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Journal of Nigerian Medical and Dental Consultants Association of Niger Delta University Teaching Hospital

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EDITORIAL: GIANT STEPS.

Tubonye C. Harry, FRCOG, FRCP, FWACS
Editor-in-Chief

Niger Delta Medical Journal 2019;**3**(1):4

The first issue of the third volume is a giant step for the NDMJ. It is marked by consistency in unbroken publications and most importantly securing the ISSN number for both the print and online versions from the National Library of Nigeria. We will continue to earnestly seek inclusion on medical databases including the PubMed and PubMed Central of the United States National Library of Science.

We have an eclectic range of subjects in this third issue. We revisit the 10th Deans Lecture[1] relevant now as it was when delivered. The trend of publishing inaugural lectures from the Faculty begins with the 16th Inaugural Lecture, the first from the Faculty[2].

Oyetundun and colleagues[3] evaluate the zinc levels in paediatric patients with acute diarrhoea. Accurate antenatal diagnosis affect conservative management when feasible, but not always so in the 3rd world settings, where a benign condition portends diagnostic conundrum[4]. Do no harm is the philosophical injunction that underpins medical care. That albeit is not always the case as demonstrated by Tabowei and colleagues[5] in their elegant paper.

Forms of treatment that are used in addition to (complementary) or instead of (alternative) standard treatments. These practices generally are not considered standard medical approaches[6]. Olumuyiwa and colleagues[7] describe their findings in an urban teaching hospital setting.

We are indebted to our peer-reviewers[8] for their commitment and passion in sustaining medical education and practice to the dedicated services proffered *NDMJ*. We thank them.

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THE MAKING OF A GREAT MEDICAL SCHOOL

10th. Dean's Lecture.
Faculty of Clinical Sciences.
College of Health Sciences.
Niger Delta University.
by
NIMI BRIGGS, OON, MD, FRCOG
University of Port Harcourt.
Thursday 12 November 2015
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My choice of the title of today's lecture is predicated on my perception of the determination of this institution to be a great medical school. For as I ponder on the institution's difficult past, from which it has arguably made a good measure of recovery, I am persuaded that things will be better and that the greater is yet to come. Commencing a legacy lecture series as a young institution is audacious; sustaining it beyond the first one or two is tenacious. It is such mustard seeds, sown and nurtured with unflagging resolve that propagate into gargantuan trees, from which, not just states, not just countries, but indeed nations are nourished. I congratulate the Faculty of Clinical Sciences and its parent organisations, the College of Health Sciences and the Niger Delta University for instituting the Dean's Lecture Series. It is my wish that it blossoms into a major academic event that will deepen scholarship and so, help to shape the course of this university, together with its medical school, in its quest to be numbered among the best on a global scale.

Medical Schools everywhere, by whatever name called – Faculties, Institutes, Colleges, or even Medical Universities - are institutions of prodigious and formidable standing. They are established essentially to provide dedicated environments in which varieties of scholarly and professional activities in Medicine and related disciplines are carried out, including the training of students – especially professionals, academics and scientists; the conduct of research – especially the health-related ones and the provision of specialised services – particularly to needy communities. Accordingly, it is the summation of the institutions' outputs and abilities in these complex areas of expertise, judged through multiple prisms, all of which underscore the element of quality, that inform public opinion and perception, determine reputation and character and define visibility and greatness. Such favourable outcomes that categorise an institution as *great*, therefore do not come easy and cheap. They are planned for and they also evolve over time. In general, they are the product of initial careful preparations followed by rigorous and sustained execution of deliberate and well-articulated action plans and policies. In choosing to speak this afternoon on **The Making of a Great Medical School** therefore, my purpose is to draw the attention of this young and futuristic academic community and medical professionals to some of the pertinent issues about which you all should be preoccupied for your institution to become that respected and revered medical school which you all rightly desire.

The lecture is structured as follows: because I had indicated that some careful initial preparations are important prerequisites to good outcomes, I will begin with a brief account of some of what needs to be in place before the commencement of a medical school. Next, I will speak about institutional rankings – universities and their medical schools as these are currently accepted as rational bases for evaluating the performances, standing and quality of these institutions. In this section, I will point out some of the criteria that are used for such evaluations to which this medical school has to

subscribe, as it is, in a way, in competition with others, within and outside Nigeria. From these benchmarks, I will expand on three: quality of academic work, quality of research and quality of patient care which have the greatest potentials to define the status of a medical school. Following this, I will put the College of Health Sciences of the Niger Delta University in historical perspective and comment briefly on the life and times of three illustrious sons of this Glory Land of Bayelsa – Theodore Idibiye Francis, Kenneth Diete Koki and Gabriel Lambert Eradiri - in the context of today's lecture. My conclusion will emphasise the value of a great medical school to the community at large.

PREPARATIONS.

Training would-be-health professionals, especially physicians, nurses and pharmacists – the main task of most medical schools – is a highly complex and tightly regulated affair in all countries[1]. This is so because these professionals, everywhere, have to be certified and registered as having acquired requisite knowledge and skills through supervised training in approved institutions to enable them practise their professions.

Statutory bodies set up by Governments not only give approvals for commencement but also supervise development of curricula and construction of physical infrastructure. Curricula are developed by the Senates of the Universities in which the medical schools are domiciled and in line with benchmarks set by the regulatory bodies. Ideally, the curricula should cover the entire training period of four, five or six years as may be applicable and should contain the objectives as well as essential ingredients of the training programmes that are run by the specific universities. The physical structures comprise the teaching and learning environment, including classrooms, lecture theatres, specialised laboratories, dedicated medical library as well as recreational and social facilities. Others are residential accommodation, especially for students and the provision of utilities, particularly electricity, potable water and sanitation. Provision must be made for the use of Information and Communication Technology (ICT) which has not only proved to be a veritable learning tool but also a facility for accomplishing many day-to-day tasks. I am referring to computing facilities, smartboards, Tablets, mobile communications and of course, reliable, fast and affordable internet access. Special mention must be made of the need for the provision of a standard hospital(s) that would serve the needs of the students once they get done with the basic aspects of their training. Furthermore, staff recruitment – teaching and non-teaching - is carried out to cover the various areas through which the students would rotate and be trained. Most importantly, a well-qualified and capable individual, *of honest report*[2] and with strength of character is appointed to head the institution. In all this, funding arrangement must be secure and sustainable as establishing and running a medical school is capital intensive and expensive.

The time spent in such careful planning and preparations before the intake of students is never wasted. Rather, such actions constitute an important way of ensuring that things run smoothly from the start and that students are properly engaged in their educational pursuit right from the time of their admission into the medical school. Indeed such painstaking preparations are important first steps in the making of a great medical school; omitted or handled badly, a problem is created which serves as a drumbeat for disaffection and a root cause of perennial difficulties that fester for long and confine a medical school to the doldrums.

The regulatory agencies that approve the establishment and supervise the activities of medical schools for the training of physicians in Nigeria are the Medical and Dental Council of Nigeria (MDCN) and the National Universities Commission (NUC). Their functions are complimentary, emphasising different aspects of their supervisory roles – professional and academic, respectively, as the medical degree is both a professional as well as an academic qualification. The respective guidelines of the two organisations are contained in two seminal publications: *Minimum Standards for Medical and Dental Education in Nigeria (The Red Book)*[3] and *Benchmark Minimum Academic Standards (BMAS) For Undergraduate Programmes in Nigerian Universities*

(Medicine and Dentistry)[4] which should be available in all medical schools in Nigeria. Where a Pharmacy programme is housed in a Medical College/School, as is currently the case at NDU, the regulatory functions for the programme are provided by the Pharmacy Council of Nigeria and the NUC.

Whereas it is impossible to anticipate and provide for every conceivable situation, that should not be an excuse for not trying and rather, making students' intake the priority. A number of medical schools in Nigeria have commenced in a hurry with little or no preparations. Students had been admitted in a haste with little or no groundwork. Not surprisingly, the mess that followed took precious time, lots of rancour and immense effort to clear. No medical school should wish itself such harm.

RANKING UNIVERSITIES AND THEIR MEDICAL SCHOOLS.

Ranking universities by using sets of criteria to benchmark them for the purposes of comparison and profiling is a relatively recent phenomenon[5]. Increased human interactions across boundaries necessitated by several factors – globalisation, emigration, migration, technological advancements – have remarkably enhanced students' inclination to study in countries other than theirs. Comparison of universities across national borders to inform choices therefore becomes inevitable. However, with increasing access to the internet which enables institutions to upload information on the web about their operations, the practice of comparing institutions across borders has rapidly gained popularity and global attention leading to the emergence of a number of organisations (Times Higher Education, Quacquarelli Symonds (QS) that have taken on the business of university ranking. So, currently, not only are there international rankings of world universities which are published annually, there are also regional (for example Asian, African), in-country (for example United Kingdom, Nigerian, South African) and others. It has been suggested that ranking universities, especially among the developing countries of Africa, could drive development of the region by enhancing institutional funding[6].

In the ranking process, using web-based information, key, weighted and scored performance indicators (KPIs) are used to assess universities against a wide range of parameters that derive from the core mandates of universities, including teaching, research, creativity, knowledge generation and its transformation into services, goods and products as well as institutional relevance to communities. Also assessed is popularity and the universities' cosmopolitan mix with respect to staff and students. Thus, popularity is assessed through structured surveys, including peer evaluations; the teaching and learning environment through the quality and number of students that seek admission, visibility of alumni, number and academic standing of faculties including citations and laurels, post graduate degrees awarded and income of academic staff; research by impact, funds attracted, patents and derived goods and services; and international diversity by ratio of international to domestic staff as well as ratio of international to domestic students[7]. Ranked in this or similar manner, the top 100 universities are regarded as the world's best. They are mainly in Europe and the United States of America and they all have strong web presence. Universities whose activities are poorly and inadequately presented on the World Wide Web accordingly receive poor ratings in the ranking system. However, in a ranking that was published recently, *Times Higher Education* – a UK based university ranking organisation - ranked the University of Port Harcourt as best in Nigeria, 6th in Africa and 300th in the world, based on the impact of publications emanating from staff of the institution[8]. Outside these global rankings, the National Universities Commission of Nigeria also ranks universities in the country. In the 2015 ranking by the Commission, the Niger Delta University is ranked 54th out of the 147 in the country[9].

Medical Schools being integral parts of their respective universities contribute to the overall prominence of their institutions through their

activities in the traditional areas of education, research and clinical care. It is proficiency in these areas of expertise that also make a medical school a great one - the criteria for ranking medical schools being similar to those for ranking universities. Thus a great medical school is one that attracts applications for admission from bright students from all over the globe. One that diligently educates and sufficiently stimulates as well as motivates such students to acquire relevant knowledge and skills for a professional or academic career in medicine or other disciplines and to commit to lifelong learning. A great medical school is one that is research led with staff that are seriously engaged in the pursuit of breaking new grounds and generating knowledge that would contribute to progress in the profession. A medical school whose staff are concomitantly involved in the provision of the highest quality of care to patients and also use such medium to train students. Indeed a great medical school is one that is involved in the wellbeing of its community, carrying out such public health measures that enhance the health of its members[1]. Let me expatiate on some of these.

EDUCATION.

The number and quality of students who apply for admission into a medical school is somehow indicative of the institution's worth. Globally, students with the highest pre-university qualifying grades tend to seek admission into the best medical schools where they frequently also excel in their studies. Students admitted to Harvard Medical School (established 1782) which is reputed as one of the world's best, typically have an undergraduate *Grade Point Average (GPA)* of between 3.73 and 4.00 and have a median *Medical College Admission Test (MCAT)* score of 37 out of 45 possible points[10]. Similarly, the *MCAT* score of students admitted to Johns Hopkins School of Medicine (established 1893), another globally acclaimed medical institution is 36 out of 45. Admission process which includes interviews is rigid and highly selective. In 2014, of the 6,322 persons who applied for admission, 717 (11%) were granted interviews and of these, 116 (1.8% of applicants) were enrolled as first-year medical students[11].

A similar trend is observed in Nigeria: large number of applicants with requisite scores from the Joint Admission and Matriculation Board Examination applying to study medicine in universities they believe have acquired fame and respect – some, not surprisingly, for all the wrong reasons[1]. Tables 1a, 1b and 1c show number of applicants to ten highest subscribed universities in the country for degree programmes in medicine for 2012, 2013 and 2014. The number of applicants is high and across board, much less than 10% (< 1% in some instances) of persons who apply get admitted (average for most other programmes, 30%). Also, in many universities, most of the highest scoring candidates in the science disciplines, apply to study medicine. And so, in stipulating *cut off points* for admission into various programmes, those for medicine tend to be the highest.

Training to become a physician is therefore an oversubscribed programme which is well sought after in many parts of the world. Furthermore, the programme attracts some of the best students who preferentially seek admission into well-renowned medical schools[12]. To attract the best students therefore, a medical school has to enhance its reputation through its infrastructure and the nature of its establishment, the number and quality of its academic staff, their academic output and the relevance of the academic programme that it runs. Additionally, the personal life styles, commitment and dedication of staff to their duties and to the course of students are all significant in defining a medical school and its perception by would-be –students[12,13].

Happily, many bright students who attend renowned medical schools work hard, make good grades, graduate and successfully pursue brilliant careers thereafter, within and outside the medical profession. They innovate, discover, win laurels, awards and recognition, contribute to knowledge, establish entrepreneurial empires, prosper immensely and become famous – all of which rob off positively on their alma mater in more ways than one. Thus, great medical schools attract good students who become accomplished alumni who in

turn, add to the greatness of their medical schools through their success in various areas of human activities. Accordingly, committing to taking the education of every medical student seriously is a vitally significant way by which great medical schools evolve.

To a large extent, the same is also true of the training of the pharmacist. The admission criteria are stringent, the course is arduous and many who practise the profession do well.

RESEARCH.

By July 2015, there were 147 universities in Nigeria[14]. Like all others in the world – current estimate, 25,000[15] - they reflect diverse cultures and variations in their orientations. But their central objective, to pursue the impartial truth and to seek a better understanding of the world so as to contribute to improvement in the quality of life of all mankind, is the same[16]. It is therefore argued that research is one pathway by which the Almighty reveals to mankind truth about creation.

To achieve this goal of the pursuit of truth, universities everywhere, use research, analytical and critical enquires as tools, through which knowledge is generated that leads to understanding and utilitarian values. The innovation, knowledge dispersal and discoveries that emanate from these processes thus become one of the most fundamental expected outcomes for which universities are established[17]. These anticipated outcomes truly define universities and serve as some of their most vital performance indicators. So important is this feature in the context of universities that evidence of research activities as provided partly by the quantity and quality of peer-reviewed publications in reputable journals constitutes the major factor used in assessing academic staff for advancement from one cadre to the other.

However, it is not only universities that carry out research – the process of objectively investigating specific problems in order to obtain verifiable results. Realising the huge benefits by way of innovation, discoveries, new products, improved ways of doing things that arise from research, all organisations worth their salt carry out research as deliberate policies. Some have even created divisions within their organisations – *Research and Development (R and D)* - that are designated for the purpose and to which they commit large portions of their annual resources. Manufacturers, farmers, transporters, educationists and many more, all commit to research[18]. It was such a realisation that motivated the immediate past Vice-Chancellor of the University of Port Harcourt, Professor Joseph Ajienka, *FNSE*, to create a Deputy Vice-Chancellor's position for R&D during his tenure to drive research and the conversion of research outcomes into patents, products and services in keeping with the entrepreneurial orientation of his institution[19]. To his credit, a number of other universities subsequently indicated interest in that arrangement. Indeed it can even be argued that research, by which we learn to do things better and more efficiently, underscores all human activities.

Because universities take on research as duty and responsibility, it is not surprising that most ground-breaking researches that have led to quantum leaps in human advancement, have come from such institutions. These cover all fields of human endeavour as shown at the website, *Universities – Discoveries. Com. Discoveries and Innovation that changed the world.*

Everywhere, it is people that carry out research – in universities, staff and students. They do so for a variety of reasons including curiosity, the desire to discover, personal gain, fame, societal advancement and to discharge their responsibilities to their employers. Research and discovery as well as the scholarly activities with which they are associated, not infrequently, attract huge benefits as well as recognition. Of these, probably the most prestigious is the *Noble Prize* – a set of annual international awards made possible through a large fortune left behind by Alfred Nobel (1833-1896), a Swedish chemist who discovered the dynamite[20]. The awards are bestowed in a number of categories by Swedish and Norwegian Committees for academic, cultural and scientific advances on "those who, during the preceding year, shall have conferred the greatest benefit on mankind"[21]. Apart from huge financial returns of about one million US dollars to recipients, noble

laureates bring tremendous fame and recognition to their affiliate universities. Not surprisingly, most Nobel Prize winners, outside the Peace Prize are researchers affiliated to universities of which, Stanford University in the U.S.A. currently tops the list[22].

