

***MOTHERHOOD: A NATURAL BUT PERILOUS AND
ADVENTUROUS EXPEDITION***

(From Conception to Reproductive Annihilation)

By

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SUMMARY

The topic of today's lecture *MOTHERHOOD: A NATURAL BUT PERILOUS AND ADVENTUROUS EXPEDITION (From Conception to Reproductive Annihilation)* was not easy to select. In the past, a lot of emphasis has been on dangers of childbirth, but it appeared to me that the woman we refer to came from the oblivion. Therefore, I decided to look at the circumstances of the beginning of her existence from the time she was conceived in the womb to the time she is no longer able to reproduce; from the perspective of functioning from bench to bedside. I have made sojourns at some particular flash-points in this journey to highlight the grave dangers she may face and also proffer possible solution.

In the beginning, the woman developed from the rib of a divinely anesthetized man called Adam. Although sex is genetically determined by the presence or absence of some chromosomes, the primary determinant is the existence or absence of the male factor. In other words, the female sexual circumstances is a "neutral" state, and this may be considered as genetic discrimination. Thus at the time of conception, she was short-changed as her continued existence depended on the absence of the male factor.

The journey commences from conception in utero (*before the woman is born*) and probably ends at menopause. Ironically, the

number of germ cells reaches the maximum at about 20 weeks' gestation (before birth) and then begins to demonstrate a downward trend. The sliding trend in ovarian follicular numerical strength continues until complete cessation, which leads to menopause.

Along with this journey lie several land mines which may pose a grave danger and in extreme situations make it impossible for the woman to complete this trip.

At birth, the genitals are grossly mutilated in the name of circumcision. Reproductive maturity which is the puberty is fraught with severe debilitating pain and bleeding. The adolescent period exposes her to sexual molestation, unwanted pregnancy, criminal abortion, and sexually transmitted diseases including HIV-AIDS. Then gender discrimination and inequity become the order of the day.

During pregnancy, anaemia, micronutrient deficiency, malaria, concomitant intra abdominal surgical emergencies and other complications may occur. In labour, excruciating pain coupled with the lack of labour support can unsettle the ill-prepared, leading to severe maternal morbidity or worst still mortality.

After delivery, she is devastated by the pelvic floor consequences of childbirth. If she survives this onslaught and reaches the period of menopause, when nature has taken away most of the primary hormones that made her a woman, she is again exposed to another dangerous situation, an unfriendly lipid environment, atherosclerosis, and other life-threatening cardiovascular diseases. She continues to suffer from this situation until the end of time.

Protocol

- The Vice Chancellor, Professor Benjamin Chukwuma Ozumba.
- Deputy Vice-Chancellors
- Other Principal Officers of the University
- Provost, College of Medicine
- Deans of Faculties, Postgraduate School, and Student Affairs
- Directors of Institutes and Centres
- Professors and Other Members of Senate,
- Past Inaugural, Lecturers
- Heads of Departments and other Academic Colleagues
- Members of Administrative and Technical Staff
- My Lords Spiritual and Temporal
- Members of My Family, Nuclear and Extended
- Distinguished Guests
- Gentlemen of the Print and Electronic Media
- Great Umsites
- Lions and Lionesses
- Ladies and Gentlemen

I am explicitly and exceedingly thrilled and privileged to be permitted to stand before you to deliver the 111th Inaugural Lecture of this great University, and my alma mater on this day, the 30th of June, 2016. This happens to be the 17th Inaugural Lecture from the College of Medicine and the second from the Department of Obstetrics and Gynaecology.

This honour is even further considerable with the realization that I am fortunate to be stepping into the same Inaugural shoes of the current Vice Chancellor, Prof Benjamin Ozumba, who happens to be the first in the Department of Obstetrics and Gynaecology to deliver an inaugural. I am of the conviction that much more will come from the Department immediately after that.

This maiden lecture is an event of importance in the life and career of any academic staff member. The lecture offers the newly appointed Professor the opportunity to enlighten his colleagues, the University community and the general public of his work to date, including teaching, current research, and plans for the future.

Indeed, the occasion of the inaugural ought to be likened to an academic *coronation*, an academic *Chinyelugo* or indeed an academic *Nzena Ozo* title, whichever you choose.

Professors are usually required to give their inaugural lecture within 12 months of their appointment, but I am presenting mine after six years partly due to the delay in the announcement (3 years) and availability of slots in the University calendar.

The topic of today's lecture *MOTHERHOOD: A NATURAL BUT PERILOUS AND ADVENTUROUS EXPEDITION* (From Conception to Reproductive Annihilation) was not easy to select. I wanted to showcase the mother from a different perspective. In the past, a lot of emphasis has been on dangers of childbirth, but it appeared to me that the woman we are talking about came from the oblivion. Therefore, I decided to look at circumstances of the beginning of her existence from the time she was conceived in the womb to the time she is no longer able to reproduce; from the perspective of functioning from bench to bedside.

My Humble Beginning

I was the third in a family of six children born to Mr. Cyril Anaele Nwagha and late Mrs. Dorothy Ejiuwa Nwagha of Umuezealagwu, Okwuama, Umuokwara, Amucha -Ebeise, Njaba Local Government Area of Imo State. My educational career is incomplete without first of all summarizing the educational history of my Rock and Role model, Mr. Cyril Nwagha.

Mr. Cyril Nwagha passed through five different primary schools in Oguta between 1946 and 1953, and immediately started a teaching career because his mother who was a widow could not afford the fees for further education. Due to his humility and impeccable sense of responsibility, he was sponsored by the mission to Fatima Teacher Training College, Nsu, where he obtained the Teachers Grade III Certificate in 1958. In 1959, he came back to teaching and enrolled with RRC London G.C. E (O Level), which he passed in 1962. In 1964, he obtained the Teacher's Grade II certificate and in 1967, GCE A Level in History, Geography, Economics and Religion, all as an external candidate. He obtained the Teachers Grade I Certificate in 1972; and in 1973, got admission to read History in UNN but did not accept the offer due to domestic reasons. However, in 1974, he enrolled at the University of London to read Law as an external candidate, but could not continue after part one.

In order to fulfill his dream of at least getting a paper no matter how small from any University, he enrolled with the University of Nigeria Nsukka for an associateship programme in Education and majored in social studies at the end of 1989, the year he retired from service and the year I graduated from the Medical School.

You can see the doggedness and the determination and the passion for succeeding in his set goals despite adverse and extreme economic realities. This is the attribute of the man who brought me to the mother earth.

Looking at the above, the passion for teaching developed quite early when we used to watch my dad grade and record marks of students. This was the foundation that got me to where I am today.

My primary education was between 1971 and 1977 in three schools in my Local Government Area namely: Central School, Amucha (1971/72); Central School, Amandugba for primary two;

back to Central School, Amucha between 1973/74; and finally Central School, Nkwerre from 1974 to 1977.

I started my secondary school at Saint Augustine Grammar School, Nkwerre but left in 1982 when my father was transferred to Secondary Technical School Okwudor. This school was where I sat and passed the West African School Certificate (WASC) examination.

Initially, I never wanted to study Medicine. My best subject in school was Geography while History was my worst (the two subjects my father taught at senior secondary level). I wanted to study Geology, but my father's body language was tilting to anything Medical. This was understandable because his grand and great grandparents were famous native doctors. Again my father was our family doctor, who successfully treated 95 percent of all our ailments. How and where he mastered the art of giving injection still remain a mystery to me.

Thus, in my first JAMB in 1982, I opted for Pharmacy and chose the University of Ife (still trying to avoid Medicine, but in tandem with my father's body language). I was not successful, as I could not make the merit list and my state was not in the catchment areas of the University of Ife.

After the disappointment, I had no other choice but to proceed to Federal School of Arts and Science, Aba for higher school. During the one-year sojourn, I changed my mind (peer group influence); studied extra hard; and in the next JAMB, got admission to study Medicine at the University of Nigeria, Nsukka.

All through those years, I always looked forward to my father as my mentor and role model. My first encounter with external mentorship was during my second year in Medicine. Dr. Mrs. Ukabam, our lecturer in Renal physiology, invited me to her office

after the first continuous assessment. She informed me I did very well and encouraged me to continue, and that the sky was my limit. The encounter was the turning point for me as I now have somebody to look forward to; a second person I do not have to disappoint. My second MBBS was the first test of the value of mentorship and academic advising. I did not disappoint as I passed with a distinction in Medical Physiology.

As an extrovert, I was determined not to allow my activities affect my sense of reasoning and my focus. Consequently, playing in the first eleven of the UNN football team, undergraduate politicking, and membership of three theatre troops did not prevent me from graduating among the top ten in my class. We were in the Dean's list.

During my internship at the University of Nigeria Teaching Hospital, Enugu, my interest was to specialize in Orthopaedic Surgery and Trauma while subspecializing in Sports Medicine.

All that is now history as I was posted to a 'baby factory', the Oluyoro Catholic Hospital for my National Youth Service. From then on the passion for caring for women germinated.

After my NYSC in 1992, I worked as a medical officer at St Kevin's Hospital in Amannachi, Orsu LGA in Imo state. During the period, I passed the primary fellowship examination in Obstetrics and Gynaecology at the first sitting.

When I came for the residency interview in 1995, I knew nobody, but under the wisdom of Dr. John Okaro, the then head of department, fourteen of us were taken on merit. I went on to become the departmental academic coordinator and the chief resident, and passed all my examination at one sitting and in record time.

My passion about not allowing women to suffer continued to manifest phenotypically as I slept in the labour ward for most of

the time as the chief resident. During that period the residency programme in the department was one of the best with regard to organization and pass rate. For the first time, I introduced the morbidity meetings where women who did not die, but had significant morbidity were presented for internal audit, not for punitive measures. Today, the World Health Organization has recognized that concept and investing millions of dollars worldwide to prevent the occurrence of these 'near misses'.

When I passed my final fellowship examination, there was no active recruitment going on despite the existence of vacancies. The then Provost of the College of Medicine, Prof Martin Aghaji, encouraged me to take up an appointment in Medical Physiology which was later dualised with Obstetrics and Gynaecology. In effect, I have been teaching in the two departments since 2002 till date and participating in all the professional examinations till date while receiving no extra pay.

Therefore, I am determined to get to the zenith also in my second area of teaching (Medical Physiology) as I have already obtained a Masters degrees and currently pursuing a Ph. D in that area.

My Teaching and Research

As I was very busy with the organization of clinical work in the department, I never really thought I should commence research activities. The irony of it all was nobody brought that to my attention. It seemed a lot of people saw me as a workaholic and problem solver, without really noticing or helping me to focus on the academic component. I was just fixing things for the department without giving much attention to this aspect of my vocation.

