; 3 (3): 49 – 54.

3. Cerhan JR, Moore SC, Jacobs EJ et al. Pooled analysis of waist circumference and mortality in 650,000 adults. *Mayo Clin Proc*. 2014; 89(3): 335 – 345.

4. Rees K, Hartley L, Flowers N et al. 'Mediterranean' dietary pattern for the primary prevention of cardiovascular disease. *The Cochrane database of systematic reviews*. 2013; 8: CD009825.

5. U.S. Department of Agriculture and U.S. Department of Health and Human Services. Dietary Guidelines for Americans, 2010. 7th Edition, Washington, DC: U.S. Government Printing Office, December 2010.

6. Igwenyi IO, Azoro BN. Proximate and phytochemical compositions of four indigenous seeds used as soup thickeners in Ebonyi State, Nigeria. *Journal of Environmental Science, Toxicology and Food Technology* 2014; 8: 35 – 40.

7. Anderson RM, Shanmuganayagam D, Weindruch R. Caloric Restriction and Aging: Studies in Mice and Monkeys. *Toxicologic Pathology*. 2009; 37 (1): 47 – 51.

8. Sohal RS, Agarwal S, Candas M, Forster MJ, Lal H. Effect of age and caloric restriction on DNA oxidative damage in different tissues of C57BL/6 mice. *Mech Ageing Dev*. 1994; 76 (2–3): 215 – 224.

9. Kaneko, T; Tahara, S; Matsuo, M (1997). "Retarding effect of dietary restriction on the accumulation of 8-hydroxy-2'-deoxyguanosine in organs of Fischer 344 rats during aging". *Free radical biology & medicine*. 1997; 23 (1): 76 – 81.

10. Saisho Y. Pancreas volume and fat deposition in diabetes and normal physiology: consideration of the interplay between endocrine and exocrine pancreas. *Rev Diabet Stud*. 2016; 13: 132 – 147.

11. Greenstock CL. Radiation and aging: Free radical damage, biological response and possible antioxidant intervention. *Medical Hypotheses* 1993; 41 (5): 473 – 482.

12. The Diabetes Prevention Program (DPP) Research Group. The Diabetes Prevention Program (DPP): Description of lifestyle intervention. *Diabetes Care* 2002; 25: 2165 – 2171.

13. Babatunde S, Ikimalo J. Uptake of cervical cancer screening: awareness, willingness and practice among antenatal clinic attendees in Port Harcourt, Nigeria. Port Harcourt Medical Journal 2010; 4: 149 – 154.

14. **Ordinioha B.** Ethical scrutiny of HIV testing in a secondary health facility in South-South Nigeria. *Port Harcourt Medical Journal* 2008; 3: 32 – 36.

15. **Ordinioha B.** Mandatory HIV testing and uptake of ante-natal services in a Primary Health Care Center in South-South Nigeria. *Port Harcourt Medical Journal* 2008; 2: 257 – 262.

16. National Population Commission (NPC) [Nigeria] and ICF International. Nigeria Demographic and Health Survey 2013. Abuja, Nigeria, and Rockville, Maryland, USA: NPC and ICF International. 2014.

17. **Ordinioha B**. *Principles and practice of environmental health in Nigeria*. Port Harcourt. Rural Health Forum. 2006.

18. **Ordinioha B.** A survey of sanitation facilities used in some riverine communities in the Niger delta: Health implications and a literature search for ideal facilities. Nigerian Medical Practitioner 2010; 58 (4): 91 – 96.

19. **Ordinioha B**. *Pictorial illustrations of the Environmental Health Condition of communities in the Niger Delta Region, Nigeria*. Preventive and Public Health Consult. 2014.

20. Human Right Watch. The Price of Oil: Corporate Responsibility and Human Rights Vilations in Nigeria's oil producing communities. Washington DC. Human Right Watch. 1999.

21. Ononugbo CP, Avwiri GO, Chad-Umoren YE. Impact of gas exploitation on the environmental radioactivity of

Ogba/Egbema/Ndoni area, Nigeria. Energy & Environment 2011; 22 (8): 1017 – 1027.