Medical Schools as well as other health research institutions on their parts, offer their staff and students abundant opportunities for meaningful research in the laboratory sciences, clinical sciences and public health. Happily, the Nobel Prize Committee also has a category for Physiology and Medicine and so far, the committee has bestowed 106 of such awards on 300 Laureates with all the appurtenances to recipients and their medical schools, universities and institutions, between 1901 and this year (2015), where the awards went to three scientists for "therapies that have revolutionized the treatment of some of the most devastating parasitic diseases."[23] As of now, Nigeria's only Nobel Laureate, Professor Wole Soyinka is in Literature (1986. *University of Ife,* as it then was). However, there are a number of national awards of great distinction like the *Nigerian National Order of Merit (NNOM*) which have been won by academics from their work in various medical schools. Such persons include Professors Etim Essien – Ibadan/Calabar, Umaru Shehu – Maiduguri, Ladipo Akinkugbe – Ibadan, Kelsey Harrison – Ahmadu Bello/Port Harcourt, Samuel Ohaegbulam - UNN. By winning these awards, the recipients portrayed their medical schools and universities in good light.

It is unlikely that all medical schools and their parent universities will produce Nobel Laureates or National Merit Award winners as prevailing circumstances and existential realities differ remarkably from one institution to the other. However, it is important for all to cultivate an appetite for research, right from students in their early years to the most highly placed staff. A medical school which is famous for the quality of its research and the discoveries that emanate therefrom, is seen as a great medical institution. So, a medical school that would wish to join the league of stars, must consciously do all in its power to encourage research in its institution by providing adequate funds, hiring sharp minds with research orientation and providing the enabling environment for quality research – utilities, equipment and support staff right from the time of its commencement. Funds spent in this manner may not reveal immediate discernible benefits; they are well-meaning investments in the greatness of a medical school.

CLINICAL CARE

Many students who enrol in the various programmes of medical schools and their universities do so because they wish to practise and take some responsibility for the clinical care of patients at some point in their career[24]. This is without prejudice to some who graduate and take to other professions – banking, flying planes, dress making, photography and others. The clinical aspects of the training of students thus becomes one that many look forward to with great expectation. In addition to bed-side teaching on the wide array of diseases, students are made to acquire the skills, competence and the professional attributes of empathy, honesty and accountability needed for the practise of their professions.

Such complex engagement of students takes place in highly specialised environments – usually tertiary hospitals which have to be specially equipped, appropriately staffed and properly managed to fulfill this significant role. Hospitals where students are trained therefore become integral parts of their affiliated medical schools and universities and the level of competence and professionalism that such institutions display in the care of the patients under their watch, also define the level of respect accorded the medical schools. Such hospitals commit not just to patient care but also, teaching and research. Students have direct contact with patients, learn about their infirmities and participate in their care, albeit, under the supervision, tutelage and mentorship of academic staff of the university and medical school who also serve as clinicians/consultants to the hospital. In return, the high class teaching and research carried out in the hospitals by the academic staff of the universities and their medical schools bring about higher quality of care of the patients in the hospitals, than would have ordinarily been the case[1].

The proper functioning of each arm of this tripod arrangement – university, medical school and hospital - and their close collaboration with one another is needed to give the students the requisite sound and rounded education obligatory for professional practice[24]. It also affords the clinical teachers the milieu in which to exercise the full range of their knowledge and skills, including those for research. Furthermore, such close collaboration contributes to the fame and respect accorded each of them by the general public. A great medical school therefore is one in which staff and students take their clinical responsibilities to patients seriously.

THE COLLEGE OF HEALTH SCIENCES OF THE NIGER DELTA UNIVERSITY.

So, how does all this pertain to the object of today's lecture: the College of Health Sciences of the Niger Delta University (NDU) and its Faculty of Clinical Sciences? Realising that a university's international outlook matters, NDU, right from its commencement in 2000, was mindful of its perception abroad and the quality of its work as these two elements are sufficiently captured in the institution's Mission Statement: "To strive to maintain an international reputation for research and academic excellence for the promotion of social, cultural and economic wellbeing of mankind". There could have been no better declaration of intent to ensure a respectable position for the institution on the local and international league of universities. For how else can a university expect to attract the high caliber of staff and students if it fails to look beyond its own borders?

The same strong aspiration to build a great health institution fueled the establishment of the College of Medical Sciences in 2001 as it had as its core values "professionalism, innovation, excellence, team work, partnership/collaboration and integrity". With such firm focus, the College formed faculties and commenced classes with the admission of 100 students into a remedial programme in Medicine. But alas things went awry almost from the start as the programme floundered and could not be continued at NDU due to gross inadequacies and huge logistic problems – laboratories, classrooms, hostels, access to the medical school and absence of an appropriate facility for clinical studies. The needed accreditation from the NUC and MDCN could not be obtained. Even the introduction of a Bachelor's degree programme in Basic Medical Sciences as a stopgap measure could not satisfactorily address the problem and in the end, the students had to be fanned out to other medical schools to continue their studies. In the process, some took 12 years to graduate from a five year programme! Tempers flared and there was immense altercations amongst stakeholders in the medical school. Clearly there had been a breach of the apposite steps to be taken in the process of making a great medical school – preparations had been shoddy; students had been admitted in a hurry. Even at that, the admission of 100 students as first intake into a medical programme was ambitious. The College of Medicine of the University of Lagos admitted only 28 students annually in its first three years of its existence – 1962, 1963 and 1964 before nudging slightly upwards; Johns Hopkins School of Medicine established 1893 currently only has 116 students in its first year class.[10].

Thankfully, some of these drawbacks are now in the past; some hard lessons had been learnt and the medical school is being positioned to place it on the path to greatness. Accreditations by the statutory bodies have been obtained and the programmes in the College are now running with some degree of success. A number of graduates of the College have sat for postgraduate professional examinations by the National Postgraduate Medical College and the West African Postgraduate Medical College and have passed their Primaries at first attempts just like graduates from some of the older medical schools. Furthermore, the medical school has attracted some mature and seasoned academics and professionals from different parts of the country – even if as adjuncts and on short stints - and they are rendering the much needed expert services. Interdisciplinary ideas and corporations – a very forward- looking approach to institutional development - is being actively encouraged.

A good case in point of this approach is the establishment of *Genito-Urinary Medicine* – a discipline that requires the knowledge of Gynaecology and Internal Medicine as they are currently taught, and appointing a very capable hand to man the unit in the person of the current Dean of the Faculty of Clinical Sciences[25]. This is a novelty as the unit in the NDU is the first of its kind in any Nigerian university. I join many in congratulating all those who made this turn around possible at the NDU just as my heart reaches out to the students who had the bad end of the stick in the early days of the institution. But a lot still needs to be done – infrastructure, well equipped laboratories, hostels and many more areas that need urgent and sustained attention. Of these, the teaching hospital requires a very special mention being the laboratory of the Faculty of Clinical Sciences, the anchor of today's lecture. The teaching hospital merits an urgent upgrade in all areas of its operations and a proper administrative structure that would enable the Chief Medical Director, who, happily, is an academic staff of the faculty to do a good job.

Irrespective of their ownership or affiliation, well-equipped, properly run and functional hospitals are formidable assets to a nation, even when they do not bear the appellation of *teaching hospital*. Set up rightly, they quickly acquire a momentum of their own in education, research, and professional care and become renowned centres for the good of all. Little wonder they are invaluable complements to all medical schools. Let us recall a few of them: University College Hospital, Ibadan, which in 1960 produced the first set of doctors in Nigeria that had received the full complement of their training in the country; the First Consultant Hospital, Lagos, where in October 2014, the late Dr. Emeyo Stella Adadevoh and her colleagues stringently applied public health principles[26] at great personal risks in the case of the late Patrick Sawyer, then a patient suspected to be with ebola infection and thereby saved Nigeria and probably the world from what would have been a calamity of unimaginable dimension; the Groote Schuur Hospital in Cape Town, South Africa where Christiaan Bernard successfully carried out the first human heart transplant in December 1967; St. Mary's Hospital, London where Alexander Fleming discovered penicillin, the first antibiotic in 1928; the Toronto General Hospital of the University of Toronto, Canada where in 1920, the discovery process of insulin which revolutionised the treatment of patients with diabetes was perfected by Frederick Banting and Charles Best (a medical student); the Johns Hopkins Hospital, Baltimore, where, in 1987, Benjamin Carson led a team of 70 health professionals that successfully separated Patrick and Benjamin Binder from Germany who had been joined at the backs of their heads for 7 months as craniopagus twins, and many more, all readily come to mind as great medical institutions that have impacted immensely on mankind's progress.

Nearer home, examples also exist of hospitals that have played great roles in the lives of people and universities that have used their medical schools and hospitals to positively influence their communities. Braithwaite Memorial Specialist Hospital, Port Harcourt, a 375-bed health facility, as it now is, named after the pioneer surgeon and head consultant of the hospital, Dr. Eldred Curwen Russel Braithwaite, an Australian, has been consistent in the provision of quality, safe and compassionate healthcare services to Nigerians, especially those based in riverine southern parts of the country since its establishment in 1925. In a similar vein, the University of Port Harcourt, commencing 1992 and for over 10 years carried out specialised patient care, capacity building, training and community enlightenment in K-gbara Dere – a community of indigenous Ogoni people, about 30 Kilometres from the institution. The university did this through a collaborative research between it and the Women's Health Group of the Liverpool School of Tropical Medicine aimed at improving the "quality of life and standard of health care for women" through the execution of "health strategies for women in developing countries[27, 28]". K-gbara Dere was the project site and because of the presence of the university, Shell Petroleum Development Company felt sufficiently reassured to equip the cottage hospital at the site to an extent that staff of the university and its teaching hospital were able to offer free specialised care to the inhabitants and their neighbours in B-Dere.

A close relationship was fostered between the university and the K-Dere community as the university used the facility to train its medical students in rural medical practice as well as preventive and social medicine. Employment opportunities were generated and some members of the research team learnt the Ogoni language and established long lasting friendships, one of which led to marriage. Furthermore, the research led to several unprecedented reports on the status of reproductive health of women, especially adolescents, in Rivers State including a lead original research article in the Lancet[27] and the completion of five Ph.D. theses. It is in such light that I would wish the teaching hospital and the medical school of the NDU to be remembered in future. Happily, a good number of the sons and daughters of this Glory Land of Bayelsa have trained in great medical institutions all over the world and pursued brilliant and inspiring careers thereafter. Let us reflect momentarily on the life and times of three of them: Theodore Idibiye Francis, Kenneth Diete Koki and Gabriel Lambert Eradiri as examples of bright students whose abilities were unearthed by great medical institutions.

Theodore Idibiye Francis (1933-1992) a native of Nembe, graduated bachelor of Medicine and Bachelor of Surgery from Guy's Hospital Medical School of the University of London in 1959. He had further training at various times at the Royal College of Physicians, London, the Liverpool School of Tropical Medicine and Boston City Hospital at Harvard University. He returned to Nigeria and commenced a brilliant career that saw him through the Universities of Ibadan and Port Harcourt as well as that of the Federal University of Technology, Akure. At various times, he was Professor and Head of the Department of Medicine of the University of Ibadan; Foundation Provost of the College of Health Sciences of the University of Port Harcourt; Foundation Chief Medical Director of the University of Port Harcourt Teaching Hospital and Foundation Vice – Chancellor of the Federal University of Technology, Akure. He received several accolades including Fellowship of the Nigerian Academy of Science and those of the Royal Colleges of Physicians of London and Edinburg.

Like Theodore Francis, Kenneth Diete Koki (1926-1992) as he was later known, hailed from Nembe. He was educated at the Yaba Higher College, University College Ibadan and the University of London from where he obtained Licentiate in Medicine, bachelors and doctorate degrees in Physiology. He returned to Nigeria and took up appointment as lecturer in Human Physiology with the University of Lagos and an honorary consultant to the Lagos University Teaching Hospital. He attained professorial status and moved through many universities in Nigeria – University of Nigeria, University of Benin and the University of Port Harcourt. In the process, he taught several medical, dental and single honours students from many parts of the country including my humble self. He was the first to work out the nerve supply to muscle spindles and to date, his PhD thesis on the subject which was concluded in 1962 remains a leader in that field.[29] He played a major role in the establishment of the Rivers State University of Science and Technology – the first University of Science and Technology in Nigeria and he served as the pioneer chairman of its governing council. He was dearly loved by his students who fondly called him *The Great KDK*.

Gabriel Lambert Eradiri (OFR) is from Agudama. He read Pharmacy at the University of Ife, as it then was, where he taught briefly and followed up with a long and successful career as a federal civil servant. He also worked briefly in the United Kingdom as a manufacturing and dispensing pharmacist at St. Mary's Hospital, London. He has received several awards including an honorary Doctor of Science degree from the Marlborough University, USA. He is a member of the Institute of Pharmacy Management, London, the International Pharmacy Federation, the Society of Health Nigeria (Life Member) and a Fellow of the Pharmaceutical Society of Nigeria. His professional services include: Secretary of the Pharmaceutical Law Review Committee, Lagos (1965-66); National Secretary of the Nigerian Union of Pharmacists (1967-77); Pharmaceutical Society of Nigeria Representative at the Federal Government Pharmacist Board of Nigeria (1972-74) and First National Deputy President of the Pharmaceutical Society of Nigeria (1994-97).

Ladies and gentlemen, the point being made is that such brilliant boys and girls still exist in Nembe, Agudama, Yenagoa, Amassoma, Otueke and elsewhere especially in this Glorious Land of Bayelsa. History beckons on the NDU to make great professionals and academics of them as was made of Theodore Idibiye Francis, Kenneth Diete-Koki and Gabriel Lambert Eradiri. The university should, as is advocated in the recently adopted Sustainable Development Goal 5, take its drive of ensuring *inclusive and equitable quality education* and the promotion of *lifelong learning opportunities for all,* beyond its borders[30]. Talent, it is said, is universal; opportunity is not.

CONCLUSION

What is clear is that a great medical school is made through the commitment of its stakeholders - especially students and staff - to such a course. Outside the issues of infrastructure and finance, it is the dedication, drive and passion with which students pursue their academic work and staff commit to research, professionalism and community engagement, with the overarching aim of mankind's advancement, which ultimately determine the standing of a medical school. Starting well and building up reputation for competence and excellence in all spheres of its operations attract good students who graduate and pursue successful careers and in return, bring fame and glory to their medical school. Not surprisingly, the benefits of such a great institution abound both for its parent university and the community at large.

For its university, a great medical school together with its affiliate teaching hospital is *a jewel of inestimable value*[31]. Among many other advantages, such a medical school brings to the university fold a large pool of seasoned and well-bred academics and professionals who foster university culture, strengthen academic discourse and facilitate intellectual interchange.

A great medical school does even more for its wider community as the university is able to positively impact its public in a strong manner using such an institution by engaging in community-oriented activities - research, public enlightenment programmes, rural medical practice, outreach sessions, sanitation and clean up exercises and much more – all aimed at integrating with the community and securing its health.[25]

Chang-Rae Lee, a Korean-American once wrote: *It is "where we are" that should make all the difference, whether we believe we belong there or not.* Here, my perception is that the College of Health Sciences of the NDU wishes to belong to the highest class of medical educational institutions and that it is prepared to carve a niche for itself within the array of critical medical issues that are currently trending in the country: vaccination for malaria; vaccine for ebola; interruption of poliomyelitis infection; Universal Health Coverage; the gains at the twilight of MDGs in the reduction of maternal mortality and HIV infection. For me, I see a window in the fight against HIV infection in which this university is rapidly becoming a reference point for the country as judged by the structures being set up by its Genito-Urinary Medicine unit as was amply demonstrated at the university's 16th Inaugural Lecture[25]. This university should accordingly set itself the target of eradicating this infection in the whole of Bayelsa State in the next few years and from there, throughout the rest of the Niger Delta in accordance with the Federal Government's aspiration of 2030 as being the effective year for the eradication of this disease throughout the country among the 3.4 million that are still leaving with the disease.

What is then left is for me to thank this university, its College of Health Sciences and in particular, its Faculty of Clinical Sciences for inviting me to deliver today's Dean's Lecture. For me, it has been a labour of love just as has been the case in the many recent past. The central message of the lecture is simple. Challenged by the burden of history, the lecture is a call to action; an exhortation that urges the NDU, along with its College of Health Sciences to shoot for the stars.in the quality and output of its work in teaching, research and service delivery so as to be counted among the very best. But frankly, judging from the dire state of affairs in the Niger Delta from which the university derives its name, can it really afford to do any less?