The entire thing dawned on me when during my regularization as Lecturer 1, I had not much to show in publication. I was however

not discouraged because I was confident about my inert ability to pursue any aspiration with passion.

My first attempt to publish was a letter to the editor submitted to a regional journal but was frustrated because nobody, not even the editor, was able to help me to determine what the running title should be. Also, I wanted to report a case of heterotopic pregnancy but was also discouraged. When similar report was published in an excellent journal some months later, I became disillusioned.

When I eventually woke up from my slumber, another challenge was the direction to follow as I started firing on all cylinders. Fortunately, with time, I was able to focus mainly on Obstetric Biology, Obstetric Pathophysiology and Reproductive Medicine, while still dancing around general Obstetrics and Gynaecology. I have always advocated the need to work from bench to bedside in issues regarding reproductive health.

After eight years of academic and research work, (2002- 2010), I submitted my papers for professorial assessment, and it took three years before the announcement was made, and that is one of the reasons I am addressing you today.

Is Professorship the End of Academia?

The question I asked myself was, where do you go from here? To most of my friends, I have reached the zenith of academia, but ironically for me, this was just the beginning.

I then asked myself, how do I make Professors? How will I contribute to making research and publication less cumbersome for my colleagues? How do I provide mentorship in Research and publications? How do I ensure that my colleagues do not have to learn by making mistakes?

I came to the conclusion that the best way is to assist my colleagues in the rudiments of writing and publishing is to manage a scientific journal. Coincidentally, this was the period UNN decided that for promotion, academic staff must publish a certain number of papers in journals with Thomson Reuters (TR) Impact Factor. This scenario became a huge challenge to some people, but the tonic that spurred others. At that time there was only one Nigerian and less than five African journals with TR impact factors.

Which journal should I manage and how do I start.

There were some existing journals then which I indicated interest to manage, but unfortunately, I was rebuffed. I did not relent as the then Chairman of Nigerian Medical association (NMA), Enugu State, Dr. Emmanuel Ejim, became convinced on the need for the state NMA to float a journal.

This situation marked the beginning of the conception and birth of the fastest growing journal in Africa: Annals of Medical and Health Sciences Research (AMHSR).

I proceeded on self-sponsored training; attending several national and international editorial workshops, conferences; became members of the highest collection of science and medical editors in the world like World Association of Medical Editors (WAME) and the Council of Science Editors (CSE). I have networked and collaborated with editors of the best scientific journals in the world and eventually acquired editorial competence.

We published our first issue of the AMHSR in 2011 and by 2013 we were accepted and indexed in PubMed, a time frame no other African journal but one has been able to achieve. By last year, we were listed in the Emerging Sources Citation Index (ESCI) of Thomson Reuters.

Journals in ESCI have passed an initial editorial evaluation and can continue to be considered for inclusion in products such as SCIE, SSCI, and AHCI, which have rigorous evaluation processes and selection criteria. All ESCI journals will be indexed according to the same data standards, including cover-to-cover indexing, cited reference indexing, subject category assignment, and indexing all authors and addresses.

Rapidly changing research fields and the rise of interdisciplinary scholarship calls for libraries to provide coverage of relevant titles in evolving disciplines. Thus, ESCI provides Web of Science Core Collection users with expanded options to discover relevant scholarly content. Get real-time insight into a journal's citation performance while the content is considered for inclusion in other Web of Science collections. Items in ESCI are searchable, discoverable, and citable so you can measure the contribution of an article in particular disciplines and identify potential collaborators for expanded research.

The AMHSR was among the few African journals that made this list. Indeed, it is the only journal from West Africa that was included.

After AMHSR came many other journals where I serve in a different capacity. Editor-in-Chief, Annals of Medical and Health Sciences Research (AMHSR). Editor-in-Chief, Journal of Basic and Clinical Reproductive Sciences (JBCRS). Editor-in-Chief, Archives of International Obstetrics and Gynaecology (IAOG) Section Editor, Obstetrics and Gynaecology, Nigerian Journal of Clinical Practice (NJCP) Member, Editorial Board, Asian Pacific Journal of Tropical Medicine (APJTM) Member, Editorial Board, Journal of HIV and Human Reproduction (JHHR) etc.

With these instruments, I have been assisting in making several Professors worldwide, and mentoring several people on the rudiments of responsible scientific research and publication, and will continue until I undergo intellectual and cerebral extinction.

My Plans for the Future

After today I will continue my work in Obstetric Biology, Reproductive Medicine/Infertility and scholarly publication of scientific journals. Specifically, I intend to look at why some couples who are apparently normal have difficulties in conception, while those with obvious gynaecological problems spontaneously conceive. Is it genetic, familial, environmental, OR, Is *there divinity in Conception?* I addition watch out for my exploits in Gynecological Cosmetology.

Introduction

In the beginning, the woman developed from the rib of a divinely anesthetized man called Adam. It was generally understood that to become a man, there must be the presence of the XY chromosomes and a woman, the presence of double X chromosomes. Before the seventh week of intrauterine life, the sex organs (gonads) are undifferentiated. Subsequently, determination of sex depends on the existence or nonexistence of the male chromosome. Undeniably, the presence of the male chromosome means the advancement of male reproductive appearances while absence leads to the development of female sexual features. In other words, the female sexual circumstances is a “neutral” state. Recently, a controversy has trailed this assumption.^[1] However, until evidence-based counter phenomenon emerges, one is constrained to continue in this belief.

The journey to motherhood commences from conception in utero (*before the woman is born*) and probably ends at menopause. Ironically, the number of reproductive cells which reaches a maximum at about 20 weeks’ gestation (before birth) begins to demonstrate a downward trend. The sliding trend in ovarian follicular numerical strength continues until complete cessation, which leads to menopause. *Along this journey lie several land mines which may pose a grave danger and in extreme situations make it impossible for the woman to complete this trip.*

At birth, the genitals are grossly mutilated in the name of circumcision. Reproductive maturity which is the puberty may present with severe debilitating pain and bleeding. The adolescent period exposes her to abduction, sexual molestation, unwanted pregnancy, criminal abortion, and sexually transmitted diseases including HIV-AIDS. Then gender discrimination and inequity become the order of the day. When she is ready to divide and multiply, she is confronted by the most dangerous monster (maternal mortality). Even when children refuse to come, she is

Comment [H1]: Confirm that this was what you wanted to write.

subjected to acts aimed at absolute humiliation. When her spouse dies, she is again subjected to several injustices in the name of sociocultural practices. If she survives this, *Gulliver's travel*, and reaches the period when she is no longer able to reproduce (menopause), when nature has taken away most of the primary hormones that make her a woman, she is again exposed to another perilous situation. She continues to suffer from this situation until the end of time.

Mr. Vice Chancellor sir, in this inaugural lecture, I am going to tell my story of motherhood from day ZERO today ZERO; from the beginning to the start of the end; and from conception to reproductive extermination and beyond. I am going to make sojourns at some particular flash points in this journey, and highlight the work we have done in these areas to reduce the dangers as we navigate the woman through this natural, but tortuous and extremely dangerous journey.

Relax and listen as I attempt, in less than one hour, to share my expertise in teaching, research, publications and clinical work in our peculiar socioeconomic environment.

THE BIBLICAL BEGINING

"And God said, let us make man in our image, after our likeness: and let them have dominion over the fish of the sea, and over the fowl of the air, and over the cattle, and over all the earth, and over every creeping thing that creepeth upon the earth" (Genesis 1:26).

And the LORD God said, "It is not good that the man should be alone; I will make him an help mate for him".

"And the LORD God caused a deep sleep to fall upon Adam, and he slept: and he took one of his ribs, and closed up the flesh instead thereof:"

*"And the rib, which the LORD God had taken from man, made **he***

a woman and brought her unto the man”.

*And Adam said, this is now bone of my bones, and flesh of my flesh; she shall be called **WOMAN** because she was taken out of **Man**.* (Genesis 2:18-25).

And God blessed them, and God said unto them, be fruitful, and multiply, and replenish the earth,

Then Adam and Eve disobeyed GOD and prematurely ate the fruit at the Centre of the garden of Eden and God became infuriated and said to them ...

“Unto the woman he said, I will greatly multiply thy sorrow and thy conception; in sorrow thou shalt bring forth children; and thy desire shall be to thy husband, and he shall rule over thee (Genesis 3:16)

And unto Adam he said, Because thou hast hearkened unto the voice of thy wife, and hast eaten of the tree, of which I commanded thee, saying, Thou shalt not eat of it: cursed is the ground for thy sake; in sorrow shalt thou eat of it all the days of thy life; (Genesis 3:17)

Ladies and gentlemen, is this the origin of this perilous, tortuous and dangerous expedition?

We have to leave that for the copiously anointed to decipher

THE BIOLOGICAL BEGINING

The human body has two major types of cells, somatic (body cells) and highly specialized germ (reproductive) cells. The somatic cells contain two copies of each chromosome arranged in pairs; one from each parent (diploid number of a chromosome) and each includes a total of 46 chromosomes. Forty-four (44) chromosomes are called autosomes, and these are arranged in homologous pairs numbered (1-22). The remaining pair is the sex chromosome. In the female, it is called XX, while in the male, it is called XY.

After ovulation, the extruded ovum enters the fallopian tube through the fimbriae aided by the ciliated epithelium of the fimbriae. Simultaneous occurrence of intercourse ensures the deposition of billions of sperm in the vagina. However, only a few thousand succeed in reaching the tubes within 30 minutes. On entering the tubes, fertilization occurs precisely at the ampulla. The spermatozoa are chemoattracted to the ovum and penetrate the corona radiata (hyaluronidase) and adhere to the zona pellucida, and fertilization occurs. The zygote now starts to divide and re-divide within the fallopian tube, until it reaches 8 – 32 cell stage called morula. The process lasts for about 3-4 days. The morula then enters the endometrial cavity and stays another three days before implantation. Nutrition at this time is from secretions of the fallopian tube and endometrium (endometrial milk).

After implantation, the foetus begins to grow, but unfortunately, at that point one is unable to determine the actual sex of the potential baby as the gonads of both sexes are identical.

Also at the very early stages, a condensation of tissue develops on the posterior abdominal wall and is called genital ridge. Indeed, the trigger for gonadal development is initiated at about the third week of intrauterine existence, when primitive germ cells migrate from the yolk sac into the genital ridge (a particular point of the posterior abdominal wall) and develops a cortex and medulla. If the foetal chromosome after fertilization was 46 XX, the medulla regresses, and the cortex develops into ovaries. If, however, it was 46 XY, the cortex regresses, and the medulla evolves into the testes. This period is the beginning of the differentiation of the gonad into male or female, and at six weeks one can differentiate between the ovary and the testis.