22. Avwiri GO. Radiation – the good, the bad and the ugly in our Environment: 79th Inaugural lecture of the University of Port Harcourt. Port Harcourt. University of Port Harcourt Press. 2011.

23. **Ordinioha B**. The health impact of oil exploration and exploitation in the Niger delta. Omoku. Preventive and Public Health Consult. 2009.

24. Epstein PR, Selber J. Oil: A lifecycle analysis of its health and environmental impacts. Boston, MA. The Center for Health and the Global Environment, Harvard Medical School 2002.

25. Kutsuna M, ed. Minamata disease: Study group of Minamata disease. Japan: Kumamoto University, 1968: 1-4.

26. Agency for Toxic Substances and Disease Registry (ATSDR). Toxicological profile for mercury. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service. 1999.

27. Loomis D, Grosse Y, Lauby-Secretan B, et al. The carcinogenicity of outdoor air pollution. Lancet Oncol. 2013; 4:1262 – 1263.

28. Enomoto M, Tierney WJ, Nozaki K. risk of human health by particulate matter as a source of air pollution: comparison with tobacco smoking. J Toxicol Sci. 2008; 33 (3): 251 – 267.

29. **Ordinioha B.** The human health implications of crude oil spills in the Niger delta, Nigeria: an interpretation of published studies**.** Nigerian Medical Journal 2013; 54: 10 – 16.

30. **Ordinioha B, Sawyer WE.** The acute health effects of a major crude oil spillage in a rural community in Bayelsa State, Nigeria**.** *Nigerian Journal of Medicine 2010; 19: 140 – 144.*

31. **Ordinioha B, Sawyer WE.** Food insecurity, malnutrition, and crude oil spillage in a rural community in Bayelsa State, south-south Nigeria. *Nigerian Journal of Medicine* 2008; 17: 304 – 309.

32. Federal Ministry of Health [Nigeria]. *National HIV and AIDS and Reproductive Health Survey, 2012 (NARHS Plus)*. Federal Ministry of Health Abuja, Nigeria. 2013.

33. Anochie IC, Ikpeme EE. Prevalence of sexual activity and outcome among female secondary school students in Port Harcourt, Nigeria. Afr J Reprod Health 2001; 5 (2): 63 – 67.

34. **Ordinioha B, Owhondah G.** Clandestine abortion in Port Harcourt: users' profile and motivation. *Nigerian Journal of Medicine* 2008; 17: 33 – 36.

35. **Ordinioha B. Brisibe SF.** Experiences and Attitudes of young men towards abortion in a semi-urban community in Rivers State, Nigeria. *Port Harcourt Journal of Medicine* 2008; 3: 160 – 166.

36. Scheelbeek P, Khan AE, Mojumder S, Elliott P, Vineis P. Drinking water sodium and elevated blood pressure of healthy pregnant women in salinity-affected coastal areas. *Hypertension*. 2016; 68: 00-00.

37. United Nations Environment Programme (UNEP). *Environmental Assessment of Ogoniland.* Nairobi, Kenya. UNEP . 2011.

38. Adeloye A. Some early Nigerian doctors and their contribution to modern medicine in West Africa. *Medical History* 1974; 18: 275 – 293.

39. Omran AR. The epidemiologic transition: a theory of the epidemiology of population change. Milbank Memorial Fund Quarterly, 1971, 29: 509–538.

40. National Malaria Elimination Programme (NMEP), National Population Commission (NPopC), National Bureau of Statistics (NBS), and ICF International. *Nigeria Malaria Indicator Survey 2015*. Abuja, Nigeria, and Rockville, Maryland, USA: NMEP, NPopC, and ICF International. 2016.

41. Wokoma FS, Alasia DD. Blood pressure pattern in Barako: a rural community in Rivers State, Nigeria. The Nigerian Health Journal 2011; 11: 8 – 13.

42. **Ordinioha B**. The prevalence of hypertension and its modifiable risk factors amongst lecturers of a medical school in Port Harcourt, south-south Nigeria: implications for control effort. *Nigerian Journal of Clinical Practice 2013; 16 (1): 1 – 4.*

43. **Ordinioha B,** Brisibe SF**.** The prevalence of hypertension and its modifiable risk factors amongst traditional chiefs of an oil-bearing community in south-south Nigeria. Sahel Medical Journal 2013; 14: 24 – 27.