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ADMISSION INTO SOME NIGERIAN UNIVERSITIES MEDICINE AND SURGERY

2012 **Table 1a**

S/N	INSTITUTION NAME	TOTAL NO OF APPLICANTS	NO ADMISSION	%
1	UNIVERSITY OF NIGERIA NSUKKA.	8639	323	3.73
2	OBAFEMI AWOLOWO UNIVERSITY, ILE -IFE	8365	202	2.41
3	UNIVERSITY OF BENIN, BENIN CITY	7540	326	4.30
4	UNIVERSITY OF ILORIN, ILORIN	7500	202	2.69
5	UNIVERSITY OF LAGOS	7034	277	3.94
6	UNIVERSITY OF IBADAN, IBADAN	6953	221	3.18
7	AHMADU BELLO UNIVERSITY, ZARIA	6265	113	1.80
8	UNIVERSITY OF CALABAR, CALABAR	5294	211	3.99
9	USMANU DANFODIO UNIVERSITY, SOKOTO	4886	130	2.66
10	NNAMDI AZIKIWE UNIVERSITY, AWKA	4719	223	4.73
19	NIGER DELTA UNIVERSITY , WILBERFORCE ISLAND	2182	116	5.32

2013 Table 1b

S/N	INSTITUTION NAME	TOTAL NO OF APPLICANTS	NO OF ADMISSION	%
1	University Of Benin Benin City	10413	407	3.91
2	University Of Nigeria Nsukka.	8623	461	5.35
3	Obafemi Awolowo University Ile-Ife	8557	279	3.26
4	University Of Ilorin Ilorin	8282	357	4.31
5	University Of Ibadan Ibadan	7751	305	3.93
6	AHMADU BELLO UNIVERSITY, ZARIA	7562	348	4.60
7	University Of Lagos	7376	452	6.13
8	Usmanu Danfodio University Sokoto	5810	253	4.35
9	Nnamdi Azikiwe University Awka	5676	315	5.55
10	University Of Jos Jos	5333	296	5.55
20	NIGER DELTA UNIVERSITY , WILBERFORCE ISLAND	2182	176	8.07

2014 Table 1c

S/N	INSTITUTION NAME	TOTAL NO OF APPLICANTS	NO OF ADMISSION	%
1	UNIVERSITY OF ILORIN, ILORIN	12821	266	2.07
2	UNIVERSITY OF BENIN, BENIN CITY	11634	101	0.87
3	UNIVERSITY OF NIGERIA NSUKKA.	10542	188	1.78
4	OBAFEMI AWOLOWO UNIVERSITY, ILE -IFE,	9906	91	0.92
5	UNIVERSITY OF IBADAN, IBADAN,	8310	161	1.94
6	AHMADU BELLO UNIVERSITY, ZARIA	7873	139	1.77
7	NNAMDI AZIKIWE UNIVERSITY, AWKA	7342	96	1.31
8	UNIVERSITY OF LAGOS	7135	225	3.16
9	UNIVERSITY OF JOS, JOS	7060	146	2.07
10	USMANU DANFODIO UNIVERSITY, SOKOTO	6494	72	1.11
22	NIGER DELTA UNIVERSITY , WILBERFORCE ISLAND	2218	89	4.01

SOURCE: Joint Admissions and Matriculation Board

16th Inaugural Lecture
AID TO AIDS: A JOURNEY OF SERENDIPITY.

BY

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Wednesday 12TH AUGUST 2015

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1. PREAMBLE:

It all began 40 years ago when I enrolled as a fresh-faced teenager into the first College of Medicine in Nigeria at the University of Lagos in September 1974. My class was part of the first 200 cohort intake after the country embarked on a 5 year plan to produce 1000 doctors by 1980 in the then five premier First generation Universities in Nigeria.

I was among the second cohort to pass out of the College of Science & Technology (now Rivers State University of Science & Technology) in July 1974.
The journey from the rural Niger Delta to the cosmopolitan city of Lagos was filled with enthusiasm and a sense of adventurism.

The then Provost of our College of Medicine, the late Professor Felix Dosekun - an accomplished Physiologist - enjoined us to pass through the University and let it also pass through us. His inaugural lecture in 1962[1] was prescient; he opined that "the physiological sciences have enabled us probe more deeply into the nature and functions of the protoplasm". This fact was to define the identification of HIV many years later.

Our then teacher in Paediatrics, the Late Professor Olikoye Ransome-Kuti regaled us with anecdotes of the "Shrine"…late Afro-beat pundit Fela Anikulapo-Kuti's hang-out. Both persons were later to change the face of HIV in Nigeria for ever.

The sense of adventurism and delightful pleasure in all I did saw me pass out in 1979 from the College of Medicine and return to the rural Niger Delta for my house-job in General Hospital, Port Harcourt. This was another epoch of fun and work.

After National Youth Service Corps year in rural Onueke, Abakaliki, then in Anambra State, I returned back to rural Emohua General Hospital in 1981. It was the foundation start-off for the University of Port-Harcourt Teaching Hospital. I was the first resident doctor in Obstetrics & Gynaecology to then Professor Kelsey Harrison, as well as Doctors, Nimi Briggs and Celestine John as they then were. Relocation followed to General Hospital Port-Harcourt in 1983 when it became untenable to sustain the teaching hospital in Emohua.

I left for the United Kingdom in September 1984 to continue my training in Obstetrics & Gynaecology and returned back to Niger Delta University and its affiliated Teaching Hospital in January 2012, to pursue with passion my calling as an academic and a fully-fledged specialist; involved in teaching, researching and providing services for HIV/AIDS; the topic of our discourse today.

2. INTRODUCTION:

Mr Vice-Chancellor, let me begin by thanking you for the opportunity to deliver my inaugural lecture at pace with my contemporaries elsewhere in the country. Serendipity means "fortunate happenstance" or "pleasant surprise" a term coined by Horace Walpole (1717-1797) in 1754 when referring to the fairy Persian tale of the Princess of Serendib…who was always making discoveries by "accidents and sagacity"[2]. My career including my research activities have all been fortunate happenstance. I was admonished from my undergraduate days by then Dr. Tekena Harry (Virologist) that MBBS was just a stepping stone and post-graduate studies was the bane and essence of medicine. My encounter with the three-foremost Obstetricians & Gynaecologists in the Niger Delta of Nigeria in Emohua was my first rung on the ladder of postgraduate training. It became a defining moment for me, and imbued me with a passionate care for the afflictions of women. Excerpts of the Zaria maternity survey lecture was delivered in Port-Harcourt by Professor Harrison in 1982 before it became published in BJOG[3]….and the closing remark of "sunset over the Sombrero" reverberated throughout my early career.

I finished my core training in Obstetrics & Gynaecology in 1989 while at Fazakerley District General Hospital, now Aintree University Hospital, Liverpool and embarked on a higher medical training in Genitourinary & HIV Medicine, to provide service for the newly emerging global epidemic which affected sub-Saharan Africa disproportionately. The Human Immunodeficiency Virus (HIV) a lentivirus of the subgroup retrovirus had been isolated variously in 1983 by Luc Montagnier[4] in the Institute of Pasteur, Paris France and Robert Gallo[5] in National Cancer Laboratory, United States. This isolation led to the definitive antibody test for HIV. The patent, registered by the United States Department of Health and Human Services remained controversial[6], being shared eventually on 50/50 basis between France and USA after a suit filed by Institute of Pasteur in 1985 and resolved in 1987[7].

My cousin, Professor Tekena Harry (now a retired Virologist) who had spent one year on a Nigeria/France exchange programme in the Institute of Pasteur in 1980 reported the first case of HIV[8,9] in 1986 in Nigeria. In April 1985 Abbott Laboratories had on request from Prof. Tekena Harry donated HIV antibody test kits to the Nigeria Institute for Medical Research (NIMR), Yaba. A 13 years old female patient initially seen by then Dr Abulsalami Nasidi (now Professor) was tested and found to be HIV positive. This was the first established case of HIV in Nigeria. It was brought to the attention of Nigerians by the then Minister of Health, late Professor O Ransome-Kuti (my former teacher in Paediatrics) in 1985.

Mr Vice-Chancellor, hitherto only clinical suspicions were made without any virological tests in Nigeria; until the NIMR under the directions of Prof. Tekena Harry started a make-shift diagnostic centre with the kits supplied by Abbott Laboratories. The HIV epidemic was by this time nascent. It was prevalent amongst homosexuals and intravenous drug users in the developed world where it was known as the Gay Related Immunodeficiency Disease (GRID) with a heterosexual cohort largely centred in sub-Saharan Africa where it was known as the "Slim Disease". In Nigeria the response varied from lukewarm acknowledgement by some to complete denial by others. The services for diagnosis in NIMR in 1985 remained under-utilized.

The British response was different but typical. Norman Fowler, the then Health Minister launched a public awareness campaign with the "Don't die of ignorance" video and leaflet. The Iron Lady, late Prime Minister Margaret Thatcher after persuasion by Norman Fowler set up an HIV Expert Working Group which responded albeit initially slowly but later swiftly to the threatening epidemic by expanding Genitourinary & HIV training posts and Consultant posts in 1987-1990. I was thus at the right place at the right time serendipitously. I embarked on the Higher Medical Training in Genitourinary Medicine of the Northern Regional Training Programme with rotations through Newcastle, Sunderland and South Shields from 1992 – 1996, after a preparatory stint on the University of Liverpool Vocational Training Scheme between 1990-92. I was subsequently appointed a Consultant Physician to the James Paget University Hospital, Great Yarmouth in 1996.

3. AIDS:

Mr Vice-Chancellor, AIDS is defined as Acquired Immunodeficiency Syndrome, a combination of various opportunistic infections following depletion of the immune response of an individual after HIV infection. The first reported series was on 5th June 1981 amongst 5 homosexuals (men who had sex with men) who had pneumocystis carinii pneumonia and thus the earlier coinage "Gay Related immunodeficiency Disease" (GRID). In this first series that was reported two died within days, and clinicians identified that the disease "was a cellular dysfunction" associated with "sexual contact between men"[10].

HIV has a preference to reproduce within CD4 cells. CD4 cells are cluster differentiated cells that serves serve as immune response to infections. They facilitate containment of these nosocomial infections by the individual. When they are reduced in number, common infections in the environment which can be ordinarily dealt with becomes a problem. This is sometimes seen when the immunity is deliberately suppressed as part of medical treatment in transplant patients or cancer patients who have it reduced as a consequence of the effects of anti-cancer drugs.

4. EARLY TRAINING AND SERVICE DELIVERY IN GENITOURINARY & HIV MEDICINE.

Mr Vice-Chancellor, sexually transmitted infections are a marker for unprotected sex. The facilities that are put in place for handling such cases confidentially and free treatment are essential for its control. Control ameliorates the complications associated with the disease. In the United Kingdom following the scourge of syphilis, chancroid and gonorrhoea during and after the First World War, the Venereal Disease Act was enacted in 1917 making it mandatory to notify and provide confidential free treatments. This confidentiality became the mantra for providing anonymous treatment with concomitant partner notification. The Venereal Disease Act was repealed in 1998 and evolved to the Sexually Transmitted Disease Directions of 2000. It remained underpinned by the same principles of confidentiality guaranteed by enforceable law. Other contemporaneous legal changes at the time included the legalisation of abortion in 1967, the decriminalization of homosexuality in 1967 and setting 18 as the age of consent for consensual homosexual sex by the Criminal Justice and Public Order Act 1994. These Acts of Parliament rulings ensured that the Genitourinary Medicine services were well placed to respond to the HIV epidemic in providing confidential and free treatment in the United Kingdom.

These services provided timely diagnoses of sexually transmitted infections with appropriate contact tracing and partner notification. The clinical activities were regulated by peer-led Genitourinary Medicine Faculties with the established Royal Colleges. Training and service commitments were defined including quality standards and acceptable staffing levels. My training and subsequent service delivery involved regular audits in the diagnosing of sexually transmitted infections like gonorrhoea[11] or chlamydial[12,13], trichomonal infection[14], syphilis[15] and genital warts infection.[16-17]

These infections were acquired from homosexual, heterosexual and bisexual contacts. All these patients were routinely offered and screened for HIV. Thus in the United Kingdom a significant database of HIV infected patients were established nationally early in the epidemic.

From these databases, clinical trials were set up to compare the efficacy of the emerging antiretroviral drug treatments.

5. EARLY DRUG TREATMENTS FOR HIV/AIDS (1984-1992)

Mr Vice-Chancellor, the HIV viral structure through the works of Robert Gallo and others using human culture plates has become established by 1984 and HIV had been shown to be the cause of AIDS. The HIV was also now recognised as a lentivirus (subgroup of the retrovirus). As part of its replicative pathway it needed to change its viral configuration from RNA-base to DNA-base before immortalisation in the genome of the host cell, using the reverse transcriptase enzyme. Once embedded in the DNA of the host cell (CD4 cells) it replicated, producing billions of new HIV virions that destroy

the CD4 cells in which replication had occurred. In the early phase of the infection, marked often by short period of vague feverish states in some individuals, the CD4 cells are replaced as efficiently as they are destroyed. The equipoise left the individual well for considerable period of time, often from 9 – 11 years without any significant illness and potentially low risk of transmitting the infection in the absence of concurrent sexually transmitted infections.

For the virus to reconfigure from the RNA to DNA it needs the action of the enzyme reverse transcriptase. In the National Cancer Institute, working with tissue culture plates developed by Robert Gallo and his team, Samuel Broder started working on various shelved anti-cancer drugs 2',3'-dideoxynucleosides. Jerome Horwitz had developed Zidovudine and other 2',3'-dideoxynucleosides, for the treatment of cancer in 1964, as it showed anticancer efficacy in-vitro but was never proven clinically. In the National Cancer Institute, Broder[18] working with colleagues in 1987 had noticed abortion of HIV replication in-vitro. Thus 6 years after the first description of GRID and 3 years after isolation of HIV the first armamentarium of drugs was found serendipitously. It was tried on patients with advanced AIDS-related complex (ARC) or AIDS and the patients showed short term delay in disease progression of 4months[19].

However scepticism[19,20] on the place of monotherapy and timing of treatment as a result of resistance to AZT (Zidovudine), led to the first randomised controlled clinical trial, The Concorde trial[21] from 1988 to 1992 in Europe. Again, I was in the right place at the right time, as I started my training in 1992 in one of the participating centres of the Concorde trial (Newcastle General Hospital, Newcastle under Drs Mike Snow, Edmund Ong, Richard Pattman & Peter Watson). The Concorde trial showed no benefit in early or deferred treatment with Zidovudine (AZT) monotherapy in asymptomatic HIV infected patients.

On the back-heels of this came the American AIDS Clinical Trial Group (ACTG) 175 which randomised dual therapy study with either Zidovudine (AZT) combined with Didanosine (DDI) or Zalcitabine (DDC). This dual therapy showed efficacy in delaying disease progression in the short term with the emergence of viral resistance limiting further drug activity.

In Europe, a replication of the ACTG 175 was undertaken in a multi-national drug trial, the Delta Trial[22], between 1992 – 1994. It randomised patients and compared AZT monotherapy to AZT + DDI or AZT +DDC. The initiation of treatment with dual therapy prolonged life and delayed disease progression than AZT monotherapy. My training unit in Newcastle General Hospital also enrolled patients into this trial. The trial did not address the time to start treatment. What was however evident was the significant development of resistance with AZT monotherapy. Most of the trial participants were white homosexual males, with few black Africans, mostly migrants from sub-Saharan region.

At about the same time in 1994 another seminal randomised placebo-controlled clinical study[23] undertaken in United States of America had shown benefit in prevention of mother
to child transmission from 25.5% to 8.3% when AZT versus placebo was administered as monotherapy to pregnant mothers.

6. DRUG DEVELOPMENT AND ADVANCES (1994-1998)

Mr Vice-Chancellor, three significant events occurred in 1994-1998; firstly the laboratory synthesis of "blockers" to the reverse transcriptase enzyme; secondly "blockers" to the protease enzymes both necessary for the replication and maturation of the HIV. The third event was the capability of quantifying the HIV levels in the serum.

Nevirapine a non-nucleoside analogue was discovered by Boehringer Ingelheim Pharmaceuticals in 1996 and Efavirenz another non-nucleoside by DuPont Pharmaceuticals in 1998 both reverse transcriptase inhibitors.

Saquinavir (first protease inhibitor) was synthesized and patented by Hoffmann-La Roche Pharmaceuticals quickly followed Ritonavir by Abbot Pharmaceuticals and Indinavir by Merck Pharmaceuticals; all in 1996. Indinavir, the eight antiretroviral drug to be licenced was the most potent of its class.

The epidemic was now raging. By 1996 the global burden of HIV was estimated at 33.4 million with mortality of 3 million annually. Sub-Saharan Africa bore the brunt, 70% affliction with 30 % mortality. The response from most African countries varied tremendously. Uganda embraced and acknowledged the impact on its populace.