It is important to note that at up to 6 weeks' intrauterine life, the genitalia (both external and internal) are still phenotypically identical. Their distinction begins from the 8th week and between

10-12 weeks one can confidently identify the separate genitalia. In the absence of functional testes, the Mullerian ducts (paramesonephric ducts) develop into the tubes, uterus and part of the vagina (female internal genitalia). If not, the Mullerian ducts degenerate, while the Wolffian ducts (mesonephric ducts) develop to internal male internal genitalia (seminiferous tubules, epididymis, vas, prostate etc).

In Utero Development of the Female Gonad

The migration of the XX primordial germ cells from the primitive yolk sac through the dorsal mesentery into the genital ridge triggers the events and is indeed the origin of the production of millions of eggs in preparation for this journey. This process commences from the third week of intrauterine life. As soon as the germ cells arrive, they quickly mature into Oogonia although some authorities believe that the Oogonia are the primitive germ cells. The Oogonia divide mitotically into primary oocytes. The primary oocytes then undergo the first meiotic division, but this step is arrested at early prophase (diplotene stage).

In the intrauterine life, the arrested primary oocytes are covered by a single layer of granulosa cells and are called primordial follicles. At about 20 weeks (5th month) of intrauterine life, the ovaries contain about seven million primordial follicles. However, most of the follicles become atretic such that at birth, the ovaries contain only about 1.5-2 million follicles.

Pre-Pubertal Development

Further maturation of the primary oocytes continues just before menarche and is completed just before ovulation to form the secondary oocyte and the first polar body. The secondary oocyte immediately begins to divide (2nd meiotic division) but is arrested at metaphase. As these go on, follicular atresia continues to the extent that at puberty, only 300,000-500,000 follicles remain. Further loss of follicular numerical strength occurs, as the monthly

ovarian recruitment in preparation for ovulation sacrifices about 30-50 follicles.

In the end, only about 500 eggs may reach full maturity throughout the woman's life span.

Thus, the Beginning of this hazardous voyage is biologically programmed for extinction even before the female child is born.

Is this scientific reality in isolation or is it divine and related to her biblical destiny? What is the relationship between Reproductive Science and Divinity?

WHAT DIFFENTIATES THE WOMAN FROM THE MAN?

Mr. Vice-Chancellor, ladies and gentlemen, you can see that the girl child is born with obvious disadvantage, thus in order to proceed, it is pertinent to look at some features that make her the woman as opposed to the man.

Sex precisely relates to the biological, physical characteristics which make a person male or female and can be classified according to seven categories.

Classification of Sex

Genetic sex: **In the male the SRY gene is active while it is inactive in the female.**

- (i) **Chromosomal sex:** The male contains the Y chromosome, while the female contains the X chromosome.
- (ii) **Gonadal sex:** In this situation the male has testes, while the female has ovaries.
- (iii) **Gametic sex:** Here spermatozoa are present in the male, while the ova are present in the female.
- (iv) **Hormonal Sex:** The predominant male hormone is testosterone androgens and Mullerian inhibiting substance, while the female predominantly elaborates oestrogen and progesterone.
- (v) **External phenotypic sex:** The male possesses penis and scrotum, while the female has clitoris and labia.

- (vi) **Internal phenotypic sex:** The male has vas, prostate, seminal vesicles, while female has oviduct, uterus, and vagina.
- (vii) **Sex of rearing:** Sex of rearing is determined by a combination of factors and depends mainly on the direction of the phenotypic sex irrespective of the other components. It can be identified early in childhood by parents who decide for the child and later by the subject who feels he or she was wrongly assigned...the so called transgender.

THE VOYAGE TO PUBERTY AND ADOLESCENCE AND THE DANGERS WITHIN (from the girl child to the woman)

Puberty: Puberty is a period when endocrine and gametogenesis functions of the gonads have developed to a point where reproduction is possible.

Endocrinology of Puberty

Pre-puberty in utero: By the fourth week of intrauterine life, the secretion of the gonadotropin-releasing hormone by the hypothalamus (GnRH) begins. By 10-12 weeks, this culminates in the production of Follicle Stimulating Hormone (FSH) and Luteinizing Hormone (LH) by the anterior pituitary gland, with the peak occurring in mid-pregnancy (20 weeks). However, as a result of high oestrogen environment in utero, foetal FSH level is suppressed, and thus insignificant.

Pre-puberty after birth: Immediately after birth, the removal of a foetus from the high oestrogen environment leads to the rise in FSH activity. This increase persists for 6-18 months after delivery and then remains quiescent.

Pre-puberty childhood: During childhood, FSH pulses are almost undetectable, but at 8-9 years, the pulses commence gradually and then rise in amplitude and duration. Furthermore, as pulse

frequency increases the ratio of plasma LH to FSH rises with characteristic nocturnal peaks of LH at early and mid-puberty. This hormonal interplay leads to the secretion of oestrogens in the females and testosterone in the males. Factors that initiate these hormonal changes at puberty are unclear but may be associated with an increase in fat and bone mass as evidenced by an increase in leptin levels. On the average puberty begins in girls at about 10-11 years and completes at 15-17 years, while boys start at 12-13 years and ends at 16-18 years. However, a slight delay may occur in adverse socio-economic and environmental conditions. Other situations that lead to a delay include race, climate, and familial disposition. Subjects with some genetic disorders (e.g. sickle cell disease) usually have delayed puberty. As our socioeconomic conditions begin to improve, it is expected that the age of puberty might approach that of Caucasians.

Pubertal Development in Girls

In girls, the first event of puberty is breast development (the thelarche) followed by the appearance of pubic hair (pubarche). Then, the axillary hair, growth spurt and finally menstruation (menarche). Average age at menarche in the developed world is 12.6 years and occurs two years later in our environment. In 2008, *Nwagha et al.* observed that the mean age at menarche in our environment was 12.9 ± 1.1 years.^[2] Also, they noted that a lot of females in this situation were psychologically ill-prepared for this all-important event, and this could constitute severe embarrassment and confusion especially when it starts outside the home.^[2]

In that study, we observed that in some, house-helpers were significant sources of information, while some others never had prior information, which may indict some parents who never had the time or are shy of discussing reproductive health matters with their wards. If our children get only insufficient information about menarche and menstruation, one wonders the quality of sex

education they will obtain and their preparedness to cope with some situations in the adolescent period.

The socio-cultural peculiarities of our environment still have a strong influence on our parents irrespective of educational attainment. Thus, making them reluctant to discuss reproductive health matters exhaustively with their wards. Earlier studies had warned about this apparent nonchalant attitude exhibited by parents.^[3,4]

During the pubertal period, there is the development of secondary sexual characteristics, which includes female type of hair distribution, smooth and soft skin, narrow shoulders, broad hips, convergent thighs and divergent arm (wide carrying angle) and high pitched voice.

There is also associated psychosocial development like shyness, heterosexual inclinations, craving for freedom and independence, and others. These transformational changes are under the influence of a wonderful *natural chemical artists* called oestrogens.

Unfortunately, this significant milestone in this voyage is commonly unsupervised, leaving millions of the girl children unarmed as they prepare to confront the tasks of this dangerous reproductive mission.

Adolescent Period (10-19years)

The adolescent period (10-19year) is a period of mental maturation and transition from childhood to adulthood. The time tends to overlap with the pubertal period and is a very vital period in the life of every woman. This period has perceived many fluctuations over the past century. These include the earlier onset of puberty, later age of marriage, urbanization, global communication, and changing sexual attitudes and behaviours.

Several social vices are highly prevalent. These include drug abuse, cultism, armed robbery, rape and perversion, unwanted pregnancy, sexually transmitted disease, including HIV and AIDS. This situation underscores the need to manage this period with utmost care in order to prevent the escalation of these vices.

Apart from physical damage, sexual abuse at this time is capable of degrading the ego and destroying the tenets of womanhood, which can indeed truncate this journey at this stage. Survivors of sexual assault are frequently exposed to bleeding from the vagina or anus, diminished sexual desire, painful sexual intercourse, vaginismus, unwanted pregnancy, genitourinary tract infections including HIV and AIDS. Indeed, severe physical disability can occur as elucidated in the case below which we managed and published with the paediatric surgeons. The management of these cases could be daunting with possibilities of significant psychological and physical morbidity.

An eight-year-old girl with leakage of faecal material from the vagina two weeks after a sexual assault presented to us. We managed her in conjunction with the paediatric surgeons and closed the abnormal communication between the rectum and the vagina after initially diverting faeces via a colostomy. This report highlights the importance of thorough initial assessment in cases with suspected traumatic rectovaginal fistula and shows the benefits of posterior sagittal approach in the definitive treatment of large-sized fistula.^[5]

Preventing unwanted pregnancy and STDS is also huge a task in this group. It has been shown that, in Sub-Saharan Africa, up to 25% of adolescents reported sex before age 15.^[6] I do not want to believe that this was driven by sexual pleasure, as several studies have reported a high incidence of hypoactive sexual disorders.

The prevalence of hypoactive sexual dysfunction differs among populations. A vivid study on the occurrence of sexual dysfunction amid female students of Mazandara Medical University, Iran using the Female Sexual Function Index (FSFI) stated that 91% had one form of the disorder.^[7] The high prevalence noted in that study may be associated with the religious and sociocultural environment of the survey populace. A mostly Muslim community, where four wives are acceptable per man, may not be ultimate to determine the actual occurrence of sexual dysfunction. Additional descriptive studies in liberal universities in the Mid-West and Argentina and Nigeria presented diverse prevalence ranging between 25 percent and 47percent.^[8,9,10]

In the study we carried out in an academic community, we established that 53.5% of the females had total Female Sexual Function Index (FSFI) scores lower than 26.55,^[11] the cut-off value proposed by Weigel *et al.*,^[12] hence suggesting a high prevalence of hypoactive sexual dysfunction in the study population.

In that study, we examined six different domain factors of the female sexual function index including desire, arousal, lubrication, orgasm, satisfaction and pain.^[11]

Thus, it can be clearly ascertained that the great sexual escapade of adolescents in our environment may not be due to increase in sexual pleasure alone. Rather the contribution of the adverse socioeconomic situation cannot be ignored.