44. Chinenye S, Uloko AE, Ogbera AO, Ofoegbu EN, Fasanmade OA, Fasanmade AA, et al. Profile of Nigerians with diabetes mellitus - Diabcare Nigeria study group (2008): Results of a multicenter study. *Indian J Endocr Metab* 2012; 16: 558 - 564.

45. **Ordinioha B**. Incidence and reasons for Discharge Against Medical Advice in a tertiary health care facility in Port

Harcourt, south-south Nigeria. *Journal of Community Medicine and Primary Health Care 2013; 25 (2): 53 – 58.*

46. Adogame A: HIV/AIDS support and African pentecostalism: the case of the Redeemed Christian Church of God (RCCG). J Health Psychol 2007; 12(3):475-484.

47. Roura M, Nsigaye R, Nhandi B, Wamoyi J, Busza J, Urassa M, Todd J, Zaba B. "Driving the devil away": qualitative insights into miraculous cures for AIDS in a rural Tanzanian ward. BMC Public Health 2010 10:427.

48. Wanyama J, Castelnuovo B, Wandera B, Mwebaze P, Kambugu A, Bangsberg DR, Kamya MR: Belief in divine healing can be a barrier to antiretroviral therapy adherence in Uganda. AIDS 2007, 21(11):1486 – 1487.

49. Chandler DJ. The Impact of Pastors' Spiritual Practices on Burnout. *The Journal of Pastoral Care and Counselling*. 2010; 64(2):6.1- 9.

50. **Ordinioha B**, Brisibe SF. A long and healthy life with Diabetes Mellitus: A Step-by-Step Guide. Preventive and Public Health Consult. 2015.

51. Kübler-Ross E, Kessler D. *On grief and grieving: Finding the meaning of grief through the five stages of loss*. New York, N.Y.: Scribner. 2005.

52. Schram R. *A history of Nigerian health system*. Ibadan. Ibadan University Press. 1971.

53. **Ordinioha B**. Social marketing of insecticide-treated bed net for malaria control in a semi-urban community in South-South Nigeria. *Port Harcourt Medical Journa*l 2007; 1: 145 – 150.

54. **Ordinioha B.** Perception of bed nets and malaria prevention amongst users of insecticide-treated net in a semi-urban community in south-south Nigeria. *Nigerian Journal of medicine*; 2006; 15: 413 – 416

55. **Ordinioha B.** The use of Insecticide-Treated bed Net in a semi-urban community in south-south, Nigeria. *Nigerian Journal of Medicine* 2007; 16: 116 – 199.

56. **Ordinioha B.** The effect of insecticide-treated bed net on malarial parasitaemia and haemoglobin level of under-five children in an area of intense perennial malaria transmission in south-south Nigeria. *Port Harcourt Medical Journal* 2007; 1: 90 – 95.

57. Brisibe SF, **Ordinioha B,** Gbeneol PK. Willingness to pay for clinical preventive services of patients attending the General Out-patient clinic of a tertiary hospital in south-south Nigeria. *European Journal of Preventive Medicine* 2015***; 3 (1): 6 – 10.***

58. **Ordinioha B,** Brisibe SF. The storage and processing of cassava-based Nigerian staple foods for the prevention and management of noncommunicable diseases. *Port Harcourt Medical Journal* 2014; 8: 129 -139.

59. **Ordinioha B,** Brisibe SF. Can palm wine metamorphose into a health drink? Port Harcourt Medical Journal 2013; 7 (3): 193 – 202.

60. **Ordinioha B,** Brisibe SF, Best-Ordinioha JC. A review of the dietary use of palm oil in Nigeria in an era of emergent noncommunicable diseases. Port Harcourt Medical Journal 2013; 7: 95 – 104.