This was the "golden years" of HIV treatment. The landmark INCAS trial[24] had shown that with 3 drug combinations of AZT, DDI & Nevirapine reduced viral replication to below quantifiable levels with commensurate increase in CD4 cells and survival. This was the beginning of the "Lazarus effect" in HIV/AIDS. Patients were now recovering and remaining well but with a cocktail of medications taken at various challenging times. Side effects of these potent cocktails were also worrisome. The good news, were reduced mortality of patients and increased survival.

David Ho, in one of the plenary session at the 11th AIDS Conference in Vancouver in 1996 showed the potency of triple therapy, two nucleoside analogues and a protease inhibitor. HAART (highly active antiretroviral therapy) came into the lexicon including the catch-phrase "hit early, hit hard[25]". David Ho subsequently became the Time Magazine Man of the Year in 1996. Yoweri Museveni, the Ugandan President was the only African Head of State that attended.

7. PROVIDING AID TO AIDS

Mr Vice-Chancellor, I returned from the Vancouver Conference in July 1996 greatly enthused. I quickly enrolled patients in expanded access (Phase IV) as Site Investigator for Efavirenz (DuPont Pharmaceuticals), Saquinavir (Roche Pharmaceuticals) and Indinavir (Merck) after the appropriate ethical committee approval was obtained. I introduced triple therapy in East Anglia to my cohort of 30 HIV Infected patients. Our mortality dropped to only 1 or 2 a year from the previous 5 to 10 deaths annually. Patients began to get well. I was again "at the right place at the right time".

I was also concomitantly able to improve access to my service[26]. I was able to meet with the standards of seeing 90% of my patients within 48 hours by increasing the consultant staffing level[27]. The unit participated in both undergraduate and postgraduate teaching including research and service delivery.

Optimism was high for the eradication of HIV as levels below detectable limits persisted for years. However the virus remained in sanctuary sites not reached by drug treatment. Cure eluded all. Whereas cure was not assured, the concept of chronic disease management emerged. It was now recognised that sustained virological suppression was achievable with compliance. Life expectancy was now comparable to non HIV infected population. Treatment prevented transmission in sero-discordant couples and mother-to-child transmission. Treatment regimen had become simplified to one tablet a day comprising three-drug formulation and access was now more universal.

In 1997 late Prof Olikoye Ransome-Kuti set the stage for the awareness of Nigeria's HIV/AIDS pandemic for the second time, when he announced the death of his junior brother, the Afro-beat Legend Fela Anikulapo-Kuti from the complications of AIDS. This time it resonated with the national psyche, 12 years after he had announced the first confirmed case as former Health Minister in 1985. He felt frustrated by the monumental conspiracy of silence around HIV/AIDS. The National response by setting up the National Agency for the Control of AIDS (NACA) in 2000 came on board late. But better, late than never.

Mr Vice-Chancellor, almost at the same time in the United Kingdom and the developed world; an obvious preponderance in sexually transmitted infections and HIV were being manifest in the black and ethnic minority populations, as it still is. A few of us mostly members of the Medical Association of Nigerian Specialist and General Practitioners as it was then known and the Afro-Caribbean Medical Society, championed the formation of the Black & Ethnic Minority Health Section (now delisted) of the Royal Society of Medicine. We sought to discuss academically these issues and I posited quite vigorously that "sex was common to homo-sapiens for whom it served recreational or procreation purpose" and "had nothing to do with ethnicity[28-30]". I was elected and served as the President of the section from 2004-2006. The section during my tenure invited our erstwhile Ag Provost Professor Raphael Oruamabo to present on Paediatric HIV, the text of which was eventually published as book chapter.

I also went on to develop the first clinic-based multi-media website[31;32] (now decommissioned) for sexually transmitted infections as part of the 50 years anniversary of the National Health services funded by the Great Yarmouth Haven Rotary Club. This also addressed the sexual ill-health noted in my catchment population of mostly ethnically homogenous whites[33;34].

Meta-analysis (31 citations to date) done in my unit in 2007 on the efficacy of antiretroviral therapy in sub-Saharan Africa showed similarity in outcome with developed countries[35]. We showed that ART increased CD4 count from three months to 3 years with the majority of subjects having undetectable viral load at each analysed time point. This was promissory for response to treatment for HIV in sub-Saharan Africa.

8. HEART TO HEART CLINIC: NIGER DELTA UNIVERSITY TEACHING HOSPITAL

Mr Vice Chancellor, I returned in 2012 to rural Niger Delta on appointment as Senior Lecturer by your predecessor in September 2011. This was another golden era of HIV therapy for Nigeria. The drugs we piloted and used in England were now off-patent and thus the cheaper generic formulations were now available free of charge provided by non-governmental organisations (NGOs). Donor led-funding provided a pool of all drug classes, readily available for patients thereby transforming care. Saquinavir the first protease inhibitor approved and patented in 1995 came off patent in November 2010.

There were many challenges I faced on arrival to provide a veritable sexual health service including HIV/AIDS care and teaching of our medical students. My principal appointment remains the teaching of medical students from level 400 to 600. This entails didactic lectures and bed-side teaching including running outpatient clinics and ward rounds. We do this in the Niger Delta University Teaching Hospital. The first of the challenges was the non-existent of any sexually transmitted disease clinic in NDUTH and Bayelsa in general. I will juxtapose this defect in my analysis of the challenges.

Current legislature in Nigeria has criminalized homosexuality, making those at greatest risk of HIV infection "invisible" by the Same Sex Marriage (Prohibition) Act 2006. Confidential and free treatment for STDs with statutory notification is none existent, thus there is no one-stop shop for sexual health in Bayelsa in particular and most of Nigeria in general.

The current state of play with the management of HIV infection is early treatment. It has now been firmly established that early treatment prevents transmission to the uninfected. The World Health Organisation (WHO) 2014 guidelines recommend treatment when CD4 count is less than 500. This implication is early detection, which can only occur where there is routine and opportunistic testing.

If treatment is commenced with the now established universally generic co-formulation of the three-drug classes as a single drug, then compliance can be improved for continuous virological suppression. The individual so treated is less likely to transmit and infect their sexual partners or new-born baby when their viral load is

undetectable. The life expectancy of these HIV positive individuals will be no different from their HIV negative counterpart.
Most importantly the 20 – 25 years old University graduate compliant with regular treatment can marry a negative partner, have uninfected children and see their grandchildren after a fulfilled career.

9. FOUNDATION CHAIR IN HIV IN BAYELSA.

Mr Vice-Chancellor, while the future indeed is bright with new treatment regimens, it is not all smooth sailing in Bayelsa State in particular and Nigeria in general.
Bayelsa State was created in 1996, same time as my appointment as a Consultant - and the equivalent of Lecturer 1 - would I have been in Nigeria. I returned and under your watch Mr Vice-Chancellor I was granted a Chair in the speciality, the first, of its kind, in Nigeria. Thank you Sir.

The prevalence of HIV in Bayelsa is 9.1% and it is the third highest in Nigeria. The prevalence in the 8 local government areas varies from 3.5% in Southern Ijaw to 12.7% in Sagbama.

Mr Vice Chancellor, tertiary HIV care in Bayelsa is provided from two service points, Niger Delta University Teaching Hospital, Okolobiri and the Federal Medical Centre, Yenagoa - which has a memorandum of understanding with the Niger Delta University in the training of medical students. I came into post to find one of the most dedicated teams I have ever had the privilege to work with. Dr Otonyo Inatimi who had co-ordinated the HIV unit under the aegis of the United States Agency for International Development, was a wonderful gentleman and leader. I met the astute Infectious Disease Physician then Dr Dimie Ogoina (now Professor of Medicine) also in post. I cannot miss to mention the Head of Department of Medicine, Federal Medical Centre, a self-effacing highly knowledgeable Endocrinologist, Dr. Finomo O Finomo – who was co-ordinator for the HIV services.

Unfortunately the services for HIV in Bayelsa have not kept pace with services elsewhere in the world. It is unfair to compare apples and oranges, but if that is what you have, then that is what you compare.

The records I have to date from 2007, when Family Health International partnered with Niger Delta University Teaching Hospital in forging a comprehensive HIV/AIDS care, treatment and support show dismal facts. It was funded by United States Agency for International Development. Whereas the rest of the developed world was monitoring response to treatment with viral load measurement, NDUTH was still as in most part of Nigeria, was using surrogate markers with CD4 count gain. Viral resistance testing was not available and guesses were needed to sequence therapy. Most diagnostic tools and resources to procure them were none existent.

Mother to child transmission is not accurately known but only 44% of pregnant mothers completed antiretroviral prophylaxis. During the period July 2008 to June 2011, amongst 2340 antenatal booking only 91.03% agreed to be tested for HIV, of whom 108 (5.07%) were positive. Of the 108 HIV positive pregnant mothers only 48 (44%) completed their HIV therapy.

In my former unit in the United Kingdom[36] from 1996-2007 amongst 30,043 antenatal booking, there were only 13 HIV positive mothers (0.03%). All 13 women completed their antiretroviral treatments and none of the 12 live-born babies were infected. There was one still-birth associated with Nevirapine toxicity.

In 2014, in our 25-bedded medical ward in NDUTH, 28 patients died from the complications of HIV/AIDS, an average of 2 patients a month. These patients presented late and had often stopped taking their medications on their own accord. The commonest opportunistic infection causing death was tuberculosis (TB). The Female/male ratio was 2.25:1. Women continue to bear a disproportionate death toll.

These challenges were recognised by all including the clinicians and the donor agencies. I will quote some of them.

"Limited commitment of some stakeholders to adopt the – BAYELSA fights AIDS program as their own"; "Poor completion of PMTCT service due to long established cultural practices by client to deliver at TBA places" "High turnover of lower income population". (FHI/GHAIN Project Report) "Ineffective and inefficient services for sexually transmitted infections"; "intense transactional and intergenerational sex"; "widespread HIV related stigma and discrimination"; "chronic poverty" (DPH, Ministry of Health, Bayelsa State).

Mr Vice-Chancellor, the widespread HIV related stigma and discrimination, we found in our study in the clinic was a corollary for low disclosure[37;38]. This translated into low partner notification and thus a pool of recycled infectivity.

An undergraduate NDU trainee from the Department of Education attached to my unit during her guidance and counselling posting remarked in her report; and I quote: "Our Izon or African men…..can have up to 3 wives…so it moves from generation…..simply because of the secret".

10. CONCLUSION

Donor agencies are currently funding the HIV treatment and care in Nigeria. They will be leaving Nigeria in September 2016 with a phased exit plan in place since 2014. HIV treatment and care costs about N15,000 per month or N180,000 per annum well beyond the reach of many Nigerians. Bayelsa ranks the third most prevalent state with HIV in Nigeria. Disclosure rate to partners is less than 50%[37-38] and Female/Male sex ratio is 1.95:1. With this degree of HIV female infectivity, mother-to-child transmission will remain a burden to the paediatric and child health services. But is the infection exclusively fuelled by heterosexual sex? Can we reduce the stigma associated with sexual acquisition and its connotations?

Most importantly can we change and modify our behaviour?

Mr Vice-Chancellor, we had partial accreditation of our medical school in August 2012 and since then we have graduated 3 sets of medical students totalling 104, a considerable workforce in increasing the medical manpower of the State and the country. They have been privileged to train in our facility. Most have done their internship under our watch. These will be agents of change in healthcare delivery.

We also have a new dispensation of change as a mandate for the governance of the country at large. We wait to see if meaningful legislative changes that evolved the British NHS Genitourinary Medicine services to make it one of the European countries with the lowest burden of STI and most tolerant of sexual foibles will translate ultimately to Nigeria. The National Health Bill and National Health Insurance Scheme are pointers in the right direction.

Mr Vice-Chancellor, let us all start by knowing our HIV status and when known disclose to our partner(s). With early treatment we will truncate infectivity and achieve our life expectancy without worry for the complications of HIV/AIDS.

This is my AID to AIDS…a journey of "always making accidental discoveries with sagacity of things I was not in quest of" as defined by the erudite Horace Walpole.

ACKNOWLEDGMENT:

Let me firstly recognise the sacrifice made by my wife (Barrister Florence Abiye Clement-Harry) during the long periods of absence in my quest for the Golden Fleece. She resolutely stood by me, through thick and thin. This belief saw me through it all, unscathed.

I am grateful to all my mentors, Professor Tekena Harry, PhD, Late Mr. Israel Rocker FRCOG, Late Mr. John Lawson FRCOG, Dr. Sakina Rashid FRCOG, Dr. Edmund Ong, FRCP(I), Dr. Abayomi Opaneye FRCOG, Dr. Christopher Sonnex FRCP, Dr. John Meaden FRCOG, Emeritus Professor Kelsey Harrison FRCOG, Emeritus Professor Nimi Briggs FRCOG, Professor Celestine John FRCOG, Professor Raphael Oruamabo FRCP, Professor Nelson Brambaifa - who have all contributed in making me what I am today. I owe them an immeasurable debt of gratitude.

I have worked with a wonderful team of dedicated clinicians, nurses, pharmacists, laboratory scientists and non-clinical staff. I salute them all; particularly the "Heart to Heart Clinic" brigade of Niger Delta University Teaching Hospital under the guidance of the indefatigable Matron Asalagha, always calm.

I salute all my hard-working Medical Officers; Dr. Ikenna Ebuenyi, Dr. Ken Nnamdi, Dr. Emmanuel Anene and ever smiling Dr. Uche Chukwueke and all the House-Officers who have passed through the unit. The stalwart support of our CMD and the Honourable Commissioner of Health cannot be underplayed.

I have come to know and respect the excellent Bayelsa State HIV/AIDS Management Team including our Donor Agency (FHI360/SIDHAS), for their singular dedication and commitment. The adage - "It is better to light a candle, than to curse the darkness", Eleanor Roosevelt (1884 – 1962), aptly describe their modus-operandi.

My clinical consultant colleagues in both NDU/NDUTH….what can I say? It has been an exceptional privilege working with you all, and "we can do everything and anything with nothing". Your confidence in electing me your Dean will not be misplaced.

Let me also acknowledge all the members of the "Shrine"- Senior Staff Club of NDU who made me feel welcome, after my considerable sojourn "overseas". A wonderful eclectic set of ladies and gentlemen!

Mr Vice-Chancellor, thank you for making it possible for me to deliver this lecture, as the first Clinician in NDU to do so and as the Foundation Chair in Genitourinary & HIV - the first in Nigeria. Your visionary direction for NDU is there for all to see.

I thank everyone for finding the time to come from far and near to grace this occasion.

I dedicate this lecture to all my patients for whom this is an AID to AIDS.

Thank you and God Bless. Journey mercies as you depart.