It is, however, disappointing to note that despite increased sexual activities observed among this group, measures to prevent unwanted pregnancies are under-utilized as contraceptive usage is not optimal. Although we found that the awareness of emergency contraception is very high among female undergraduates in a university community, the attitude and practice were low due to certain misconceptions.^[13] Of the 346 students that approved of its use, only 138(39.9%) of sexually active undergraduates had used

emergency contraception, while the remaining 206 (60.1%) had never used it.^[13] With this finding among undergraduates, one wonders what the prevalence of contraceptive usage among the rest of the community will be. The situation portends grave danger as it exposes the adolescent to unwanted pregnancies, illegal and criminal abortions, with its dire consequences, and further jeopardizes this mission to motherhood.

Apart from the above, other notable areas of concern for the adolescent include; primary dysmenorrhea and severe menorrhagia. The cumbersome and painful menstrual bleeding is capable of disturbing day to day activities. Unfortunately, the teenager is left in the oblivion, only to learn from unpleasant experience from those that may take advantage of them.

GENDER, SEX, AND REPRODUCTIVE HEALTH MATTERS

Gender is the system of classification based on sex. In the wider society, individuals have usually formed the habit of interchanging gender with the word sex. Because of this apparent overlap in word usage, it is important to use the term male and female while talking about sex and masculine and feminine while describing gender. Sex is a physical attributes that differentiate a man from a woman, while gender denotes the conducts associated with members of that sex. Sex is more constant, but gender roles differ from culture to culture, and are more complex, contentious and less absolute. Some gender attributes include social functions, appearance, temperament, and emotions, intellects and skills, work role, reproductive/sexual role; inter/intra-gender interaction etc.

Gender Stereotype and Gender Identity

It is hard to define and separate the above terms; however gender stereotype can be defined as a shared cultural belief of what men and women should resemble. It is a social consensus that enables individuals to perceive themselves and those around them as

masculine or feminine. Gender stereotype varies from culture to culture. In strict Islamic or traditional Judeo-Christian societies, exclusion of women from public life is more evident than in modern secular societies. Even in the so-called modern societies, stereotyping persists as certain roles like consultantsurgeons associate strongly with men, while nursing and midwifery associate strongly with women.

Gender identity is the ability of the individual to believe confidently in his gender stereotype. Most people have strong gender identity; some feel less sure (weak gender identity) while some are trans-sexual or trans-gender, who feel that their gender identities are at variance with their physical sex. These often lead to conflict with the adoption of a gender role different from the physical sex. In extreme cases, physical or hormonal alteration of the body to conform to his or her gender identity may be advocated.

The Origin of Gender

It was believed that the exposure of guinea-pig or sheep to sex hormones during a critical period of early life is associated with sexually dimorphic behaviour displayed in adulthood (e.g. courtship behaviour and sexual interaction with each other). Specifically, the anterior hypothalamus and the adjacent medial preoptic area are known to be affected by sex hormones. In non-human primates like the rhesus monkey, these changes are apparent, but there is the incomplete or persistent effect of androgens on the development of sexually dimorphic behaviours. In humans, there are both sex and gender differences in brain structure. Early exposure to sex hormones will naturally lead to structural changes in the sexual development, but it is hard to be sure whether there is any direct effect on the expression of gender attributes. We thus need to study more brains from a larger range of individuals to be able to reach a reasonable conclusion.

Gender Development

When babies are born, they are assigned to either male or female depending on the presence or absence of a penis. Individuals or societies begin to treat them differently based on above assignment, and this is the beginning of the development of the gender role of that person. In this regard, parental gender stereotype influences the degree or level of social interaction parents have with their children, e.g., the type of toys they offer, clothes and the activities encouraged or discouraged. These activities are particularly marked for the first 2-3 years within which the child develops its gender identity and begins to associate certain behaviours and events with males or females. At about five years they develop a sense of gender constancy (fixed gender that cannot be changed with time). It is thus important to note that children are cognitive beings and quickly absorb subconscious impression of the world around them. These tend to show that gender stereotype is applied to children very early in life by their parents with modification by the world around them.

The society has a clear and polarized concept of what it means to be a man and a woman. Individuals also have a brightidea of themselves. In precise terms, it is not possible to strongly polarize these gender attributes. There is a high degree of overlap with attitudes, patterns of behaviour, skills etc. The extent of overlap of these attributes also varies among cultures and individuals within the same cultural setting.

Gender/Sexual Equality and Equity

UNICEF defines equality between the sexes as "leveling the playing field for girls and women by guaranteeing that all teenagers have an equal opportunity to develop their talents".^[14]

In lay terms, **gender equality** means equal treatment of women and men in laws and policies, equal access to resources and services with families, communities and society as a whole. **Gender equity** (often used synonymously with equality) can

precisely be described as fairness and impartiality in the distribution of welfares and responsibilities between men and women.

The term sexual equality is a biophysical entity that describes same size, quality, quantity, extent, level or even status as regards the sexual attributes between a male and a female.

Gender Discrimination: The Myths, and The Truth

Having survived the adolescent onslaught and firmly determined to move on, she encounters another land mine; gender discrimination. Gender discrimination is any distinction, exclusion or restriction made by socially constructed gender roles and norms which deter a person from enjoying full human rights. Many men have capitalized the perceived sexual inequality that exists between men and women to advance gender bias. The proponents argued that sexual difference originated from chapter 26 of the book of Genesis in the Holy Bible when God created Adam and gave him Eve from one of his ribs.

From then, gender role and stereotype were defined and stratified with little or no overlap. But recently civilization has changed many things. However, if we must discuss this objectively, it will become apparent that the biological entity 'sex' which affects gender is not equal. Hence, most physiological values in pulmonary and cardiovascular systems are higher in males than females. Even in some individuals of the same biological entity, paired organs are hardly ever the same sizes. Both sexes should, therefore, be treated equally and equitably (*equity*) without discrimination and intimidation irrespective of the obvious biological differences. There should be right to choice of marriage, land and property inheritance, reproductive rights and freedom from violence.

Gender Issues in Reproductive Health

The peculiar biological nature of women makes them vulnerable with a high burden of disease in matters relating to the reproductive system. The close anatomical proximity between the anus and vagina further exposes the female genital system to unprovoked assault. Fortunately, nature has provided the vagina with a stratified nonkeratinized epithelium which in addition to physical resistance produces lactic acid that attacks rampaging scavengers. In addition to these natural protections, there is a fundamental and urgent need to protect the reproductive rights of the woman.

We had earlier stated that the presence of the XY chromosomes leads to maleness, while the presence of double X chromosomes (absence of a Y) leads to femaleness. Undeniably, the existence of the male chromosome leads to the development of male sexual appearances, while non-existence leads to the development of female sexual features. In other words, the female reproductive situation is a “neutral” state. Lately, a disagreement has trailed this assumption;^[1] however until evidence-based counter phenomenon emerges, one is constrained to continue in this belief. Also, it is widely understood that the journey to female reproductive annihilation begins *in utero*, with the greatest number of eggs cells present at about 20 weeks of gestation. From then on, the downward trend in ovarian follicular numerical strength continues till puberty. After that, the monthly follicular recruitment warrants an annual loss of eggs, which continues until complete cessation leading to menopause. In contrast, it was previously known that in male, there is a gradual deterioration in sexual function but the capacity to produce spermatozoa persists and may never stop completely. The implication, for this reason, is that the reproductive life of the male is longer than that of the female.

As mentioned earlier, physiologically significant differences exist between both sexes with the men exhibiting greater cardiorespiratory measurements, including, heart size, blood

volume, blood pressure, and vital capacity among others, than their female counterparts.^[15]

Various societies, in the endeavor to establish male dominance in everyday life and also infertility management, have copiously exploited these perceived biological inequalities to advance gender discrimination. This supremacy is also ostensibly noticed in some aspects of reproductive health. There is no doubt that the sheer absence of disease and affliction is not enough to declare an optimal sexual health status. Rather, there must be an impeccable feeling of physical, social, and mental well-being in matters regarding the reproductive systems, its structures, and processes. To be able to accomplish this, a woman should, among other things, have the right to take a decision on marital issues. She should be eligible to a responsible, healthy, and satisfying sex life, with the availability of inexpensive, innocuous, and effective methods of fertility regulation.

In Nigeria, and indeed other developing countries, parental and family influences significantly affect marital relationships, with the woman usually playing the second fiddle. Also, despite the clamor for partner involvement, husbands hardly ever accompany their wives to the antenatal clinic (ANC).^[16] Even though recent studies in Nigeria documented improved male partner attendance to ANC and delivery, several women do not believe that their husbands should be present.^[17] This same behaviour is analogous to what is found in the other facets of reproductive health, including infertility management. In a study piloted in Mid-Western Nigeria, a whopping 89.5% of the respondents favoured male to female children, and this was ascribed to sociocultural peculiarities.^[18] Indeed in the exact words of the authors, “most disturbing is that women don’t seem to see anything wrong with the situation”.^[18] The preference for male children in Igbo land is so glaring to make me agree with Emeritus Prof. Uchenna Megafu on the concept of “Male sex Infertility”. The similarity between the

Jews and the Ibos has always been a controversial discourse. However, the exclamation of Sarah after giving birth to Isaac lays credence that the concept of male preference may have the biblical injunction. *God hath made laughter for me and him who hears will laugh over with me, who would have told Abraham that Sarah will bear children yet, I have born him a son in his old age* (Genesis 21:6-7).

The Male Sex Infertility Syndrome (MSIS)

The idea of "Male Sex Infertility" may represent a misnomer, but it is a real threat, especially in the Igbo-speaking area of Southeastern Nigeria. I have attempted to define Male Sex Infertility as the inability to have a male child, after one year of regular, unprotected normal sexual intercourse.^[21] I described it as a syndrome because I believe there are missing components yet to be discovered. The cultural provision for inheritance, which exclusively gives the male children the absolute right to inherit their parents' property and the ego need of preventing the family name from migrating into extinction, has made this phenomenon a real issue in infertility management in developing countries.^[21] Day by day, many multiparous women attend infertility clinics, seeking assistance for the conception of male children. Efforts to convince them to reconsider their approach always led to the question "Doctor how many male children do you have"? If the answer is in the affirmative, then your guess is as good as mine. Numerous women are exposed to all sorts of humiliations, including ejection from the family home due to inability to produce a male child. Sometimes couples seek termination of pregnancy if they were not precisely sure of the sex of the foetus. An attempt to provide explanations, such as the woman lacks the capacity to provide the male chromosome, usually yields negative results. The fascinating aspect of this situation is that education and social status do not seem to affect this self-imposed "male sex infertility syndrome".

This inclination is alarming but has received little or no consideration. Accordingly, incomplete evidence on the prevalence, awareness and factors related to the process occurs. Efforts to initiate discussion frequently meet firm resistance from women rights activists, who liken it to the promotion of gender discrimination.