61. Dowse GK, Gareeboo H, Alberti KG, Zimmet P, Tuomilehto J, Purran A, Fareed D *et al*. Changes in population cholesterol concentrations and other cardiovascular risk factor levels after

five years of the non-communicable disease intervention programme in Mauritius. *BMJ*, 1995, 311: 1255–1259.

62. Lloyd-Williams F, O'Flaherty M, Mwatsama M, Birt C, Ireland R, Capewell S. Estimating the cardiovascular mortality burden attributable to the European Common Agricultural Policy on dietary saturated fats. *Bull World Health Organ* 2008; 86: 535 – 541.

63. Mozaffarian D, Micha R, Wallace S: Effects on coronary heart disease of increasing polyunsaturated fat in place of saturated fat: a systematic review and meta-analysis of randomized controlled trials. *PLoS Med* 2010; 7:e1000252.

64. Zeba AN, Martin PY, Somé IT, Delisle HF. The positive impact of red palm oil in school meals on vitamin A status: study in Burkina Faso. *Nutr J* 2006, 5:17.

65. Artaud-Wild SM, Connor SL, Sexton G, Connor WE. Differences in coronary mortality can be explained by differences in cholesterol and saturated fat intakes in 40 countries but not in France and Finland. A paradox. *Circulation* 1993; 88: 2771 – 2779.

66. Wilkinson RG, Pickett KE. *The Spirit level: Why Equality is better for everyone*. London. Penguin, UK. 2009.

67. Mckeown T. *The role of medicine: Dream, mirage or nemesis?* Princeton, New Jersey. Princeton University Press. 1979.

68. **Ordinioha B**, Adeosun A. A survey of the community water supply of some communities in Rivers State, south-south Nigeria. The Nigerian Health Journal 2008; 8: 39 – 42.

69. **Ordinioha B**. A survey of the community water supply of some rural riverine communities in the Niger delta region,

Nigeria: Health implications and literature search for suitable interventions. Nigerian Medical Journal 2011; 52 (1): 13 – 18.

70. Chinda S, **Ordinioha B**. Health implications of chemicals found in the drinking water supply of members of an urban community in Rivers State, south-south Nigeria. *Port Harcourt Medical Journal 2016; 10: 91 – 96.*

71. **Ordinioha B,** Sawyer WE. The health implications of trace minerals in the drinking water of some oil-bearing communities in the Niger delta region, Nigeria. *Journal of the Nigerian Environmental Society (JNES) 2012; 7 (2): 1 – 12.*

72. **Ordinioha B,** Owhondah G. Sanitation facilities and hygiene practices in a semi-urban community in Rivers State, south-south Nigeria. *The Nigerian Health Journal* 2008; 8: 10 – 15.

73. **Ordinioha B,** Sawyer W. Solid waste management in some oil-bearing communities in Rivers State, south-south Nigeria: Implications to community health. *Port Harcourt Medical Journal 2012; 6: 251 – 258***.**

74. **Ordinioha B**. Energy saving bulbs: An emerging threat to public health, from mercury contamination of the environment. The Nigerian Health Journal 2012; 12: 65 – 67.

75. **Ordinioha B.** The human health implications of the environmental conditions and practices in some rural riverine communities of the Niger delta, Nigeria. Port Harcourt Medical Journal 2013; 7: 123 – 132.

76. N-ue DM, **Ordinioha B.** Assessment of the level of some heavy metals in commonly consumed local fish species displayed for sale in Port Harcourt, Nigeria. *Port Harcourt Med J* 2016; 10: 55 – 59.

77. Brisibe SF, **Ordinioha B.** Socio-demographic characteristics of alcohol abusers in a rural Ijaw community in Bayelsa State, south-south Nigeria. *Annals of African Medicine 2011; 10: 97 – 102.*

78. Brisibe SF, **Ordinioha B**, Dienye P. Intersection between alcohol abuse and intimate partner's violence in a rural Ijaw community in Bayelsa State, south-south Nigeria. *J Interper Violence 2012; 27: 513. DOI: 10.1177/0886260511421676.*

79. **Ordinioha B,** Brisibe SF. Alcohol consumption among pregnant women attending the ante-natal clinic of a tertiary hospital in south-south Nigeria. *Nigerian Journal of Clinical Practice* 2015; 18 (1): 13 - 17.