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ABBREVIATIONS:

1. ACTG: AIDS Clinical Trial Group
2. AIDS: Acquired immunodeficiency syndrome
3. ARC: Aids-related complex
4. AZT: Azidothymidine
5. BJOG: British Journal of Obstetrics & Gynaecology
6. CD4: Cluster differentiated cells
7. CMD: Chief Medical Director
8. DDC: Zalcitabine
9. DDI: Didanosine
10. DNA: Deoxyribonucleic acid
11. DPH: Director of Public Health
12. EFV: Efavirenz
13. FMC: Federal Medical Centre
14. F:M: Female to male ratio
15. FHI: Family Health Initiative
16. GRID: Gay related immunodeficiency syndrome
17. GHAIN: Global HIV & AIDS Initiative Nigeria
18. HAART: Highly active antiretroviral therapy
19. HIV: Human immunodeficiency virus
20. INCAS: Italy, The Netherlands, Canada and Australia Study
21. NACA: National Agency foe Control of AIDS
22. NDU: Niger Delta University
23. NDUTH: Niger Delta University Teaching Hospital
24. NHS: National Health Service
25. NIMR: Nigeria Institute for Medical Research
26. NGO: Non-governmental organisation
27. NVP: Nevirapine
28. PMTCT: prevention of mother-to-child transmission
29. RNA: Ribonucleic acid
30. SIDHAS: Strengthening and Integrating HIV & AIDS Services
31. STI: sexually transmitted infections
32. TB: Tuberculosis
33. TBA: Traditional birth attendant
34. VCT: Voluntary Counselling and Testing
35. WHO: World Health Organisation

ORIGINAL ARTICLE:
Serum Zinc Levels and Clinical Outcome of Hospitalized Nigerian Children with Acute Diarrhoea

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ABSTRACT

Background: *Acute diarrhoea contributes significantly to morbidity and mortality in under-five children globally with micronutrient deficiency, such as zinc, playing a pivotal role in the determination of its outcome. This study aimed to determine the prevalence of zinc deficiency among children hospitalized with acute diarrhoea and its relationship with clinical outcome.*

Methods: *A comparative, cross-sectional study in which a total of 100 children aged one to 59 months with acute diarrhoea and an equal number of apparently healthy age- and sex-matched controls were recruited. Blood samples were analyzed for serum zinc with Jenway™ spectrophotometer using colorimetric method. Data was analyzed using SSPS version 20.0 software.*

Results: *The mean serum zinc level of 65.3±7.4µg/dl in the subjects was significantly lower than 69.0±6.5µg/dl in the controls (P < 0.001). Furthermore, there was a high prevalence of zinc deficiency in the study population with 47.0% recorded in the children with acute diarrhoea which was significantly higher than 32.0% in the controls (P = 0.030). Children with low serum zinc levels had a significantly higher mean duration of hospitalization of 3.8±1.3 days when compared with 3.0±1.6 days in those with normal zinc levels (P =0.008). A significant though weak negative correlation existed between the serum zinc levels and duration of hospitalization (r= -0.278; P =0.044) while the duration of diarrhoea was not influenced by the serum zinc levels in the children (P =0.295).*

Conclusions: *Children with acute diarrhoea had lower serum zinc levels compared with healthy controls. Zinc deficiency prolonged the duration of hospitalization but not the duration of acute diarrhoea in the* children. *The need to intensify zinc supplementation in children with diarrhoea is therefore reinforced.*

KEYWORDS: zinc, clinical outcome, children, acute diarrhoea, Nigeria

INTRODUCTION

Acute diarrhoea constitutes a major health challenge in children less than five years globally, accounting for 8.6% of the 5.8 million deaths in 2015.[1] It is currently the fourth leading cause of morbidity and mortality in under-five children worldwide.[2] Developing countries bear the greatest burden of the disease with Nigeria and India accounting for 42% of the global under-5 deaths due to diarrhoea. It is estimated that 13% of all year's lost due to ill-health, disability or early death (disability-adjusted life years) are caused by diarrhoea.[2]

Zinc is an important micronutrient necessary for protein synthesis, cell growth and differentiation, immune function and intestinal transport of water and electrolytes.[2] Zinc deficiency contributes substantially to the morbidity and mortality of young children world-wide as evidenced by high estimated prevalence and association with diarrhoea, pneumonia and malaria.[2] Studies have documented the beneficial effect of zinc supplementation on diarrhoea thereby reducing mortality.[3] This has lead to a recommendation by World Health Organisation (WHO) and United Nations Children's Fund (UNICEF) for use of zinc supplementation for all children with diarrhoea. Despite several reports on the beneficial effect of zinc in diarrhoea, there exists significant heterogeneity in the effects of zinc on diarrhoea-related outcomes such as stool duration, frequency and output observed across randomized controlled trials.[2] With the background of high morbidity and mortality resulting from diarrhoea especially in developing countries such as Nigeria, it is therefore imperative to determine the relationship between serum zinc and clinical outcome in under-5 children.

PATIENTS AND METHODS

Study protocol. This study was conducted at the Emergency Paediatric Unit (EPU) and Oke-ose community. Ethical approval was obtained from the Hospital Ethical Review Board (ERC PIN/2014/10/0253). A total of 100 children aged one to 59 months with acute diarrhoea presenting at the EPU were recruited. Acute diarrhoea was defined as passage of loose or watery stools at least three times within a 24 hour period, developing over a few hours or days and lasting fewer than 14 days. An equal number of apparently healthy age- and sex- matched controls were recruited from Oke-ose community where the hospital is located. The exclusion criteria were children with persistent diarrhoea (>14 days), severe malnutrition, malaria, pneumonia, sickle cell disease, presence of gastrointestinal anomalies, prior zinc supplementation and/or blood transfusion in the preceding 3 months, and previously recruited children. The minimum sample size required for this comparative cross-sectional study was determined using the formula:

$$n = \frac{[p_1(1-p_1) + p_2(1-p_2)]}{(p_1 - p_2)^2} \times C_{p,power}$$

Where n is the desired sample size; p_1 is 69.1%; p_2 is 44.0%; and $C_{p,power}$ is 13 which was determined by p-value of 0.05 and 95% power. A purposive sampling was used until the desired sample size was attained. All parents / caregivers of eligible children were informed of the purpose of the study, expected procedures and potential risks and benefits following which a written consent was obtained prior sample collection.

Socio-demographic and clinical details were obtained using a structured questionnaire that was pre-tested with appropriate modifications made prior commencement of the study. The study was conducted from December 2015 to August 2016. History of diarrhoea was obtained from the caregiver of each subject, and a physical examination of all the study participants was done. The weights of children aged less than two years and/or 12kg were assessed using a bassinet weighing scale (Waymaster, England) while older children had their weight measured using a beam balance weighing scale (Marsdens, England).

Specimen collection and processing. Blood samples were collected for estimating serum zinc, total protein, albumin and C-reactive protein. A total of 4mls of venous blood was drawn from the

peripheral veins of all recruited children. Blood samples were centrifuged then the sera obtained were transferred into acid-washed plain bottles and immediately stored at -20^{0}C till time of analysis. Serum zinc was analyzed with a Jenway™ spectrophotometer 6300 model (Jenway Limited, Dunmow, Essex, United Kingdom) for measuring optical density at 560nm, after preparation with the zinc fluid monoreagent (5-Br-PAPS) kit (Centronic GmbH, Wartenburg, Germany), a quantitative colorimetric assay of $Zn^{2?}$. Children with levels of less than 65µg/dl were considered zinc deficient. Also, since zinc is transported in plasma bound to albumin, the concomitant serum total protein and albumin levels were determined using total protein assay and albumin assay (Agappe Diagnostics Limited, kerala, India). C-reactive protein levels were determined using CRP assay kits (Monobind Inc., Lake Forest, CA, USA). The CRP estimation was done to provide an objective laboratory evidence for the presence or otherwise of ongoing inflammation at the time of the recruitment.

Outcome variables. The effect of serum zinc was examined on two diarrhoea-related outcomes – the duration of hospitalization and duration of diarrhoea episode.

Statistical analysis. The data was analyzed using the Statistical Package for the Social Sciences (SSPS) version 20.0 software (IBM Corp., New York, USA). Measures of central tendency, dispersion of quantitative variables, and proportion for the qualitative variables were presented. Means were compared using the independent samples t-test (t), while proportions were compared using the Chi-square test (χ^2). The Pearson's correlation test was used for bivariate correlation analysis. The level of significance was established at p value of <0.05.

RESULTS.

Demographics: There were 63 males (63.0%) and 37 females (37.0%) among the subjects, while the controls had 60 males (60.0%) and 40 females (40.0%). There was no significant difference between the two groups in terms of age and sex (p >0.05). However, underweight malnutrition shown by mean weight for age z score (WAZ) was significantly higher in the subjects when compared with the controls (p <0.001) [Table 1].

Serum zinc and other biochemical parameters: The mean serum zinc levels in the children with acute diarrhoea and the control group were 65.3 ± 7.4µg/dl and 69.0 ± 6.5µg/dl respectively (p <0.001). There was also a significant difference in the mean serum total protein, albumin and CRP levels between the subject and control groups (p <0.001)[Table 2]. Hypozincaemia was observed in 47.0% in the children with acute diarrhoea and 32.0% in the controls (p =0.030). Furthermore, the subjects with low zinc status had significantly lower mean serum zinc levels of 56.9 ± 7.1µg/dl than the corresponding value of 62.7 ± 6.9µg/dl in the controls (p <0.001)
[Table 3].

Serum zinc status and clinical outcome:

In the children with acute diarrhoea, the mean duration of hospitalization of 3.8 ± 1.3 days in those with low zinc levels was significantly higher than the value of 3.0 ± 1.6 days in those with normal zinc levels (p =0.008). However, the mean duration of diarrhoea in these children was comparable (p =0.295)[Table 4]. The Pearson's correlation test was used to determine the relationship between serum zinc levels and clinical outcome variables. This showed that there was a significant negative correlation between serum zinc levels and duration of hospitalization (p =0.044). However, there was no significant correlation between serum zinc levels and duration of diarrhoea in the children studied (p =0.811)[Table 5].

TABLES

Table 1: Demographic characteristics of the study population

Variable	Subject n = 100 (%)	Control n = 100 (%)	t / χ^2	*p* value
Male : female ratio*	63 : 37	60 : 40	0.190	0.663
Mean age in months ± SD†	8.7 ± 1.8	8.8 ± 2.0	-0.372	0.712
Mean weight in kg ± SD†	7.7 ± 2.0	8.5 ± 2.5	-2.499	**0.013**
Mean WAZ ± SD†	-1.2 ± 1.1	-0.5 ± 1.2	-4.300	**0.001**

SD: standard deviation; kg: kilogram; WAZ: Weight for age Z-score; * Calculated using the Chi-squared test; † Calculated using the Student's t test.

Table 2: Serum zinc, total protein, albumin and CRP levels in the study population

Variable	Subject (n = 100)	Control (n = 100)	*t*	*p* value
Mean zinc ± SD in µg/dl†	65.3 ± 7.4	69.0 ± 6.5	- 3.757	**0.001**
Mean total protein ± SD in g/l†	53.5 ± 9.4	92.4 ± 11.8	- 19.157	**0.001**
Mean albumin ± SD in g/l†	40.6 ± 6.8	45.5 ± 6.1	- 5.364	**0.001**
Mean CRP ± SD in mg/dl†	24.6 ± 4.0	2.9 ± 0.8	53.199	**0.001**

SD: Standard Deviation; µg/dl: Microgram per decilitre; g/l; gram per litre; mg/dl; milligram per litre; CRP: C-reactive protein; †Calculated using Student's t test.

Table 3: Serum zinc levels based on zinc status of the study population

Variable	Subject	Control	*p* value	OR (95% CI)
Low zinc status n (%)*	47 (47.0)	32 (32.0)	**0.030**	1.884(1.060 - 3.349)
Normal zinc status n (%)	53 (53.0)	68 (68.0)		
Hypozincaemia‡ (Mean ± SD) in µg/dl†	56.9 ± 7.1	62.7 ± 6.9	**0.001**	NA

OR: Odds Ratio; CI: Confidence Interval; SD: Standard deviation; µg/dl: Microgram per deciliter; NA: Not Applicable; * Calculated using Chi-square test; ‡ Serum zinc levels <65µg/dl; † Calculated using Student's t test.

Table 4: Serum zinc status and clinical outcome of the subjects

Variables	Zinc status		*p* value
	Low n=47	Normal n=53	
Duration of hospitalization (Mean ± SD) in days†	3.8 ± 1.3	3.0 ± 1.6	**0.008**
Duration of diarrhoea (Mean ± SD) in days†	7.0 ± 3.1	6.4 ± 2.6	0.295

† Calculated using Students t test

Table 5: Correlation between serum zinc levels and clinical outcome variables

Variables	Zinc levels	
	R	*p* value
Duration of hospitalization (days)	-0.278	**0.044**
Duration of diarrhoea (days)	-0.024	0.811

r: Pearson's correlation coefficient

DISCUSSION

In this study, the comparatively lower serum zinc levels in children with acute diarrhoea as against healthy controls is in congruence with earlier studies from Bangladesh and Iran.[7] This finding further substantiates the well documented interrelationship between serum zinc and diarrhoea.[11] Zinc is known to play a pivotal role in the function of the immune system through antimicrobial, antioxidant and anti-inflammatory roles.[5] Its positive influence on the gut mucosa, both on a molecular and cellular level, enhances gastrointestinal barrier function.[7] Therefore, zinc deficiency increases the susceptibility to, and severity of gastrointestinal infections which then causes damage to the structure and function of the gastrointestinal tract and subsequently diarrhoea. Moreover, one of the main sources of zinc loss from the human body is through the intestine, and diarrhoea potentiates excess intestinal zinc losses. In addition, serum zinc is reduced during acute infections / inflammation, due to the acute phase reactant - induced redistribution of zinc to the liver, as well as decreased plasma proteins such as albumin which is the main transport protein for zinc.

The high prevalence of zinc deficiency found in the study population as well as the magnitude of the relative differences in serum zinc levels (1.5 times) between the children with acute diarrhoea and the controls in this study is in accordance with findings

in Bangladeshi children by a similar study. This underscores the global burden of zinc deficiency in earlier reports with the highest prevalences documented in Africa and South Asia where the aforementioned studies were conducted.[7] On the contrary, a report emanating from Iran did not find any zinc deficiency in the healthy controls despite a high prevalence of 62.5% in the subjects.
The disparity of population status of zinc as shown by the aforementioned studies may be partly explained by the quality of the local staples in the local population where these studies were conducted. The common staple food in Ilorin where the present study was done comprise of rice, yam, maize and cassava, all of which are high in myoinositol hexaphosphate (phytates) which irreversibly binds zinc within the intestinal lumen thereby inhibiting the absorption and utilization of zinc.[5] Also, animal-rich sources of zinc such as meat, fish and poultry are consumed in limited quantity because of cost-related non-affordability of these foodstuff by the local population.

In this study, all the children managed for acute diarrhoea were discharged with no mortality recorded. This is at variance with other Nigerian studies which reported mortalities between 0.6 to 10.4%.[5] The inclusion of co-morbidities such as malaria and pneumonia in some of the aforementioned studies where mortalities were recorded may have had a role in disease outcome.[7]
With regard to the relationship of serum zinc and clinical outcome, the duration of hospitalization of the subjects were influenced by the serum zinc levels. Furthermore, the finding of a significant negative correlation between serum zinc levels and duration of hospital stay in the children underscores an earlier study which documented shorter hospital stay in zinc-supplemented children with diarrhoea. This lends credence to the beneficial effects of zinc in reducing morbidity associated with childhood diarrhoea as previously documented.[11]

This study observed that the mean duration of diarrhoea episode in the children was comparable irrespective of serum zinc status. The paucity of similar published studies has not enabled the comparison of these findings, although reviews on effect of zinc supplementation on diarrhoea –related outcomes report a reduction in diarrhoea duration.[11] A possible reason may be that diarrhoea caused by commonly identified pathogenic agents is usually self-limiting, lasting a few days to a week, less so with institution of appropriate management such as rehydration therapy, zinc supplementation and antibiotics where necessary.[7] The significant heterogeneity however observed across the aforementioned review results could have been influenced by baseline serum zinc levels, necessitating the need for more research to understand its possible relationship with diarrhoea-related outcomes in children.

CONCLUSION

This study observed a high prevalence of zinc deficiency in under-five Nigerian children particularly those with acute diarrhoea. Therefore, zinc supplementation and food fortification schemes should be instituted in the population. Zinc deficiency prolonged the duration of hospitalization but not the duration of diarrhoea episode in the children.

AUTHORS' CONTRIBUTION

Afolabi O F: Concept and design, literature search, data acquisition and analysis, statistical analysis, manuscript preparation, final approval of manuscript. Saka A O: Definition of intellectual content, literature search, data analysis, manuscript editing and review, final approval of manuscript.

Ojuawo A: Definition of intellectual content, data analysis, manuscript editing and review, final approval of manuscript.
*All authors take responsibility for the integrity of the work and are therefore designated as guarantors.

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CONFLICTS OF INTEREST DISCLOSURE
There are no existing conflicts of interest.

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Huge Luteoma of pregnancy: elective caesarean section, left salpingo-ovariectomy with partial omentectomy: A Case report.

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Summary
Luteoma of pregnancy is a benign human chorionic gonadotropin(HCG)-dependent ovarian tumour occurring in pregnancy seen in a 22-year-old primiparous woman who booked for antenatal care at 10weeks. All booking parameters were normal. Her antenatal visits were uneventful and had 2 obstetric ultrasound scans, the first was normal, but the second done at 36weeks showed a huge and bizarre co-existing mass isolated within the left upper abdominal region and extending up to the epigastrium and the mass appeared semi-solid with multiple cystic centres and measure 23.04x16.47cm. Had elective Caesarean section at 38 weeks, Findings at surgery were: moderate straw-coloured gelatinous ascitic fluid, live female neonate, birthweight 3.4kg, Apgar scores 8, 9 & 10 in 1, 5 & 10 minutes respectively; placenta was fundal, weighing 0.4kg. Huge left ovarian mass measuring ≈19x18x9cm and weighing 3.5kg, attached to the fimbrial end of the left fallopian tube. Other pelvic and abdominal organs were grossly normal. A midline incision was made extending above the umbilicus to access the peritoneal cavity, collecting ascitic fluid for cytology. After the caesarean section the mass was excised together with part of the omentum and specimens sent for histology. The cytopathology was negative for malignancy. Macroscopically, the ovarian histopathology specimen was a massive haemorrhagic cystic mass measuring 23.0×21.0×9.0cm, microscopy was consistent with luteoma. Findings in the omental specimen was normal. Luteoma of pregnancy is a benign pregnancy-related ovarian mass that generally resolves spontaneously after delivery. Antenatal accurate diagnosis is challenging but important for optimal management.