Infertility and Subfertility: Infertility and subfertility are a spectrum of disorders encountered globally. It has been estimated that up to 15% of couples experience difficulty in conceiving after 12 months of regular unprotected healthy sexual intercourse.^[19] Regular healthy sexual intercourse has no precise definition but is considered when sex takes place at least two to three times a week, accompanied by a normal erection, penetration, and ejaculation, and without pain or discomfort. It is of enormous concern that the scourge of infertility is ravaging individuals in resource-poor settings. Males and females can be said to share equal blame in this situation. For women, we discovered that apart from uterine and tubal factors: polycystic ovarian syndrome, hyperprolactinemia, anovulation and defective luteal function are common endocrine disorders.^[20]

Let us examine a case scenario to throw more light further on the domineering and discriminative tendencies against the females in resource-limited settings. Mrs. AO was a 45-year-old woman married to a 50-year-old business partner for 20 years with no living child. Several investigations and treatments were unsuccessful. She was sent to us by her pastor whose wife had achieved spontaneous pregnancy, after ten years of unsuccessful shots, including *in vitro* fertilization (IVF). After a detailed history, physical examination, and basic infertility evaluations we discovered that she had an enormous uterine fibroid, bilateral tubal disease, and low 21-day progesterone (absence of ovulation). The husband had concluded with his relatives to marry another wife since they believed she was responsible for the childlessness. For

the meantime, the man stubbornly refused to give consent for semen analysis, in spite of all appeals, insisting that he was normal. He even claimed he had impregnated his lover during his youth.

We became curious and decided to appraise earlier reports, and interestingly, we observed that Mrs. AO had her first sexual involvement at marriage. All her previous results were sound, admirable tubal patency, and unequivocal ovulation. The husband went ahead to marry another wife, who quickly became pregnant and registered for ANC. The circumstances concerning that pregnancy are still controversial as the gestational ages at various trimesters were at variance with the time of their first sexual encounter.

There are numerous females in a similar situation as Mrs. AO, who wedded when they were reproductively healthy but aged to infertility due to the spouse's blatant refusal to perform a simple semen analysis. Men typically spend so much money on investigation for their partner's infertility but find it hard spending a dime for their own laboratory test. Even when they do and identify that the problem is a male factor, they find it tough to admit until the woman capitulates to follicular atresia, grows fibroids, and endometriosis with associated tubal disease and oligo/anovulation.^[21]

The table then turns, and the woman starts to accept the burden and anger of her husband and families. Occasionally, the physician is not secure. He turns into the target of these egoistic male companions, and may even be accused of ineffectiveness in an attempt to persuade the man to understand the consequences of nondisclosure of his male factor inadequacies.

In an opinion paper titled, "Gender Issues in the Management of Infertility in Developing Countries" we highlighted the apparent

nature role of the male ego in infertility matters that most men with azoospermia or severe oligospermia will somewhat desire an adoption than allow artificial insemination with donor semen.^[21] Indeed, men scarcely ever discuss their fertility problems, rather, they prefer to keep it to themselves or discuss it with few friends despite the fact that we have discovered the possibility of male reproductive capacity ticking to biological extinction as a result of the aging spermatozoa.^[22]

Apparently, religious/natural inequality exists. However, equity should be applied in the distribution of resources. Most women are at home with gender equality and equity but become evasive when equality is extended to economic matters. Thus, it is important to be very objective in determining gender issues. In most societies, only very few women go to war, they are left to tell the stories. Irrespective of these, however, it is pertinent that all genders receive equal treatment. Structured public enlightenment should, therefore, be carried out by individuals, communities, non-governmental organizations and the government at all levels to eradicate gender discrimination and protect the reproductive rights of women and enhance the achievement of Millennium Developmental Goals (MDG).

IS THIS NOT ANOTHER PERILOUS MILESTONE TO MOTHERHOOD?

PREGNANCY

Pregnancy involves a significant number of physiologic, biochemical and anatomical changes, affecting all the organs and systems in the body virtually.^[23,24] These alterations during pregnancy maintain a healthy environment for the foetus without compromising the mother.^[25] However, we have shown that there is increased generation of free radicals and reactive oxygen species in normal pregnancy.^[26] In a healthy pregnancy, free radicals are at biological levels, but when their production rates overwhelm the

synergistic actions of available antioxidants, several deleterious or harmful conditions may ensue, including adverse pregnancy outcomes. These free radicals are useful to the body and results in oxidative stress. Nature utilizes antioxidants as defence mechanisms, and their serum concentrations tend to fall when utilized as such.^[27,28,29,30]

Some of these antioxidants include vitamins and minerals. Antioxidant vitamins are crucial for the healthy growth and function of both humans and animals. They play critical roles in cellular metabolism, maintenance, and growth throughout life. They are also fundamental components of many enzymes and transcription factors and are micronutrients that prevent peroxidative damage. Indeed, they are essential for a well-functioning immune system.^[31,32]

The antioxidant vitamins A and E are of particular significance during pregnancy as both excesses and deficiencies can have intense and sometimes persistent effects on many foetal tissues and organs without clinical signs of deficiency in the mother.^[33] Unfortunately, we discovered that these micronutrients get depleted as pregnancy progresses and as parity (number of gestation) increases.^[34,35] We thus expect our pregnant women to book early to enable us to commence micronutrient replacement.

Unfortunately, we found out that even our experienced expectant mothers usually book late for ANC. As the number of pregnancies increase, we discovered that our women booked at a later gestational age.^[36] Thus, we concluded that the number of deliveries had a substantial impact on the gestational age at booking, and went further to encourage early booking irrespective of the number of previous pregnancies. No single pregnancy is the same as the other and unexpected adverse outcome may occur despite previous uncomplicated pregnancies. This situation underscores the need for more health education if we must achieve

and sustain the MDG.^[36] Since parity decrease micronutrient reserve,^[34,35] it is critical that this advice is heeded to avoid the consequences of micronutrient deficiency syndrome.

Apart from antioxidant micronutrient, other nutritional deficiencies are highly prevalent during pregnancy. Good nutritional standing during pregnancy is one of the paramount predictors of ideal pregnancy outcome. Nutritional status of pregnant women is determined by the nutrient intake and dietary planning during pregnancy, including the macro and micro nutrients. The period of conception and some weeks after are the days for the formation of most organs and systems of the foetus. The energy required to develop these systems is derived from the energy and nutrients in the mother's circulation and metabolism; therefore, adequate nutrient intake during pregnancy is particularly crucial.

Unquestionably, the foods a woman eat are the principal sources of nutrients for the body and as the baby grows the necessities for these nutrients increase.^[37] The increased nutrient intake will not only improve the growth and development of the child but will also help in adapting to changes that will support healthy childbirth. Hence, it has been well-known that women who eat well and circumvent known risks have a tendency to have fewer complications during pregnancy and delivery, and are more likely to make larger, healthier babies.^[38] Moreover, undernutrition or protein-energy malnutrition and the consequence of nutrient deficiencies have been associated with significant causes of various medical disorders in developing countries. Indeed, dietary immodesty has been documented as a critical feature in the pathogenesis of some chronic diseases like atherosclerosis, diabetes mellitus, cancers, and hypertension.^[39]

Furthermore, poor nutrition aggravates malaria and anaemia,^[40] ensuring that people from rural areas with heavy socio-economic burdens get persistently bombarded with malaria

parasitization and worm infestations. Pregnancy in such conditions worsens the situation and exposes the women and their unborn children to preventable morbidity and mortality. There is no uncertainty that the nutritional status of pregnant women is an essential determinant of foetal growth and survival.^[41] By the way, though this situation may be well known to numerous metropolitan women and their pregnancy caregivers, moderately little attention has been given to it in the rural areas.^[42] Moreover, in these rural areas, the concept of well-balanced nutrient intake for pregnant women is not given the proper consideration. As a result, the situation has deteriorated into complicated pregnancies such as spontaneous abortion, stillbirth, preterm birth, and low birth weight.^[43] Regrettably, we have not evaluated adequately the exact nutrient needs of our pregnant women. Thus, replacements have been arbitrarily assigned with various fortified foods and nutrients. This practice has not enhanced the maternal and perinatal mortality indices, as they remain embarrassingly high,^[44] and prejudice the achievement and sustainance of the MDGs. The situation calls for urgent evaluation and documentation of the nutritional status of pregnant women from rural areas so as to help Obstetricians and Midwives and indeed other traditional caregivers in educating such women for the best pregnancy outcome. Besides, it can be tremendously beneficial if policy makers formulate and articulate healthy nutritional policies that are optimal for foetal-maternal existence. Adverse socioeconomic environment threatens unindustrialized regions, and thus, pregnant women hardly enroll for antenatal care within their first trimester, except few primigravidae.^[36,45]

There is a definite requisite for initial evaluation of some nutritional parameters, principally serum iron as supplementation iron started after mid-pregnancy may not be able to prevent the consequences of iron-deficiency anaemia.^[46,47] Several studies by Nwagha and colleagues have continued to emphasize the low

levels of vitamins and mineral in women during pregnancy and lactation.⁴⁸⁻⁵³

In our environment, there is no doubt that nutritional deficiency is prevalent in pregnancy. It thus turned into a common practice to supplement iron and folic acid routinely with the aim of preventing anaemia in gestation. However, the contribution of other micronutrients in the prevention of anaemia and oxidative damage to red cell membrane has received slight attention. Subsequently, maternal and perinatal mortality and morbidity continued to be unacceptably high in spite of universal struggles to curb the trend. In an attempt to improve the condition, our practitioners resorted to the practice of administering all sorts of micronutrient replacements, without recourse to the peculiar micronutrient needs to be necessitated by our varied socioeconomic, cultural and geographic environment. The important outcome was the infiltration of the Nigerian market with several multivitamin and mineral combination with various and varying contents. It thus became pertinent that we should ascertain the serum level of some of the micronutrients (copper and selenium) in order to determine the optimal formulation of micronutrient needs suitable for our environment.

In the unindustrialized world, the majority of women who become pregnant are anaemic. Anaemia in these populations is exacerbated by a high prevalence of infections with intestinal parasites^{54,55,56}, malaria and HIV⁵⁷ and the occurrence of haemoglobinopathies^{58,59,60}.