80. **Ordinioha B**. An evaluation of the volume and concentration of alcoholic beverages offered for sale in Port Harcourt, south-south Nigeria. *The Nigerian Health Journal* 2008; 8: 24 – 26.

81. **Ordinioha B,** Brisibe SF. Urbanization, household food security and childhood malnutrition: a comparison of two communities in Rivers State, south-south Nigeria. Journal of Food Security 2013; 1: 1 – 9.

82. **Ordinioha B,** Onyenakporo C. Experience with the use of Community Health Extension Workers in primary care, in a private rural health care institution in south-south Nigeria. *Annals of African Medicine* 2010; 9 (4): 240 – 245.

83. Itimi K, Dienye P, **Ordinioha B.** Community participation and childhood immunization coverage: A comparative study of rural and urban communities of Bayelsa State, south-south Nigeria. *Nigerian Medical Journal 2012; 53 (1): 21 – 25.*

84. Brisibe SF, **Ordinioha B**. An assessment of the functionality of a Community Health Committee in an oil-bearing

community in south-south Nigeria. *The Nigerian Health Journal* 2014; 14 (4): 150 – 156.

85. Brisibe SF, **Ordinioha B**. Attitude to the formation of Community Health Committee in an oil-bearing community in south-south Nigeria. *The Nigerian Health Journal* 2014; 14 (3): 108 – 113.

86. **Ordinioha B,** Sawyer W**.** The environmental health condition of the new University of Port Harcourt Teaching Hospital. *The Nigerian Health Journal 2012; 11 (4): 117 – 119.*

87. Emuren K, **Ordinioha B**. Microbiological assessment of indoor air quality at different sites of a tertiary hospital in south-south Nigeria. *Port Harcourt Med J* 2016; 10: 79 – 84.

88. Emuren K, **Ordinioha B.** Physico-chemical assessment of indoor air quality of a tertiary hospital in south-south Nigeria. *Port Harcourt Med J 2017;11:21 – 25.*

89. **Ordinioha B. Brisibe SF** The management of health care waste in a tertiary health care institution in Port Harcourt, south-south Nigeria. *Journal of Community Medicine and Primary Health Care* 2008; 21(1): 37 – 44.

90. **Ordinioha B. Brisibe SF**. The management of sharp wastes in a tertiary health care institution in Port Harcourt, south-south Nigeria. *Nigerian Medical Practitioner* 2010; 58 (1- 2): 26 – 32.

91. **Ordinioha B, Ugboma H.** Caesarean section: the perspective of women in Port Harcourt. *Port Harcourt Medical Journal* 2010; 4: 160 – 167.

92. **Ordinioha B,** Brisibe SF. Improving skilled attendants at birth: Experience in a primary health care facility in Rivers

State, south-south Nigeria. *Journal of Community Medicine and Primary Health Care 2013; 25 (2): 59 – 66.*

93. Brisibe SF, **Ordinioha B**, Gbeneol PK**.** The effect of hospital infection control policy on the prevalence of Surgical Site Infection in a tertiary hospital in south-south Nigeria. *Niger Med J* 2015; 56: 194 – 198.

94. Brisibe SF, **Ordinioha B,** Gbenolol PK. Knowledge, attitude and compliance of health workers to the infection control policy of a tertiary hospital in south-south Nigeria. *Nigerian Journal of Clinical Practice* 2014; 17 (6): 691 - 695.

95. Gbeneol PK, Brisibe SF, **Ordinioha B**. Environmental factors and the efforts at increasing access to drinking water in the Niger delta region of Nigeria. *Port Harcourt Medical Journal* 2015; 9: S49 – S55.

96. Gbeneol PK, Brisibe SF, **Ordinioha B**. The contributions of MDGs water projects to access to drinking water in communities in the four ecological zones of the Niger delta region. *Port Harcourt Medical Journal* 2015; 9: S41 – S48.

97. Gbeneol PK, Brisibe SF, **Ordinioha B**. Environmental factors and the efforts at increasing access to health care services in the Niger delta region of Nigeria. Port Harcourt Medical Journal 2015; 9: S56 – S61.