KEYWORDS: Luteoma, Pregnancy, primiparous, partial omentectomy

INTRODUCTION

Luteoma of pregnancy is a benign human chorionic gonadotropin (HCG)-dependent ovarian tumour occurring in pregnancy.[1] It is commonly reported in Afro-Caribbean women in their third and fourth decades of life and in those with pre-existing polycystic ovarian syndrome.[2] Its incidence is unknown because most are asymptomatic and the diagnosis is generally made incidentally during a caesarean section or a postpartum tubal ligation; and resolves spontaneously by 3 months postpartum.[1]

Case presentation

A 22-year old Gravida4 para1^{+2}(none alive) woman who booked for antenatal care at 10 weeks gestational age, with her last and only confinement normal and 5years before, though baby died of a febrile illness at 2years. All booking parameters were normal; weight was 68kg, height 1.55m, packed cell volume (PCV) 32%, genotype AA, blood group B Rhesus D positive, she was non-reactive to HIV, hepatitis B surface antigen, hepatitis C virus and the venereal disease research laboratory test. Her antenatal visits were uneventful and she had two obstetric ultrasound scans (USS), the first was normal, but the second done at 36 weeks had findings of a "huge and

bizarre co-existing mass isolated within the left upper abdominal region and extending up to the epigastrium and the mass appeared semi-solid with multiple cystic centres and measured at least 23.04 cm and 16.47 cm in size. Placenta was anterofundal, liquor volume adequate, estimated fetal weight was 2.6kg and no gross fetal anomalies seen".

She was booked for elective Caesarean section (ELCS) which was done at 38 weeks, Pre-operative PCV was 24%, other investigation results were normal. Findings at surgery were: moderate straw-coloured gelatinous ascitic fluid, clear liquor, live female neonate, birth weight 3.4kg, Apgar scores were 8 at the first minute and 10 at 10 minutes respectively. The placenta was fundal, weighing 0.4kg. Huge left ovarian mass measuring ≈ 19x18x9cm and weighing 3.5kg (see figure), was attached to the fimbrial end of the left fallopian tube. Other pelvic and abdominal organs were normal. A midline incision was made extending above the umbilicus to access the peritoneal cavity, collecting ascitic fluid for cytology. The baby was delivered cephalad, and placenta by cord traction. Uterus was repaired in two layers. The mass was removed after serial double clamping; firstly excising then ligating the infundibulopelvic, ovarian ligaments and then the left tube and meso-salpinx. Part of the omentum was also excised, and all specimen sent for histology. Estimated blood loss was 600ml. She had two units of blood peri-operatively. Post-transfusion PCV was 30% on the 2nd post-operative day. She was discharged home on the 5th post-operative day, and followed up in the post-natal clinic, which was uneventful for her and the baby. The cytopathology showed some inflammatory cells, but was negative for malignancy. The gross findings of the ovarian histopathology specimen consisted of a massive haemorrhagic cystic mass measuring 23.0×21.0×9.0cm. Cut section revealed multinodular cystic ovary with haemorrhagic fluid in the cavity. The omental tissue consisted of a tan coloured tissue with attached fat lobules, soft to touch and measured 19.0×3.0cm, with microscopy showing normal omental tissue. Microscopy of the ovarian specimen revealed: well circumscribed lesion composed of polygonal cells with abundant pink cytoplasm. Individual cells showed round nuclei with variable prominent nucleoli and nuclei atypia. Elsewhere were seen unremarkable ovarian and adipose tissues; with a diagnosis of Luteoma. The procedure implications and pathology reports were discussed with her and she was reassured. She was re-counselled for Pap smear, family planning and exclusive breast feeding. She was then discharged to the respective clinics.

Discussion

Luteomas of pregnancy are tumour-like nodules of lutein cells forming in the ovary during pregnancy, they can get up to 20cm or more in diameter, and clinically appear ominous to the Obstetrician.[1] The aetiology is unclear though thought to arise from the proliferation of luteinised cells under the influence of β-hCG.[3]

Approximately 25% of women with luteoma of pregnancy have androgen hypersecretion and among them 10 – 50%, and 60-70% of female fetuses, develop signs of hyperandrogenism such as hirsutism, acne on the face, shoulders, back, and chest, hair loss, and masculine symptoms such as clitoromegaly and deepening voice. Some symptoms such as acne and hair loss are fully reversible but hirsutism, deepening voice, and clitoromegaly may be only partially reversible after delivery[4]. The patient had acne on her face but no other signs of hyperandrogenism were seen. The risk of virilisation of the fetus depends on the gestational period of the beginning of the hyperandrogenism (higher in the first trimester of pregnancy) and on the placental aromatase functionality[4]. Male fetuses are not affected by these alterations but some authors suggest that the increased intrauterine exposure to androgens may lead to an increased risk of mental retardation and hypogonadism.[2,3]

Rarely luteoma of pregnancy of large size may cause ovarian torsion or tumour rupture with symptoms of acute abdomen, haemoperitoneum, or compression of the pelvic structures such as ureters.[2]

Diagnosis and follow-up of this condition should be made with non-invasive methods; at ultrasound scan luteoma appears as a solid, single, or multinodular mass. It may be unilateral or rarely bilateral with a cystic appearance due to the presence of haemorrhagic foci.[1,2] However, because ultrasound examination during the second half of pregnancy may be challenging, considering the poor image quality caused by the uterine enlarged volume, magnetic resonance may be useful in the diagnostic evaluation of the patient.[4] Differential diagnosis must be made with other solid ovarian neoplasm such as luteinised thecoma, granulose cell tumour, or Leydig cell tumour.[4]

The management of luteoma of pregnancy depends on the presentation. Different authors report that surgical treatment with unilateral salpingo-oophorectomy for frozen section was the most frequent option; however, whenever possible, conservative management should be recommended considering its benign self-limiting nature[1,5]
Luteoma classically regress by 3 months postpartum; androgens levels reduce in the first 2-3 weeks and clinical virilisation symptoms generally disappear in 2-6 months after delivery.[1,6]
The patient had salpingo-ovariectomy done because of the lack of a complete antenatal evaluation and the huge mass volume of the tumour. Recurrence in subsequent pregnancies is possible but rare.[6]

Figure 1: delivery and inspection of the luteoma

Figure 2 : excision of the Luteoma

Conclusion

Luteoma of pregnancy is a benign pregnancy-related ovarian mass that generally resolves spontaneously after delivery. Antenatal accurate diagnosis is challenging but important for optimal management.

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Iatrogenic intestinal obstruction: how common? Presentation of three cases and review of the literature.

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Abstract
Small intestinal obstruction from iatrogenic causes are becoming common in Nigeria and West Africa, even though obstruction from adhesion because of the increasing rate of laparotomies is more common. The actual incidence of obstruction from iatrogenic causes is unknown in this environment because the doctors fear for litigations and therefore fail to report them.

We conducted a five year prospective analysis of data of three consecutive cases of Iatrogenic intestinal obstruction seen at the Divine Grace Medical center, Okolobiri, Bayelsa State, Nigeria The data obtained include the bio-data, clinical history, clinical features, surgery , intra-operative findings, investigations and outcome of treatment.
All three patients were seen after surgical exploration of the abdomen and presented with features in keeping with small bowel obstruction that failed to resolve after adequate nasogastric decompression of the stomach and correction of electrolytes imbalances. The patients had a repeat laparotomy where findings of nylon 2 stitches attaching the bowel to the site of operation, presence of gangrenous small bowel, dilated proximal segment and peritonities were made. All patients had bowel resection and anastomosis recovering subsequently with no further complications

KEYWORDS: Iatrogenic, Small bowel obstruction, Gangrenous patch, Resection,

Introduction.
Small bowel obstruction is a common life-threatening surgical emergency world-wide.[1,2,3].In developing countries external abdominal hernias are the leading cause of intestinal obstruction, but in the developed world, post-operative adhesion is the most common cause of small bowel intestinal obstruction in adults.[4] It is responsible for morbidity and mortality in 12-16% of all hospital admissions of acute abdominal pain in the United States.[5] The mortality of small bowel obstruction ranges from 2-8% and may increase to as high as 25% if bowel ischemia is present, and if there is a delay in diagnosis and surgical intervention.[6]

Asefe Z[7]noted that small bowel obstruction is a cause of significant morbidity and mortality in most developing countries. In their series, Shittu OB [8] showed that inguinal hernias are the leading cause of intestinal obstruction in Nigeria. The report of Ohen-Yeboah et al[3] in Kumasi, Ghana also supported this view. As a result of increasing number of laparotomies, several studies have shown that adhesion are becoming the commonest cause of intestinal obstruction in Nigeria and the West–African sub-region.[9,10] In a study conducted at the Niger Delta University Teaching Hospital by Alagoa et al[11], intestinal obstruction due to external hernias has the highest incidence(40.7% of cases),followed closely by adhesions(37.3% of cases).

Frager DH[12], and Miller G[13] also noted in their series that the major cause of small bowel obstruction is adhesion, followed by hernias and malignancies accounting for over 80% of all cases. As Parker C[14] noted in his article, that intestinal adhesion is the commonest cause of small bowel obstruction

Introduction.

Small bowel obstruction is a common life-threatening surgical emergency world-wide.[1,2,3].In developing countries external abdominal hernias are the leading cause of intestinal obstruction, but in the developed world, post-operative adhesion is the most common cause of small bowel intestinal obstruction in adults.[4] It is responsible for morbidity and mortality in 12-16% of all hospital admissions of acute abdominal pain in the United States.[5] The mortality of small bowel obstruction ranges from 2-8% and may increase to as high as 25% if bowel ischemia is present, and if there is a delay in diagnosis and surgical intervention.[6]

Asefe Z[7]noted that small bowel obstruction is a cause of significant morbidity and mortality in most developing countries. In their series, Shittu OB [8] showed that inguinal hernias are the leading cause of intestinal obstruction in Nigeria. The report of Ohen-Yeboah et al[3] in Kumasi, Ghana also supported this view. As a result of increasing number of laparotomies, several studies have shown that adhesion are becoming the commonest cause of intestinal obstruction in Nigeria and the West–African sub-region.[9,10] In a study conducted at the Niger Delta University Teaching Hospital by Alagoa et al[11], intestinal obstruction due to external hernias has the highest incidence(40.7% of cases),followed closely by adhesions(37.3% of cases).

Frager DH[12], and Miller G[13] also noted in their series that the major cause of small bowel obstruction is adhesion, followed by hernias and malignancies accounting for over 80% of all cases. As Parker C[14] noted in his article, that intestinal adhesion is the commonest cause of small bowel obstruction accounting for between 60-70% of all cases. He also noted that the processes for the adhesion formation in the abdomen can begin within a few hours after surgery. Other causes of small bowel obstruction includes: Crohns disease, intussusceptions, volvulus, gall stones, foreign bodies and iatrogenic in advanced countries.[13,15]

As was noted by Erik K et al[15], iatrogenic defects in the mesentery or omentum especially after a Roux-en Y gastric bypass may serve to trap a segment of the bowel leading to a closed loop intestinal obstruction. Erik et al[15] and other workers[1,2] also noted that small intestinal obstruction is characterized by the presence of colicky abdominal pain, vomiting, distension and obstipation.

The management of small bowel obstruction is conservative with the use of nasogastric tube decompression. Surgery is reserved for those who fail to respond to this and those who develops complications such as strangulation or perforation.[2] Iatrogenic causes leading to small intestinal obstruction are common, and are known world-wide, but the actual incidence is unknown in this environment. As a result of the traumatic implications of medical audit, social factors and litigations, many doctors fail to report the actual operative findings following reoperation thus the paucity of documentation of these conditions in medical text books and literatures. Besides ignorance and the belief of the population on the spiritual causes of disease, many affected individual do not complain to the authorities when they or their relations have such complications after surgery. No study had been done in this environment on the iatrogenic causes of small intestinal obstruction therefore the aim of this paper is to present three cases seen and to review the literature on the possible causes of iatrogenic intestinal obstruction and suggest ways to ameliorate them.

Patients and methods.

This is a five year prospective review of three consecutive cases of suspected Iatrogenic intestinal obstruction seen at the Divine Grace Medical Center Okolobiri, Bayelsa State Nigeria between June 2011 and May 2016.The bio-data (age, sex, occupation), clinical history, clinical features, type of operation performed, investigations included ultrasonography, X-rays, electrolytes & urea, intra-operative findings and outcome of treatment were recorded. All the patients had gastric decompression with a wide-bore nasogastric tube, urethral catheterization, intravenous fluid and antibiotics. All three cases had re-laparotomy as a result of failure of the non-operative treatment.

Case presentation.

Case 1

EO, a 23 year student referred from a private clinic to the accident and emergency department with a five day history of generalized colicky abdominal pain, vomiting, abdominal distension and fever. He had herniorrhaphy performed 7 days earlier at a private clinic for obstructed right inguino-scrotal hernia and had emptied his bowel twice after operation but with elevated temperature for three days. Examination revealed a young man, who was dehydrated, pale, anicteric and febrile to touch ($39.3^{O}C$).His pulse was 100/minutes, of good volume, and was regular. Blood pressure was 80/60mmHg.

The abdomen was distended but moves with respiration. There was a mid-line abdominal wound dressing. There was an oblique sutured wound sutured with interrupted 2/0 nylon located about 4cm from the anterior superior iliac spine to the mid inguinal point on the right side. The wound was dry and the abdomen was rigid with tenderness, guarding and rebound tenderness on palpation. Bowels sounds were present and exaggerated. The rectum was empty of stool.

A diagnosis of peritonitis secondary to small intestinal obstruction was made and a wide-bore naso-gastric tube was inserted and drained about a liter of greenish yellow fluid and feculent materials. Urinary catheter was inserted and drained highly concentrated but adequate amount of urine. The blood smear was negative for malaria parasite. The pack cell volume was 35%, electrolyte and urea showed elevated urea, low potassium, and sodium level. Plain abdominal X-ray (erect/supine) showed dilated small bowel loops, and multiple air fluid levels. The ultrasonography only showed dilated bowel with free fluid in the peritoneum. He was admitted, rehydrated with intravenous normal saline, the serum potassium was corrected with intravenous Potassium chloride and he was prepared for emergency laparotomy.

Findings at surgery include - hemoperitonium, fibrinoid exudates and bread and butter adhesion, a constricted segment of patent but viable ileum and hemorrhagic omentum. The proximal ileal segment was dilated with a small perforation at the anti-mesenteric side (border) about 20cm from the ileocecal junction. This patch was gangrenous and attached to the medial part of the hernia wound by size 2 nylon suture, anchored to the anterior abdominal wall.

The gangrenous ileum was resected, and end to end anastomosis of the ileum was performed to restore continuity of the bowel. The abdomen was irrigated with warm normal saline, and a tube drain was left in-situ.

His postoperative period was complicated by prolonged ileus, high swinging fever, superficial wound infection, and low pack cell volume of 20%. He was transfused with two units of whole blood and had gentamycin, ciprofloxacin, and metronidazole infusions. The stitches were removed on the 10^{th} post-operative day and he was discharged home with no further complications.

Case 2.

B U, a 30 year old business woman presented to our facility with a 6 day history of abdominal pains, abdominal distension, vomiting and constipation. She had caesarian section 10 days prior to the onset of symptoms at a private hospital for cephalo-pelvic disproportion. Abdominal pain was colicky, associated with progressive abdominal distension and projectile vomiting but no fever. She was later discharged against medical advice from the private hospital by her relation.

Examination revealed a young, obese lady not pale, dehydrated, anicteric, but afebrile to touch. Pulse was 90/ minutes, good volume, and regular. The blood pressure was 130/80mmHg.

Abdominal examination revealed a distended abdomen that moves with respiration with a clean mid-line infra-umbilical incision. There was marked guarding, and rebound generalized tenderness that was worse on the right iliac fossa and right hypochondrium. The bowel sounds were present and exaggerated.

Rectal examination was normal. An impression of adhesive intestinal obstruction was made. She was

commenced on naso-gastric drainage, urethra catheterization, intravenous fluid therapy and analgesics. Her pack cell volume serum, serum urea level and electrolytes were within normal limits. Abdomino-pelvic ultrasonography showed dilated bowel loops and free fluid in the peritoneum. The plain abdominal X-ray revealed multiple air fluid level and dilated small bowel loops and absence of gas in the colonic region.

Conservative management failed and on the 3rd post-admission day, she had laparotomy. Intraoperative findings include, healing mid-line incision, constricted segment of ileum anchored to the anterior abdominal wall by nylon stitch, dilated proximal segment of ileum. The trapped segment of ileum was viable. The Uterus was enlarged, the tubes, ovaries and colon were normal. The stitches were released, the abdominal cavity was moped dry and the intestine returned to the peritoneal cavity. Patients had uneventful post-operative period and was discharged home on the 9th postoperative day.