Anaemia due to lack of iron is common in pregnancy, and may go together with other micronutrient insufficiencies since both can be caused by high rates of infection, diarrhoea, anorexia, poor dietary quality and nutrient bioavailability.⁶¹ The coexistence of these micronutrient deficiencies with iron deficiency may increase the risk of anaemia and limit the haematological response to iron supplementation.⁶²

The deleterious effects of anaemia in pregnancy on both mother and child will continue to constitute a burden in our contemporary obstetric practice.^{63,64} The incidence is still remarkably high, despite the lower level of standard we have adopted in our definition^{65,66}. There is no doubt that iron deficiency is the commonest cause of anaemia in pregnancy in our environment.⁶⁵ However, the enormous contribution of other micronutrients in erythropoiesis cannot be overlooked. Studies have shown that despite routine iron supplementation, high incidence of anaemia still exists.^{67,68}

This situation may be as a result of poor compliance, inadequate duration of supplementation of other micronutrients or inadequate treatment of other related factors, low intake of enhancers of iron absorption and high intake of inhibitors of iron absorption such as phytates and oxalates.⁶¹ Several studies have identified multiple micronutrient deficiencies (Vitamins, B12, B2, B6, folate, zinc, ascorbic acid, vitamin E) in association with iron deficiency.^{68,69,70,71} Contributing factors include physiological changes in pregnancy such as plasma volume expansion which alters blood chemistry and increases maternal to foetal transfer of nutrients. Also, there is increased utilization of some of these micronutrients as defence mechanisms against pregnancy-induced oxidative stress.^{72,73}

More recently, an analysis of multiple vitamin statuses of anaemic and non-anaemic pregnant women showed a positive correlation between abnormal haematological results and prevalence of vitamin deficiencies. The subjects with iron deficiency anaemia had much higher rates of vitamin C, folate, and vitamin B12 deficiencies than the anaemic subjects.⁷⁴

Consequently, when we added parenteral B₁₂ to iron in the management of iron deficiency anaemia, we noted the Packed Cell

Volume (PCV) and reticulocyte count increased significantly in both the test (iron plus B₁₂) and control subjects (iron minus B₁₂). In that study, we also noted that the mean values of PCV and reticulocytes after treatment were however significantly higher in the tests when compared with controls.⁷⁵ Thus, we concluded that iron deficiency does not occur in isolation. Thus, all efforts aimed at treatment should include the replacement of other micronutrients. Even if they do not directly stimulate erythropoiesis, they complement the action of iron, may act as antioxidants to prevent free radicals damage and may serve as coenzymes in different cellular metabolisms necessary for healthy mother and child.⁷⁵

In addition to the burden of these nutritional anaemias, malaria parasitaemia is particularly very common. Malaria in pregnancy is a critical public health issue in tropical and subtropical regions of the universe. In Africa, millions of women residing in malaria-endemic zones get pregnant each year, and most live in areas of relatively stable malaria transmission. Other susceptible groups include children below the age of 5 years, sickle cell anaemia patients, non-immune visitors to endemic areas and immunocompromised persons. Poverty, ignorance, and malnutrition similarly contribute to the enormous burden of malaria in pregnancy.

In neglected situations, maternal and perinatal morbidity and mortality are high.^{76,77} The main problem results from infection with *Plasmodium falciparum*. The influence of the other three human species (*P. vivax*, *P. malariae* and *P. ovale*) is less well understood. The susceptibility of pregnant women to malaria parasites is well established.^{78,79} It was previously thought that this is related to depression of the cell-mediated immune response to *P. falciparum* antigens.⁸⁰ Recently, susceptibility has been linked to the level of antibodies to placental sequestered parasites.⁸¹ The sequestration is more marked in the first 24 weeks than during the

third trimester.⁸² Some researchers have also suggested that the vascular nature of the placenta may be responsible for the sequestration of the parasite.⁸³ Primigravidae and women at their second pregnancy are more susceptible to this as anti-adhesion antibodies against CSA-binding parasites associated with protection only develop after successive pregnancies.⁸⁴ The existence of parasites in peripheral blood without symptoms is common in hyperendemic areas and is related to protracted anaemia and placental sequestration. Furthermore, the absence of parasites in peripheral blood does not exclude complications since up to 58.4% of women with placental parasitization do not have peripheral parasitaemia.⁸⁵

The mechanism of adverse outcome of asymptomatic malaria in pregnancy does not appear to be due to oxidative stress. We have already established that oxidative stress occurs in pregnancy as well as in symptomatic malaria.^{27,86} However, when we assessed the association between some antioxidant vitamin levels, Malondialdehyde (MDA), and asymptomatic malaria parasitemia; we concluded that additional oxidative stress did not occur, irrespective of the numerous foetomaternal complications associated with asymptomatic parasitemia.⁸⁷

This report was an interim finding, and since there is a dearth of published data for or against our conclusions, we advocate that pending when such will arise, asymptomatic malaria parasitemia may not stimulate additional oxidative stress in healthy pregnant Nigerian women.⁸⁷ Probably if we had characterized the magnitude of asymptomatic parasitemia as mild, moderate or severe, matched against some oxidative stress indicators; an interesting scenario might have arisen. Similarly, if we had analysed other oxidative stress indicators, the story may have been different.

The management of malaria in pregnancy can be very challenging. Intermittent Preventive Therapy (IPT) with Sulphadoxine and Pyrimethamine, use of Insecticide Treated Nets (ITN) and prompt

treatment of established cases with artemisinin-based combination therapy are the gold standards.

Though ITN and IPT coverage can easily be achieved if given serious attention, ITN has its pitfalls because pregnant women cannot remain under it for more than eight hours in a day,⁴⁵ and IPT need serious evaluation to meet the necessary combination therapy for improved results. On the other hand, integrated vector control will require enormous logistics that cannot be provided by an individual.

There is no doubt that ITN can reduce mosquito bites and malaria prevalence, but we discovered a non-significant increase in the prevalence of malaria after six months use in a rural Nigerian community. The reasons were most likely related to unrelenting exposure to mosquito bites somewhat due to occupation and other poverty/environmental-related factors. These factors included inadequate accommodation and overcrowding which made the use of nets very uncomfortable, leading to upsurges in the average night-time spent outside the ITNs, thus increasing contact to mosquito bites. Farmlands surrounded the majority of homes in the study community with thick bushes and poor waste management. These factors unintentionally contributed additional breeding sites for mosquitoes. Furthermore, it has been reported that environmental modification measures are difficult to implement in overcrowded periurban areas, and this would even be more difficult in a rural community. The control of mosquitoes in rural Nigerian community can thus be said to be poor despite the provision of ITNs, due to the lack of hygienic environments. Again, the inherent inability of poor inhabitants to match net intervention with insecticide spraying was another contributing factor. There was also no attempt to eliminate mosquito breeding sites due to poor awareness and literacy level of the residents. In that study, it was challenging to follow up the women to ascertain how they used the ITNs. Another issue that may have

influenced our results is the poor compliance of the subjects. The number of recruited subjects that reported for additional investigations decreased each month, and this constituted a major limitation for the study. Appraisal with matched control who did not benefit from the use of ITN would have been more suitable and will be taken care of in additional studies.

In another study we conducted on the use of ITN, we discovered that most pregnant women and mothers of under-five children in the rural study area belong to the poorest socio-economic group, and they spend a smaller amount of money on anti-malarial treatment. ITN was the most used method of malaria vector prevention in both urban and rural study areas, and most of the vulnerable target group benefitted from their use irrespective of their socio-economic status and area of domicile. However, ITNs were least accessible to the poorest in the rural area. Furthermore, the study showed that ITNs were used for malaria prevention better than other vector control methods in both urban and rural areas.⁸⁸

Looking at these challenges holistically, we proposed an all round advocacy that combines ITN, IPT, integrated vector control, and nutritional support, as well as health education, to be used concurrently in the prevention of the adversarial effects of malaria in pregnancy.^{45,89}

Additionally, in order to accomplish set targets, we should direct energy towards integrating other vector control measures. Rural areas will benefit from efforts at larval control and reduction of breeding sites like bushes near living homes. Any attempt to reduce poverty as well as improvement in housing and electricity in Nigeria will invariably reduce the malaria burden, and go a long way in reducing maternal and perinatal morbidity and mortality.⁹⁰

Apart from the above, other numerous landmines do exist as the woman seeks to fulfill her biblical, cultural and social role. These

include obesity in pregnancy,^{91,92} a very common, but less diagnosed time bomb called thromboembolism,⁹³ antepartum bleeding, hypertensive disorders, diabetes mellitus etc.

Sometimes, emergency surgical situations may arise which will necessitate surgical intervention and exploratory laparotomy during pregnancy (*e.g.* acute appendicitis, torsion of ovarian cyst etc). One of the most dangerous situations is the removal of uterine fibroid during pregnancy.⁹⁴ A 25-year-old primigravida at 17 weeks' gestation, whose pregnancy was complicated by uterine fibroid, was presented as an example. Initial evaluation, including ultrasonography, suggested ovarian malignancy complicating pregnancy. Exploratory laparotomy revealed a degenerated, ruptured, giant mass that weighed 11.6 kilograms (about three and half average size babies). The tumor was attached to the right lateral side of the uterine fundus, with a very thick pedicle; also, the tumor was adherent to the infracolic omentum, the pelvic and abdominal parietal peritoneum. She received eleven units of blood in the process. The histopathological diagnosis revealed a degenerated uterine fibroid. Pregnancy, labour, and puerperium were normal, with a spontaneous vertex delivery of a male life baby.⁹⁴

CHILDBIRTH

Childbirth is another significant landmark in this expedition to motherhood, but it is fraught with landmines that can explode at any time without notice.

Labour pain (intensities and complexities): A rather enigmatic aspect of childbirth is the association of this physiologic process with severe pain. The understanding of pain during labour is the result of sophisticated handling of multiple physiologic and psychosocial factors on a woman's particular interpretation of nociceptive labour stimuli. There is an anticipation among contemporary women that giving birth is the worst pain you could

ever feel. Because of this, women approach childbirth with a striking fear of the pain and endeavouring to remove it all in search of an upright birth capability. How aching is childbirth? Can you have a good delivery practice if you feel pain?

Ronald Melzack researched on experiences of pain in labour. He concluded from the study that most deliveries can be termed relentlessly painful, but the intensity of the pain is variable.⁹⁵ About 25% of first-time mothers and only 11% of experienced mothers rated labour as horrible or excruciating. In fact, 9% of first-time mothers and 24% of veteran mothers said they had low intensities of pain.⁹⁵ With only 17% of women having low degree of pain, the “natural” labor cannot possibly be as erratic as we think it is.⁹⁵

For several mothers, labour is the first involvement with any actual physical pain. Women who have had other physical illnesses tend to rate delivery lower on the balance than things like kidney or gall stones, chronic back difficulties, some shattered bones, double ear infections, toothaches in need of root canal treatment, and convalescing from Caesarean surgery. Ironically, some women even assert the pain of labour is easier to handle than the pain of a broken heart.