98. Gbeneol PK, Brisibe SF, **Ordinioha B**. Attitude and performance of Community Development Committees in the management of OSSAP-MDGs intervention projects in communities in Rivers State, Nigeria. *Port Harcourt Medical Journa*l 2015; 9: S33 – S40.

Citation

Prof Best Ordinioha
MBBS (UPH), FMCPH

Professor Best Ordinioha was born on 22nd July, 1972 to Chief Sunday Nwalor Ordinioha, a tax collector and former Dispensary Assistant and his third wife, Late Eze-Nwanyi Evelyn Ordinioha, a colonial trained community midwife. He was born in his home town Mgbede – Egbema, a small semi-urban, oil-bearing community in the Ogba/ Egbema/ Ndoni Local Government Area of Rivers State.

He had his primary school from 1976 to 1981 in the primary school of his community, State School Mgbede; and for his secondary school education he attended Community Secondary School Upata I Edeoha (1981), Egbema Grammar School Okwuzi (1981 – 1983) and Baptist High School Port Harcourt (1983 – 1986).

He was admitted into the University of Port Harcourt medical school in 1988, at age of 16 years, and graduated in 1995, at the age of 23 years, even after spending an extra year in school, due to ASUU strike.

He did his internship at the University of Port Harcourt Teaching Hospital in 1996, rotating through the teams of Prof. Harrison and

Prof. Okpani for his O&G posting, Prof. F. Eke, paediatrics, Prof. Onwuchekwa, Internal Medicine and Prof. N. Eke and Prof. Jamabo, surgery.

He did his national youth service in 1997 at Dan Musa LGA of Katsina State, and was charged with the responsibility of providing health care to the entire people of the LGA, in two health centers, and several health posts. He performed exceptionally well, and was given an NYSC State honours award for his meritorious service.

He returned to the University of Port Harcourt Teaching Hospital in 1999, for his residency training programme in Community Medicine, which he completed in May 2005, with the award of the fellowship of National Postgraduate Medical College of Nigeria in Public Health. He thus became the first graduate of the residency training programme of the hospital in Community Medicine and Public Health.

He was employed into the medical school of the University of Port Harcourt in 2005 as Lecturer I, in the department of Preventive and Social Medicine, and became the Coordinator of the department three months later in January, 2006, following the retirement of then acting HOD, Dr. SBS Afiesimama. He was subsequently appointed the head of his department at the UPTH, and served in the two capacities for three years, within which he recorded remarkable feats. The residency training programme of his department became fully accredited during his tenure, and quickly became one of the best training centers in the country, based on the number of candidates that attempted and passed the various postgraduate examinations.

He was appointed an examiner at both the Part I and Part II examinations of the National Postgraduate Medical College of Nigeria in Public Health, at the earliest possible time; has served as external examiner in seven medical schools, and in the MPH programme of two universities.

Professor Ordinioha has served the university and teaching hospital in various capacities. He has served two terms as head of his department, both in the university and in the teaching hospital; served as a member of the College of Health Sciences, Servicom committee; member of the Faculty of Clinical Sciences Research committee, and was the Faculty's representative for the Research Fair of the 2017 convocation ceremony. He was also the coordinator of the Postgraduate programme of his department, and was the pioneer coordinator of the Community Health Officers' training programme of the teaching hospital. He is currently the Associate Dean of the Faculty of Clinical Sciences.

He rose swiftly through the academic rank, as he was promoted a Senior Lecturer in 2008, a Reader in 2011; and a professor of Community Medicine and Public Health in 2015, at the age of 43 years, following a rigorous appraisal exercise.

His research interests are in environmental health, and in the mainstreaming of the chronic care model in the management of chronic diseases. These have taken him to nearly all the communities in the Niger delta region, on field studies, the results of which he published in more than sixty research articles in local and international journals, eight books and one monograph.

Prof. Ordinioha is happily married to Dr (Mrs) Joyce Best-Ordinioha, and they are blest with two daughters, Blest and Treasure; and three sons, Best Junior, Solomon and William.