Case 3.

G T, a 19 year old student, presented at the accident and emergency department with a three day history of progressive abdominal pain, swelling, vomiting and inability to pass stool or flatus. He was discharged against medical advice from a private clinic after appendectomy six earlier. His condition was said to have deteriorated after the operation that necessitated the discharge from the hospital.

Examination revealed an acutely ill looking young man, who was dehydrated, pale, anicteric, febrile to touch with temperature of 38.7^{OC}. Pulse rate was 90/minutes, good volume, and regular. Blood pressure was 100/70mmHg and his chest was apparently clinically clear.

Abdominal examination revealed a distended abdomen that moves slightly with respiration, with dressings at the midline infra-umbilical region. The abdomen was rigid with guarding, and rebound tenderness. Bowel sounds were present but reduced. The rectum was empty of stool. A provisional diagnosis of acute adhesive intestinal obstruction was made. He was commenced on conservative management. His pack cell volume was 28%, the urea was elevated, and the electrolytes revealed hypokalemia and hyponatremia.

The plain-abdominal X-ray showed dilated small bowel loops with multiple air fluid levels while the abdominal scan showed dilated bowel loops with free fluid in the peritoneum. His condition deteriorated with pain, abdominal distension and vomiting worsening while the fever persisted. Following the failure of conservative treatment, patient had laparotomy 3 days post admission after proper rehydration and correction of the electrolytes deficits.

Findings at operation include- feco-peritonium, perforated terminal ileum, gangrenous patch of omentum attached to the anterior wall at the site of appendix repair, gangrenous anti-mesenteric patch of perforated terminal ileum about 25cm from the ileocecal junction anchored by a stitch to the anterior abdominal wall.

The stitches were removed, and the gangrenous omentum and small bowel were resected. Primary anastomosis to restore bowel continuity was carried out, the abdomen was mopped dry, irrigated with warm normal saline, and drain was inserted in the right para-colic gutter.

The swinging high grade fever persisted, and on the 3rd postoperative day, he developed sero-sanguineous discharge from the wound. However, the wound swab was sterile, and the blood smear for malaria parasite was negative. The antibiotics were changed to ciprofloxacin, metronidazole and gentamycin. Fever subsided, patient emptied his bowel on the 5th post-operative day, alternate stitches were removed on the 7th post-operative day and the patient was discharged 10th day post-operation with no complications.

Discussion

Intestinal obstruction is a common surgical emergency that accounts for about 20% of all admissions to surgical emergency services.[16].A study by Akcakaya A[17] in Turkey, noted that the commonest cause of intestinal obstruction in the developed countries is adhesion, while

strangulated hernias are more common in developing countries. Ajoo[18] in his study noted that intestinal obstruction is a common cause of emergency admissions second only to appendicitis. He found that the main cause of intestinal obstruction was strangulated or incarcerated groin hernia. Muyembe VM et al[19] noted that the leading cause of intestinal obstruction was sigmoid volvulus, external hernias, adhesion and bands, ileo-colic intussusceptions and small bowel volvulus. In all these studies, no mention was made of iatrogenic causes of small bowel obstruction. This is either due to its infrequent occurrence or underreporting by the attending physicians.

Sixty to 70% of small obstructions are caused by adhesions, which emanate from abdominal surgeries.[13] Adhesions represents bands of fibrous tissues that obstruct the lumen and are due to postoperative inflammatory processes and may lead to bowel obstruction in the early post-operative period or may obstruct years later.[13,15]. As noted by Erik K et al[15], besides a loop of intestine being caught by stitches, iatrogenic defect in the mesentery or omentum may serve to trap a segment of bowel leading to a close loop intestinal obstruction. Peritoneal adhesion are the most common cause of small bowel obstruction accounting for 65%-75% of cases[20,21].

The cases presented had different pathologies that needed emergency intervention and all had emergency surgery. However, in the immediate postoperative period, they developed classical features suggestive of small bowel obstruction. Since these signs and symptoms occurred few days postoperatively, bands and adhesion were suspected. These explain the reasons the patients were all managed conservatively, but none responded to the regime.

The use of ketamine as anesthetic agent in most private health facilities and the inexperienced single surgeon performing these procedures in a clinic may partly be responsible for these avoidable accidents. Ketamine causes disassociated anesthesia and during the operation, the patient may struggle as a result of pain or discomfort. The surgeon operating with an inexperienced assistant may panic and in the process pick up parts of the viscera with the needle and anchor it to the anterior abdominal wall. These have resulted in small bowel intestinal obstruction and its consequences as demonstrated in the three cases.

As Sule et al[22] noted, the appearance of features of bowel obstruction soon after an apparent successful operative especially those performed by non-specialist surgeon should heighten the suspicion of a pathology other than adhesion as a cause of the mechanical intestinal obstruction. In all the cases illustrated above, the attending physician failed to anticipate other pathologies being responsible for patient condition and to make a diagnosis of intestinal obstruction despite glaring clinical signs and symptom.

Although, small bowel obstruction due to adhesion can begin few hours after operation, it is said to be responsible for between 60 to 70% of small bowel obstruction[20,21], the findings of stitches attaching the bowel to the site of operation was an indication that adhesion or herniation was not responsible for the obstruction. The presence of gangrenous patch of small bowel, dilated proximal segment and the absence of recurrence after the operation, suggested that the binding of the small bowel to the anterior abdominal wall and the site of incision was responsible for the small bowel obstruction and not adhesion.

Small bowel obstruction due to adhesion respond to nasogastric intubation to decompress the gut, adequate intravenous fluid administration, correction of electrolytes imbalances and clinical observation. The three patients were commenced on these but none responded. This again confirm the fact that the obstruction was iatrogenic and not due to adhesion or other unforeseen intestinal pathology as was documented by Sule AZ, et al[22].

A delay in operation for small bowel obstruction places patients at higher risk of bowel resection. However, patients without signs of strangulation or peritonitis or history of persistent vomiting, crampy abdominal pain and abdominal distension after operation can be managed conservatively. In our study, two patients in addition to these had

fever and wound infection. The presence of fever in a patient with small bowel obstruction indicates bowel ischemia and strangulation which may lead to bowel perforation. This was demonstrated in two of the patients who had these signs and symptom, and responded adequately to surgical intervention.

Although, modern radiological modalities such as CT Scan, Ultrasonography[13,15] and Magnetic resonance imaging (MRI) can reliably make early diagnosis of intestinal strangulation, but in the third world setting where these advanced imaging technique are not available in most places and the surgeon relies only on his clinical acumen and the report of plain abdominal X-rays and blood investigations.

Though the diagnosis could be difficult to make in the immediate post-surgical period, the use of ultrasonography, plain abdominal X-ray and the presence of persistent pain, vomiting, abdominal distension after surgical procedure should raise the suspicion of the physician especially when the surgery was performed by untrained personnel for other pathologies. Small bowel Ischemia is the complication that increases the morbidity and mortality associated with small bowel obstruction[12]. As was documented by Frager[12] and Erik et al[15],the mortality rate in patients who undergo surgery for small bowel obstruction with ischemia is as high as 25% compared to those without strangulation which may be as low as 2%.A delay in surgical exploration raises the morbidity and mortality of small bowel obstruction therefore, early diagnosis is needed to reduce these complications.

As soon as the diagnosis is made, immediate laparatomy should be performed as was done in these cases. But the physician should be careful in re-operating the patients especially those who are prone to developing adhesion. A repeated exploration and adhesiolysis in patient with adhesion may worsen the process of adhesion formation, their severity and subsequent intestinal obstruction.

There are no reliable accurate criteria for determining the presence of nonviable bowel within abdominal cavity. This had been documented by many authors[23,24], therefore, suspicion of the condition is needed to avoid the complication. Shatila et al[25], had noted that 50% of patients with gangrenous small bowel develop wound infection. Although the number of patients in our series is small but our report is in agreement with those of Shatile et al[25], for the patients whohad gangrenous patch of ileum also developed wound infection. This is not surprising since there was soiling of the abdominal cavity and operating field by infected fecal materials. However, the patient responded to adequate intravenous fluid and broad spectrum antibiotic therapy among other adjuvant therapies.

With the increase in the number of untrained medical personnel who undertake surgical procedures, there may be increase in the incidence of iatrogenic accident as was demonstrated in the three cases. To reduce these complications, morbidity and mortality, there is need for training and retraining of medical personnel in handling surgical procedures such as herniorrhaphy and appendectomy especially in remote villages in developing countries. The surgeon should always be on the alert. The diagnosis of iatrogenic intestinal obstruction should be suspected when a patient after surgical exploration of the abdomen presents with colicky abdominal pain, vomiting, and abdominal distension that does not resolve after adequate nasogastric decompression of the stomach and correction of electrolytes imbalances. Failure to respond to conservative treatment should alert the surgeon to take a more critical look, do a more detailed evaluation and investigate the patient further. Such patients should have the serum electrolytes in addition to plain abdominal X-ray (supine/erect) done to make a diagnosis and to ruleout other causes of intestinal obstruction which may not necessary be related to the presenting pathology.

Although, prolonged ileus could be a differential diagnosis especially in the immediate post-

operative period but there is usually no pain and bowel sounds are reduced or absent in such patients. In all the three cases demonstrated, the bowel sounds were present but were exaggerated.
It is important to note that delay in making diagnosis and surgical treatment may cause a substantial increase in morbidity and mortality rate following iatrogenic small intestinal obstruction. The ischemia, gangrene, perforation and electrolytes derangement that ensue, could lead to the increase in the morbidity and mortality rate following iatrogenic intestinal obstruction.

Conclusion

Iatrogenic intestinal obstruction tends to occur early in the post-operative period hence it is easily confused with the usual early intestinal obstruction due to the bread and buttered adhesion. Surgeons should be aware of the possibility and after a short period of conservative management treatment, the patient should be investigated and re-operated to be absolutely certain that bowel had not been inadvertently entrapped by sutures. Failure to re-operate may lead to poor outcome for the patient. There is need for medical personnel to update their surgical knowledge regularly, know his limits, and refer patient when the need arises.

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ORIGINAL ARTICLE
Complementary and Alternative Medicine: Sociodemographic characteristics of users with Human immunodeficiency virus/Acquired immune deficiency syndrome on Antiretroviral therapy attending HIV clinic in South South, Nigeria

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Abstract

Background: *Human immunodeficiency virus/Acquired immune deficiency syndrome is a chronic illness, associated with massive morbidity and psychosocial issues. People living with HIV/AIDS have traditionally turned to Complementary and Alternative Medicine (CAM) due to the health and social issues attributed to living with the disease.*

Objective: *To determine the prevalence and the association between sociodemographic characteristics and CAM use among adult HIV/AIDS on antiretroviral drugs attending HIV clinic in University of Port Harcourt Teaching Hospital.*

Methods: *It was a descriptive cross sectional study, conducted between May and July 2015 in which 415 systematically selected participants completed a semi structured interviewer administered questionnaire. The data was analysed using Statistical Package for Social Sciences (SPSS) version 20.0. Bivariate analysis was performed using Pearson's Chi square. A p value of ≤0.05 was considered statistically significant.*

Results: *The mean age of the participants was 39.84±9.13 years with the majority in the age group 30-39 years. The prevalence of CAM usage was 69.9% and highest among CAM users were mostly within the age group 30-39 years, from social class four and Ikwerre ethnic group. Ethnicity and socioeconomic status were significantly associated with CAM usage with p value of (0.021 and 0.05 respectively). Biological products such as high dose Revital and Ginsomin were the commonly used as CAM by the participants (60.6%).*

Conclusion: *Based on the high proportion of CAM users among HIV/AIDS patients on ARV drugs, primary care givers should carefully ask all patients about possible CAM usage and the types they are involved in.*

KEYWORDS: HIV, Complementary medicine, alternative medicine

Introduction

The global burden of HIV/AIDS is quite enormous with associated massive morbidity and psychosocial issues. Once a person is diagnosed or known to be positive, his or her career and employment may be affected hence the search for cure of the disease is important. The complex health and social issues associated with living with Human Immunodeficiency virus (HIV) makes people living with the disease turn to Complementary and Alternative Medicine (CAM).[1]

Complementary and Alternative Medicines are defined as a group of diverse medical and health care systems, practices, and products that are not currently considered as primarily part of conventional medicine[1]. CAM has been used to treat many diseases in Nigeria but the safety of this therapy has been the major concern to many people particularly medical practitioners especially when the chemical components are not known. People Living with HIV/AIDS use traditional medicine with their antiretroviral drugs due to the availability and easy access to a variety of CAM, cultural belief, freedom of patients to select and utilize treatment modality of their choice and due to the adverse effect of conventional medicine[2]. Some studies suggested that the use of CAM among adults HIV/AIDS patients on ARV is between 15%-79%[3, 4]. As the use of CAM among HIV positive patients is becoming increasingly wide spread, some CAM therapies may jeopardize the efficacy of conventional HIV medication, making it critical to understand CAM use among this population.

Most patients do not communicate with their health care providers on their use of CAM resulting in interaction with ARV drugs, adverse reactions of CAM and poor adherence to ARV drugs which will likely increase drug resistance and an increase in disease spread. Certain family and sociodemographic factors influencing the health care seeking behaviour of an individual like culture, income level and educational background can increase the frequency of side effects of ARV when combined with CAM.

This study will provide relevant data on the prevalence of use of CAM among PLWHA on ARV drugs and sociodemographic factors associated with CAM usage. The primary care Physician occupies the centre stage in the management of chronic illnesses hence, this study will be useful in the initiation of strategies to counsel patients on self-medication, implication and benefits of the use of CAM. This may lead to reduction in morbidity and mortality associated with HIV/AIDS.

Materials and Methods

Study area: This study was carried out at the HIV/AIDS clinic of University of Port Harcourt Teaching Hospital, Rivers state. Rivers state is in the South-south geopolitical zone and Port Harcourt city is the capital of Rivers state. The HIV/AIDS Clinic is situated in the medical out patients' department. It runs every working day (Monday- Friday). An average of 1000 adult HIV positive patients on antiretroviral therapy are seen monthly. Detailed record of history and physical examinations are kept confidentially and appropriate line of management followed. Ancillary tests where needed are performed.

Study design: It was a descriptive cross sectional study in which systematically selected participants completed an interviewer-administered semi-structured questionnaire. All adult patients aged 18-65 years who were on ARV drugs for at least three months and attending HIV/AIDS Clinic of UPTH at the time of study were recruited for study participation. They were recruited during the five working days of the week within a period of two months. The sample interval was derived by dividing the sampling frame by the estimated sample size i.e. 2000/415. This was equal to 4.82, approximately 5. Therefore, every 5th HIV/AIDS patient on ARV drugs that presented to the clinic each day was studied. The first sample was selected through a simple random technique in which each day the first 5 eligible participants present in the clinic were asked to handpick a number from 1 to 5 from a ballot. The patient who picked number "1"

was selected as the first participant to be recruited for the day. Thereafter every fifth eligible participant from the patients was selected for the day.

Sample size estimation: Sample size estimation was determined using the formula[5] for estimating minimum sample size for descriptive studies. The estimated minimum sample size using 57.9% prevalence of CAM usage among HIV infected patients on ARV from a previous study [2] was 374. This was however increased to 415 to allow for 10% non response.

Data collection: The questionnaire which was adapted from a previous study done in Nigeria was used for the study[1]. Pre-testing of the questionnaire was done using 40 participants in Braithwaite Memorial Specialist Hospital, which is an HIV/AIDS care centre in Port-Harcourt metropolis. This was done to test the clarity of questions, reliability of the tool and to further validate it. Names were not used and the participants were reassured that information collected would be used only for scientific purposes and kept confidential. The information obtained in the socio-demographic factors was used to group the patients into five social classes based on their occupation using the Registrar General's Scale of social classes[6]. Data collection was carried out between May and June 2015.
Social Class 1: Senior public servants, highly skilled professionals, e.g. doctors, engineers, lecturers, managers, top government and business executives.

Social Class 2: Intermediate grade public servants e.g. senior school teachers, nurses, technicians.

Social Class 3: Semi- skilled junior grade public servants, drivers, artisans, junior clerks, rank and file of the police force.

Social Class 4: Unskilled; petty traders, labourers, messengers etc.

Social Class 5: Unemployed, full time house wives, students, subsistence farmers.
Also information obtained from the sociodemographic factors was used to group participants into low, middle and high monthly income in Nigeria. The low, middle and high income earners were grouped into the following earnings respectively: **<**₦40,000, ₦40,000-₦80,000, **<**₦80,000 monthly[7].