The point is, how painful childbirth feels is rather relative. Short of another pain to compare it to, calling delivery the most painful experience is mainly discriminatory. If only about 18% of women rate labour as agonizing, how likely are you to be encompassed in that set? Overall, it has been noted one is likely to experience more intense pain in the following situations:⁹⁶

- A mother for the first time
- Less educated
- Younger women
- Have menstrual difficulties

- Previous miscarriage
- Unplanned pregnancy
- Feel conflict about becoming a mother
- Anxiety about labour
- Previous psychological issues
- Unstable passionate feelings
- Impractical anticipations of the pain
- Married to a spouse who is negative or apathetic toward the pregnancy.⁹⁶

One of the most surprising realities about the pain of labour is its association to the mother's confidence in her ability to cope. Generally speaking, the more assertive the mother, the more ability to deal with, and, the less pain she will feel. Another key factor is the individuals physically present during labour because the capability to deal with the pain of labour will be influenced by the interfaces with others attending (midwife, doctor, nurse, and others). The above is the principle of labour support and a very critical component in alleviating sufferings at this stage of motherhood.

Labor support is a non-medical care which involves substantial bolstering such as touching, massaging, bathing, grooming, smearing warmth or cold; and emotional support such as constant companion, reassurance, encouragement, anticipatory guidance information provision and non-medical advice.^{97,98}

It is an affordable intervention that responds to the basic emotional and physical needs of a woman during painful and vulnerable moments of this expedition.

Unfortunately, irrespective of the apparent importance of this we found out that labour support by a non-medical employee of health

institutions has been overlooked in our environment.¹⁰⁰ In that study, none of the respondents' husband, relations or friends was permitted into the labour room. Ninety-five (24.1%) mothers did not wish to be supported in labour by their spouses. Sixty-five (68.4%) of this group preferred to be supported during labour by medical/midwifery staff only while the rest, 30 (31.6%), would have preferred a relation. Three hundred (75.9%) parturients, if permitted, would have preferred labour support by their husbands. However, most men shy away from the labour ward and even when they desire to be present, they are not usually allowed. This situation is unacceptable. Labour support should be encouraged and indeed incorporated as part of routine care if we must make efforts to ameliorate and make this journey less painful, less stressful and less dangerous.

After labour comes delivery where the most critical aspect of this trip is encountered. The third stage of labour is described as most dangerous because this is the point where most of the women lose their lives in the quest to pursue and fulfilling their biological and biblical injunction (divide and multiply).

The third stage of labour commences from the birth of the foetus or foetuses and ends with the complete removal of the placenta and membranes and may be some hours after that.

After the delivery of the baby, both the patient and the medical attendant may have a false sense of safety that all is well and safe. Unexpected and life-threatening complications may therefore occur. These include postpartum haemorrhage (PPH), acute uterine inversion, neurogenic shock, anaesthetic complications, drug reactions, intra-abdominal catastrophes like ruptured viscera or vessels, cardiovascular and respiratory complications. All these may proceed to post-partum collapse, and severe maternal morbidity or even mortality unless prompt action is taken.

Thus, we described the third stage of labour as a time bomb.⁹⁹ In that review, we dedicated a chapter to the management of this situation in some religious groups who do not accept transfusion or any form of medication. The adherents of the faith healers include members of the Faith Tabernacle, Church of Christ Scientists, Followers of Christ Church and the Church of First-born. Founders of these churches were at one time or the other cured of various ailments where medical treatment failed. Those Christian Scientists respect the work of medical profession but choose prayers as a treatment for themselves and their children rather than drugs because they have experienced the effectiveness of prayers many times in their lives. Most of these cases are rarely encountered by practitioners as they choose to deliver in churches and prayer houses and those with PPH suffer from severe morbidity and sometimes mortality. On very rare occasions, professionals may encounter these faith healers with severe haemorrhage. The consequences of refusing medical treatment should be adequately explained. The patient's confidence on the practitioner is imperative. If, however, the patient continues to refuse care, physical methods like rubbing up the uterus, aortic compression, bimanual uterine compression and uterine tamponade should be used after a proper explanation that these methods do not necessarily require administration of drugs. All discussions should be documented, and informed consent obtained. Having done these, within the prevailing circumstances, the practitioner should be satisfied that he has done his best. Although it is very distressing to watch a patient die while refusing medical treatment, the law does not permit treatment without consent.

It is undisputable that postpartum bleeding has remained an important cause of maternal deaths. In one of the most comprehensive studies we did in four major hospitals in Ebonyi State, we discovered that between 2003 and 2005,

thetotalnumberof women that died during pregnancy and childbirth was134 out of the totalnumberoflivebirths14,844, givinga Maternal Mortality Ratio (MMR) of902.7/100,000 live births. The MMR increased progressively from 756.8 in 2003 to 1052.2 in 2005.⁴⁴

Due to the devastating effect of PPH, and the paucity of information on what to do to prevent PPH during a Caesarean operation in our peculiar environment that is averse to the removal of the uterus, we specifically dedicated a paragraph in the review of the third stage of labour that borders on the management of PPH during Caesarean section.

Management of Postpartum Haemorrhage (PPH) at caesarean section is the same as in spontaneous vaginal delivery. Additional blood loss from the incision site may, however, worsen events. Conservative measures to preserve reproductive function before resorting to hysterectomy is easier to apply. Commonly encountered cause of PPH at Caesarean section is placenta praevia. Dangerous, life-threatening bleeding can occur when there is associated placenta accreta.¹⁰¹ Management of such cases should, therefore, be anticipatory. Previous endometrial damage has been identified as a risk factor in the development of abnormal placentation, which is an important cause of postpartum bleeding.¹⁰¹ There is no doubt that routine ultrasonography is a contemporary tool in modern-day obstetric practice; thus, antenatal placental localization, especially when there is the previous history of PPH, should be the gold standard.

Before resorting to hysterectomy, conservative measures to preserve menstrual and reproductive function should be attempted. It is important to control the haemorrhage completely before closing the abdomen. Massive blood loss leads to some degree of disseminated intravascular coagulopathy, thus leaving some oozings with the hope that they will stop, increases maternal morbidity, and may lead to mortality. Apart from the methods earlier described, practitioners have stopped

intraoperative bleeding by uterine tamponading techniques. These include putting interrupted haemostatic circular stitches on the lower segment, use of condom balloons and approximating anterior and posterior wall of the uterus at the site of placental bed. While this may lead to an increase in the incidence of uterine synechia, rapid return of menstrual and reproductive functions occur.

In our peculiar environment, we devised a method of packing the uterine using sterile mopstied end to end after conventional medical treatment failed to control bleeding. Packing was started from the placenta bed and then the entire uterus, side by side, top to bottom, front and back, all tightly done for powerful tamponade effect.

We determined those that will benefit from packing when the initial pressure pack on the placenta bed significantly reduced or stopped the bleeding completely. To enable easy removal, especially when the cervix was closed in cases of placenta praevia, we cut the mops longitudinally and tied them end to end. In such situations, we also did antegrade dilatation of the cervix with Hagar's dilators up to twelve millimeters to enable the introduction the distal end of the mops up to the upper vagina. The uterine incision was closed with comprehensive care taken not to include the mops within the suture line.

We monitored the blood pressure, pulse, temperature, respiration, urine output, serial fundal height measurement, and inspection of the vaginal pack. These parameters were checked every 15 minutes for the first 4 hours, every 30 minutes for another 4 hours, after that three hourly for 24 hours. Prophylactic broad spectrum antibiotics were also given. In all our cases, we removed the mops after 24 hours, but when this falls into the night, we delayed removal until the next morning.

In most of our centres, only 4x4 inch dressing gauze was made available during surgery and valuable time was lost waiting for sterile role gauze or attempting to tie the bandage gauze together. Mops are also heavier than gauze and usually provide better tamponade effect. However, the only problem was difficulty in removal especially when the cervix was closed. We overcame these challenges by careful | antegrade dilatation of the cervix and longitudinal division of the mops.¹⁰²

Comment [H3]: Reconcile with the ante grade dilatation earlier written above.

Applying this technique, we were able to control bleeding in the majority of the women, obviated the need for blood transfusion, preserved the ever-desired reproductive and menstrual function, and reduced maternal morbidity and mortality.

The Pelvic Floor Sequelae of Childbirth

It is not in doubt that vaginal delivery is associated with the risk of pelvic floor disorder. The pelvic floor sequelae of birth which everybody recognizes includes anal incontinence, urinary incontinence, and pelvic organ prolapse. However, the damage to the vaginal musculature leading to the loss of orgasmic grip during the plateau phase of the human sexual response has mostly been ignored.

Also, due to adaptation, there is associated downregulation of the receptors responsible for sexual excitement (visual, psychic, and tactile). The resultant effect of these is the development of situational impotence by most men, leading to the high prevalence of infidelity.

Unfortunately, most practitioners do not consider this a problem, as the sexual health of the woman is given little attention. All sorts of drugs are prescribed for erectile dysfunction, but I bet you that observational evidence indicates that situational impotence, which rarely requires drugs, may be the commonest cause of erectile dysfunction in our environment.

This scenario is simple to comprehend by an understanding of the physiology of human sexual response. The initiation and maintenance of sexual excitement is controlled by a spontaneous act comprising a complex interaction and integration of visual, auditory, olfactory, imagined (emotional, erotic), or tactile (mechanical) receptors. One of the major physiological principles of receptors is the ability to undergo adaptation resulting from downregulation. Downregulation is a natural phenomenon that takes place due to regular and persistent stimulation of receptors.

The entire processes of pregnancy and child births further aggravate the downregulation of all these receptors. Notably, the destruction of the lower vaginal sphincter muscle during childbirth leads to the loss of orgasmic grip, a critical component in the maintenance of erection. It is, therefore, a waste of scarce resources buying expensive drugs that will only work temporarily, for a physiological problem that requires a physiological solution. (Apply a supramaximal stimulus, introduce a new stimulus or upregulate the receptor).

I do hope that our practitioners should take the sexual health of our women very seriously especially after childbirth.

REPRODUCTIVE ANNIHILATION

Menopause characterizes the last menstrual period. It is a diagnosis in retrospect made after waiting for one year without a menstrual period. It is marked by the permanent cessation of menstruation in a woman with an intact uterus, who is not pregnant or lactating. It occurs between 45-55 years.

Endocrine Basis of Menopause

With advancing age, the ovarian follicles begin to atrophy. Ovarian hormones (oestradiol) also continue to decline to very low levels. The decline leads to the loss of feedback inhibition on the hypothalamus and pituitary, with an eventual gross elevation of gonadotropins. The predominant oestrogen is oestrone which is a

product of adrenal and stromal cells of the ovary via peripheral aromatization of androgens. The term climacteric is a period of the waning of ovarian function which includes the menopause. After menopause then comes the postmenopausal period.