Data analysis: The data was analyzed using Statistical Pac kage for Social Sciences (SPSS) version 23. Bivariate analysis was performed using Pearson's Chi square. A p value of ≤ 0.05 was considered statistically significant.

Ethical consideration: Ethical clearance was sought and obtained from the University of Port Harcourt Teaching Hospital Research and Ethic Committee. Written informed consent was obtained from all the study participants. Confidentiality was maintained during the study period with allocation of serial numbers to the participants instead of their names or hospital numbers.

Results
A total of 415 questionnaires were administered, 405 questionnaires were consistent and completely filled, giving a response rate of 100%.
Table 1 shows the socio-demographic characteristics of the participants**.** The participants were between 19 and 65 years of age with a mean age of 39.84±9.13 years. Majority of the participants were between the ages of 30-39 years (162;40.0%). Most of the participants were from Ikwerre ethnic group (151;37.3%), females (284;70.1%), Christians (396;97.8%), married (231;57.0%), had secondary education (196;48.4%), social economic class four (164;40.5), were low income earner (246;60.7%) and from nuclear family structure (378;93.3%).
Figure 1 shows the prevalence of CAM usage among participants. More than half of the participants, 283 were using CAM along with the use of their ARV. The prevalence of the use of CAM among HIV/AIDS patients on ARV drugs was found to be 69.9%.
Tables 2a &2b show the utilization of CAM

concurrently with ARV drugs was higher among female participants accounting for (193; 68.2%, p=0.197). The higher percentage of CAM users was among the participants age group 30-39year age group (112; 39.6%, p value=0.520). The use of CAM concurrently with antiretroviral drugs was highest among participants with secondary education (141; 43.8%) though the association of educational status with the utilisation of CAM and ARV drugs was not statistically significant (*p=0.347*). The proportion of the participants that combined CAM with their ARV was found mostly among social class four participants (112; 39.6%). The association of social class with the combined use of CAM and ARV was statistically significant (*p=0.05*).

Regarding the income of the participants, the proportion of the participants that combined CAM with their ARV was found mostly among the low income group (171; 60.4%). The association of income with the combined use of CAM and ARV was not statistically significant (*p=0.690*). Regarding participants' marital status, the percentage of CAM user was highest among the married participants (159; 56.2%, p=0.819) than the other status. Concurrent use of CAM with ARV drugs was found to be highest among Ikwerre ethnic group (102; 36.0%) than the other ethnic group. Ethnicity generally as a factor to CAM use was statistically significant at a *p= 0.020.* Majority of the participants in this study were from nuclear family structure 378; 93.3% and the CAM usage was highest among them (261; 92.2%, p=0.174).
Table 3 shows the breakdown of CAM remedies used by HIV infected respondents on anti-retroviral drugs (ARV). Multivitamin known as Revital and Ginsomin capsule were the most consumed CAM products used by (231; 60.6%) of the respondents who used CAM. and was followed by use of Moringa (56; 14.7%). Fourteen (3.7%) respondents were involved in Prayer and Fasting as a form of therapy for healing.

Discussion

The prevalence of CAM use, 69.9% found in this study is slightly higher than 57.9% reported in a study done by Idung and coworkers in Uyo which is in the same geopolitical zone with the location of this present study[1]. The reason for this difference may be due to the fact that Rivers state is a more industrialised state with higher income per capita than Uyo, hence the population can afford the high cost of CAM. It is also possible that many patients feel that alternative medicine may help in coping with chronic illnesses for which conventional medicine offers no cure but only palliation[8, 9]. The high prevalence of CAM usage in this study can also be attributed to perception of CAM acceptability by health care personnel. The finding contrasts to a similar study done in Lagos, Nigeria with prevalence of 8.2%[10]. This low proportion obtained in Lagos was attributed to the continuous adherence counselling offered to patients on avoidance of taking herbal medicine with ARVs because of potential interaction and adverse effects[10]. However, the prevalence in this study was less than 94% reported among African Americans in urban hospital in South Eastern United States[11]. This was reported to be due to its availability, affordability and acceptability of CAM in their environment. The prevalence of CAM use in this study was similar to a Zimbabwe study where 68% of PLWHA used herbs in form of *moringa oleifera* with their ARV drugs[12]. This high prevalence was attributed to the fact that the intake of the herbal product was suggested by family members with strong influence on the respondents' health.
Findings from this study showed that female constituted the majority of HIV infected patients on anti-retroviral drugs (284; 70.1%) who also used CAM remedies more (193;68.2%). This finding is consistent with the sex distribution of HIV infection in Nigeria[13]. HIV infection in Nigeria is reported to be higher among females (4.0%) than males (3.2%) with girls and women showing higher early vulnerability and infection than boys and men[13]. The observed female predominance in this study could be explained by the fact that women are at a greater physiological risk of contracting HIV than men. Women are more health conscious than men leading them to devote more time and resources to curative health. Hormones such as progesterone were reported to play a role in a woman's biological vulnerability to HIV infection. This may perhaps

also be linked to the fact that the female infected were more desperate for cure of their infection and the fear of death. This can also be compared with the Uyo study where 38.6% of female HIV patients combined CAM with ARV drugs[1]. The finding in this study also corroborates with the study by Bishop and co-worker[14].

In this study, majority of the participants were in the age group 30-39years. This finding is consistent with the age distribution of HIV prevalence in Nigeria where HIV infection is highest among those between 35-39 years[13]. This finding is compared with another study done in Uyo the age group of highest respondents was 30-39 years and Thailand 25-44 years[1,2]. This finding can be attributed to the fact most predisposed age group to HIV infection are mostly the productive, agile and sexually active. However, finding in this study showed that higher proportion of CAM users in combination with their ARV (39.6%) was among this age group but this was not statistically significant, the p-value 0.520. The reason could be due to the fact that this age group desired cure to the infection and feeling of regret about their status. This can be compared with a study done in USA that reported that CAM use were likely among younger adults and the positive relationship between age and CAM use was primarily due to the inclusion of prayer specifically for health reasons[15]. This was different from the Uyo study which reported more prevalence use among participants between 40-49 years of age (191; 33.3%)[1]. Barnes et al also reported that CAM use was more prevalent among females aged 30 - 69 years[16].

Finding in this study showed that majority (141;43.8%) of the CAM users had secondary education and this could be associated with there their culture and believe about traditional medicine influences their health seeking judgement and their perceived cause of HIV infection might influence the choice of treatment. Although this was not significant in this study. This can be compared to a study done in south Africa where CAM use was more among respondents with high secondary level of education due to the fact traditional medicine was easily accessed and accepted by everyone[17]. On the contrary, a Zimbabwean study showed that majority of CAM users had primary education but believed that the disease was of spiritual origin[8].

Majority of the participants in this study with low income (171; 60.4%), married status (159; 56.2%), from Christianity religion (275; 97.2%) used CAM therapy with their ARV drug but this was not statistically significant. Greater financial resources have been reported to be associated with CAM use in previous studies[18]. The married respondents probably desired healing so that they could have hope of taking care of their household. Also the finding in this study showed that utilisation of CAM was high among those participants from nuclear family setting (261; 92.2%). This was related to strong family ties in our society, the family setting determines the success and failure of the individual health seeking behaviours and adhering to medical treatment prescribed by a physician. This can be related to a study done in Thailand on the association between the use of CAM and socio demographic factors showed that the use of CAM was high in family with high educational level and family experience of CAM use[2]. This can be related to a study conducted in Enugu among cancer patients where prevalence of CAM use was 65% and it was believed that the high prevalence rate among the patients was explained by the traditional nature of our society, our cultural and religious beliefs and practices, the cost of western conventional treatment and our peoples' understanding of cancer as a disease[19].

A high proportion of participants in this study were in social class four which is associated to the fact that HIV affect those of lower socioeconomic status since they are predisposed to riskier sexual behaviour which can lead to contraction of HIV[20]. The use of CAM was highest among social economic class four. This can be associated to the type of CAM used such as biological preparations which are due to their perceived believe of its potency[16,21].

The following are the predominant Ethnic group found in Rivers State, Ikwerre, Etche, Ogoni, Ogbai/Egbema, Ibani, Opobo, Eleme, Okrika, kalabari, Obolo, Engenni. Majority of the respondents in this study were from Ikwerre ethnic group. Where respondents from Ikwerre ethnic group constituted the higher proportion of CAM users (102; 36.0%). Ikwerre ethnicity is the largest ethnic group in Rivers state and they are mostly engaged in agriculture[22]. No study has been done in Nigeria to compare the percentage of CAM usage among different ethnic groups but it has been said that millions of Nigerians use traditional medicine to help meet some of their primary health care needs[23]. Traditional medicine is very cheap in Nigeria and there is no law restricting its usage

.

Despite the limited evidence for benefits of traditional medicine as part of HIV treatment, there remains a high frequency of usage among people living with HIV[8]. Multivitamins such as Revital and Ginsomin capsule were the most used CAM remedy (60.6%) by the participants in this study. This high percentage could as a result of prescription of multivitamin by health care personnel in the HIV clinic. This is similar to a study from Thailand which shows that majority of HIV patients (69.9%) were using vitamin mineral products with their ARV drugs[2]. The popularity of multivitamin among HIV infected persons in this study may be related to easy availability of the products and the desire to improve their immunity. Also in a recent study by Hassan and colleagues similarly reported that, among Malaysian HIV-positive study participants, vitamins and supplements were among the most commonly used CAM therapies[24].

Moringa was another commonly used CAM remedy (14.7%) among participants in this study. The popularity of Moringa use among the participants was related to the multipurpose health effects of the products and the fact that it was readily accessible and available by retailers at the HIV clinic. *Moringa oleifera* is a type of herbal product which is among the CAM remedy used by HIV patients in a study done in Zimbabwe[12]. Herbal preparation was another traditional medicine that was mostly used with ARV drugs in a study done in Ghana[25]. This can also be related with another Zimbabwean study 60% of the respondents used herbal remedy to cure the disease, this was also associated to the belief that the disease needed herbal products and spiritual intervention[8].

Limitation: The information on the use of CAM therapy was interviewer administered therefore some participants were hesitant to report actual use of CAM due to the fear of being denied further ARV drug care. Therefore, the prevalence of CAM usage could have been higher than the finding from this study.

Conclusion: The prevalence rate of CAM use among HIV/AIDS on ARV was high in this study. It was noticed that socioeconomic status and ethnicity were significant factors that were associated with the use of CAM. Due to the high proportion of CAM users among HIV/AIDS patients attending UPTH HIV clinic and receiving ARV drugs, primary care physicians need to be aware of these practices, understand the rationale for this health seeking behaviours, proactively enquire about their use and counsel patients regarding the potential of some of the therapies for adverse reactions and drug interactions.

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Table 1: Socio demographic characteristics of study participants

Characteristic type	Characteristics (%)	Frequency
Age group (years)	18-29	56 (13.8)
	30-39	162 (40.0)
	40-49	115 (28.4)
	50-59	58 (14.3)
	>59	14 (3.5)
Gender		
	Male	121 (29.9)
	Female	284 (70.1)
Religion		
	Christian (97.8)	396
	Islam	9 (2.2)
Educational level		
	Non formal	15 (3.7)
	Primary (17.3)	70
	Secondary (48.4)	196
	Tertiary (30.6)	124
Marital status		
	Unmarried	87 (21.5)
	Married	231 (57.0)
	Widowed/widower	71 (17.5)
	Divorced	16 (4.0)
Social class		
	Class 1	33 (8.2)
	Class 2	35 (8.6)
	Class 3	92 (22.7)
	Class 4	164 (40.5)
	Class 5	81(20.0)
Income		
	Low income <₦40,000	246 (60.7)
	Middle income ₦40,00-₦80,000	41 (10.1)
	High income ₦₦80,000	36 (8.8)
Ethnic group		

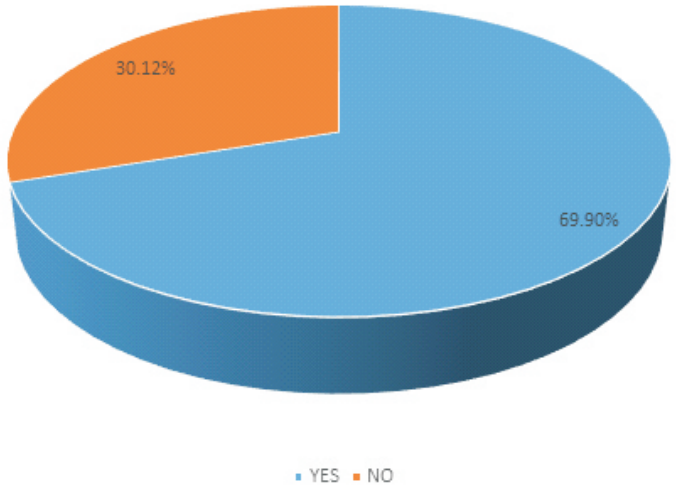

Figure 1: Prevalence of Complementary and Alternative Medicine utilization among the participants.

Table 2a: Association between socio-demographic characteristics and concurrent utilisation of CAM with ARV drugs.

	Utilization of CAM with ARV drugs		Total N=405	$\chi 2$	*p-value*
	Yes N=283 (%)	No N=122(%)			
Sex					
Male	90(31.8)	31(25.4)	121(29.9)		
Female	193(68.2)	91(74.6)	284(70.1)	1.663	*0.197*
Age					
19-29 years	36(12.7)	20(16.4)	56(13.8)		
30-39 years	112(39.6)	50(41.0)	162(40.0)		
40-49 years	83(29.3)	32(26.2)	115(28.4)		
50-59 years	44(15.5)	14(11.5)	58(14.3)		
Above 59 years	8(2.8)	6(4.9)	14(3.5)	3.228	*0.520*
Educational Status					
Non-formal	8 (2.8)	7 (5.7)	15(3.7)		
Primary	44 (15.59)	26 (21.3)	70(17.3)		
Secondary	141 (43.8)	55 (40.2)	196(48.4)		
Tertiary	90 (31.8)	34 (27.4)	124(27.9)	4.464	*0.347*
Social Class					
Class 1	22 (7.8)	11 (9.0)	33(8.1)		
Class 2	31(11.0)	4 (3.3)	35(8.6)		
Class 3	68(24.0)	24(19.7)	92(22.7)		
Class 4	112(39.6)	52(42.6)	164(40.5)	9.435	*0.05**
Class 5	50(17.7)	31(25.4)	81(20.0)		

**Statistically significant ($p \leq 0.05$)*

Table 2b: Association between socio-demographic characteristics and concurrent utilisation of CAM with ARV drugs

	Utilization of CAM with ARV drugs		Total N=405	$\chi 2$	*p-value*
	Yes N=283 (%)	No N=122 (%)			
Income					
Low income	171(60.4)	75 (61.5)	246(60.7)	0.741	*0.690*
Middle income	31 (11.0)	10 (8.2)	41(10.1)		
High income	81(28.6)	37 (30.3)	118 (29.1)		
Marital status					
Unmarried	63 (22.3)	24 (19.7)	87(21.5)		
Married	159 (56.2)	72 (59.0)	231(57.0)		
Widowed/widower	51 (18.0)	20 (16.4)	71(17.5)	0.928	*0.819*
Divorced	10 (3.5)	6 (4.9)	16(4.0)		
Religion					
Christianity	275 (97.2)	121 (99.2)	396(97.8)		*0.605+*
Islam	8 (2.8)	1 (0.8)	9(2.2)		
Ethnicity					
Ikwerre	102(36.0)	49(40.2)	151(37.3)		
Kalabari	40(14.1)	9(7.4)	49(12.1)		
Okrika	25(8.8)	5(4.1)	30(7.4)		
Etche	13(4.6)	7(5.7)	20(4.9)		
Ogba	15(5.3)	5(4.1)	20(4.9)		
Ibibio/Efik	22(7.8)	8(6.6)	30(7.4)		
Urhobo	25(8.8)	25(20.5)	50(12.3)		*0.020**
Ibos	28(9.9)	7(5.7)	35(8.6)	18.147	
Others	13(4.6)	7(5.7)	20(4.9)		
Family structure					*0.174*
Extended	22(7.8)	5(4.1)	27(6.7)	1.852	
Nuclear	261(92.2)	117(95.9)	378(93.3)		

**Statistically significant ($p \leq 0.05$)* *+ fisher's Exact statistics used*

Table 3: The type of Complementary and Alternative Medicine remedies used by CAM users.

Types of CAM used	Frequency (n)	Percentage (%)
Garlic, Ginger	19	5.0
Revital, Ginsomin	231	60.6
Green Tea, Black tea,	14	3.7
Aloe vera	3	0.8
Forever living product	2	0.5
Moringa	56	14.7
Trevor	4	1.1
Faith and prayer healing	14	3.7
Others:(California Prune, Clean shield, Soya beans Powder)	38	9.9

Multiple responses present

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