Changes Associated with Menopause

Various changes occur as a result of hormonal alteration at menopause, and these are;

- Menstruation becomes irregular and heavy initially and then eventually stops
- Psychological changes e.g. depression, insomnia, irritability, nervousness and headaches occur.
- Vasomotor changes especially hot flushes.
- Physical changes due to losing of collagen; breast and genital atrophy (causing dyspareunia), osteoporosis (fracture)
- Metabolic changes, increased incidence of coronary artery disease.

The reversal of the symptoms can be affected by hormone replacement therapy with oestrogen and progestogens.

Before now, it was believed that most of these post-menopausal symptoms are more prevalent in the Caucasians. Fortunately, we have published many studies that contradict this belief.

There is no doubt from one of our studies that the alterations that exist in the lipid profile after menopause is not pleasant to the cardiovascular health of our women. It is believed that postmenopausal symptoms are less in our women than their Caucasian counterparts. This belief may not be true because numerous previous studies have demonstrated psychological, physical, biochemical, hormonal and vasomotor parameters that are not at obvious discrepancy with what is obtained elsewhere.

The problem is that the severe climatic and pitiable socioeconomic environment so overwhelms our women that they barely ever complain about menopausal symptoms unless it is severe.

The elevated low-density lipoproteins (LDL) and the reduction in the cardioprotective high-density lipoproteins (HDL) and very low-density lipoproteins (VLDL) is a hint that menopause is an independent threat for the development of cardiovascular disease in our environment.¹⁰³

With the number of sudden deaths increasing every day in our environment and with a few studies that have also shown cardio unfriendly lipid profile, it is likely that the risk of cardiovascular disease (CAD) is increasing and may approach that of the Caucasians.

Consequently, we explored this possibility by further assessing the atherogenic index profile. In that study, we recruited menopausal women with hypertension (another risk factor for CAD) and noted that there was no significant changes in total cholesterol, HDL-C, LDL-C, VLDL-C and HDL/LDL ratio. However, there was a substantial increase in triglyceride (TG).

It is important to highlight in that study, that two risk factors for dyslipidemia (hypertension and menopause) occurred simultaneously, and we expected greater differences in the parameters traditionally used to assess cardiovascular risk (total cholesterol, HDL-C, LDL-C, VLDL-C and HDL/LDL ratio). Surprisingly, the scenario was not what we expected, as these differences were abolished. Thus using the traditional indices to evaluate the risk of CAD in hypertensive menopausal women might be misleading. As the only single parameter that showed significant derangement was TG, the need to develop other lipid profile indices when determining CAD risk should not be overemphasised.¹⁰⁴

Thus when we applied another parameter and calculated the atherogenic index of plasma (AIP), $\log (TG/HDL-C)$, we observed a highly significant increase.

Although the independent inverse relationship between HDL-C and cardiovascular risk has been demonstrated beyond doubt, the contributions of triglycerides (TGS) to cardiovascular risk have been underestimated. TGS play a fundamental role in regulating lipoprotein interactions.

The above study has motivated a lot of the studies among healthy menopausal and non-hypertensive women with similar findings. Abundant data has accumulated linking the serum levels of lipids (total cholesterol and triglycerides) and their related blood transporting lipoproteins (HDL-C, LDL-C, VLDL-C) with the incidence of atherosclerosis in overall and coronary artery disease (CAD) in particular. The relationship between the risk of coronary artery diseases (CAD), high levels of LDL-C and low levels of HDL-C has been well established.¹⁰⁵ However, the enormous contributions of triglycerides (TG) to cardiovascular risk have been underestimated especially in our environment. Indeed high levels have been linked to an increased incidence of CAD¹⁰⁶ and an increased population of small dense LDL-C particles.¹⁰⁷

The relationship between TG and HDL-C has been studied, and it has been shown that the ratio of Triglyceride to HDL-C was a robust predictor of myocardial infarction.¹⁰⁸ Comprehensively, atherogenic index of plasma (AIP) calculated as $\log (TG/HDL-C)$ has been used by some experts as a significant predictor of atherosclerosis.^{109,110} Although this index has been used to predict the risk of atherosclerosis in hypertensive postmenopausal women in South-East Nigeria,¹⁰⁴ there is paucity

Comment [un4]:

of literature on its application to normotensive postmenopausal women.

Thus, we went along to conduct another study comparing normal postmenopausal Igbo women with their premenopausal counterparts. We discovered a statistically significant increase in total cholesterol (TC), TG, LDL, VLDL and AIP. There was also a statistically significant decrease in the HDL of postmenopausal women when compared to their premenopausal counterparts.¹¹¹

Comment [H5]: Not clear. You may need to rephrase.

In our setting, most studies done on lipid profile and menopause have largely been cross-sectional. As a result of logistic and peculiar socioeconomic difficulties, none has been able to follow up the patients with dyslipidaemia in order to establish the percentage that will advance to atherosclerosis. And until such is done, the necessity to develop other indexes for assessing the risk of atherosclerosis cannot be overemphasised.

The isolated rise of cardio unfriendliness or reduction in cardioprotective lipoproteins may not on its own be sufficient to evaluate cardiovascular risk. Eventually, there may be varieties in absolute values obtained as a result of some inadvertently unexcluded co-founding variables which will, as a matter of fact, not upset the ratios. Indeed, HDL-C/LDL-C ratio has been of immeasurable significance in the evaluation of cardiovascular risk, particularly when the entire values of the specific lipoproteins seem reasonable. Thus, the use of other indexes which has been minimally applied should be encouraged.

Comment [H6]: Not clear. Revise

In Nigeria, there is a common tendency that focuses more attention towards premenopausal health to the detriment of health issues in the postmenopausal period. This trend may not be unrelated to the great importance attached to pregnancy and child-bearing. The consequential effect is the paucity of literature in events associated with or directly related to menopause. These studies, therefore,

contribute significantly to the development and standardization of values of lipid profile that will enable the establishment of a working range of values and assist our women as they advance towards reproductive annihilation, and beyond.

CONCLUSION

The creation of a female was necessitated by God's desire to give the man a companion and also to ensure that humanity does not go into extinction. This phenomenon was anticipated to be an expected and customary progression devoid of any hitches. Rather, in accomplishing that which she was destined to achieve, she embarks on a protracted, torturous, dangerous and perilous journey.

At the time of conception, she was short-changed as her continued existence depended on the absence of the male factor. Her reproductive capacity began to decline even before birth. Early sexual development was faced with dangerous challenges. Her reproductive years were fraught with numerous explosives prepared to detonate and extinguish her existence or expose her to a permanent excruciating disability. After the breeding period, when she is about to rest from the assault of pregnancy and childbirth, menopause sets in, and she is once more imperiled to other life-threatening trials.

Apart from these, women worldwide undergo verbal, expressive, physical, and sexual abuse with associated dire consequences such as traumatic injuries, sexually transmitted diseases, chronic pain, eating and sleeping maladies, other psychiatric conditions, and alcohol and drug abuse.

Mr. Vice Chancellor Sir, ladies and gentlemen, we must, therefore, reexamine ourselves, task ourselves and convince ourselves to be totally committed to making this journey less traumatic, less

cumbersome, and more comfortable so that she may be born, develop, mature, reproduce and age without tears.

Thus, from conception to reproductive extinction we must not only ensure the absence of disease and affliction, but must also make sure of an impeccable feeling of physical, social, and psychological well-being of the woman in all matters involving the reproductive systems, its structures, its functions and its processes.

ACKNOWLEDGEMENTS

My gratitude primarily goes to the Almighty God, the Most Compassionate and the Most Charitable; the Master of all origins, for His kindness and direction to me to accomplish the status of Professor of Obstetrics Biology and Reproductive Medicine in the Department of Obstetrics and Gynaecology/Physiology within the shortest possible time. He engineered my sojourn in life to come across many people who had contributed and still continue to make positive contributions to my life. Please, I require your absolution to acknowledge them publicly.

My beloved father Mr. Cyril Anaele Nwagha, and My mother, Late Mrs. Dorothy Ejiuwa Nwagha. Standing there is my role model and my Rock of Gibraltar. Standing there is the man that gave me the strength and the wisdom to persevere. He could not pursue his aspirations because his parents were indigent. When he started working, he could not also fulfill his dreams because of us. He denied himself so much to enable us to go to school and achieve what he could not do due to circumstances. He sacrificed his aspiration so we may attain academic blossom. Standing there is the best professor of law, best professor of history and the best professor of social studies and indeed best leader we never had.

Thank you Papa for all you have done for me. You thought me not to hunger for what I cannot afford. You thought me to be contented with only what I can afford and derive equal joy with

those who can afford much. You thought me to derive the same pleasure driving a Beatle with the man driving a limousine. You thought me that poverty is not the lack of money, rather the absence of happiness with one's available resources. No wonder I never saw stress and agony those years you were carrying our burden and aswell as that of your late younger brother. You made me believe that achievement in public office is not about maintaining status quo, or just making improvements in the system, but about setting the pace and producing atrailblazing phenomenon that is indelible with time.

I will also linger to treasure your exemplary and disciplinary routines which have formed the basis and character of the person before this audience today.

Papa, I want to thank you for being the best possible role model I could have hoped for in life. And for all of the moment to moment little decisions that you made, that I will never know about, that forged you into the man, and the fathe, that you became.

My lovely and beautiful beloved wife, Tessy: When I contemplate on the years that have passed, I become aware of how privileged I am to have had you by my side to love, and to assist me and support me uphold a sense of balance, to keep me on the straight and narrow, and to pull me back when I seemed to have lost my way. I want to thank you for accepting me despite all odds when I was nobody and when I had nothing. When your mates were scrambling for wealthy and international husbands, you accepted me and tolerated my inadequacies.

Despite the trials, we have made each other stronger. You have changed who I am in such fundamental and subtle ways that I attribute much of who I am now to you. You have made me happier, stronger, more empathetic. You have also given me the

cherished gift of your love, your tears, and support in my times of pain.

You have given me more than just your love, by giving me three lovely and wonderful children. You gave me our first child, Kenechukwu, in 2001; then our lovely daughters, Chilota and Kosisochukwu, in 2003 and 2005 respectively.

I also want to appreciate the parents that brought you to life, Chief and Mrs. Jerome Maduka (Ezekwesili) for bringing you up very well and also allowing me to come close.

My brothers and sisters: Engineer Chigozie Nwagha of blessed memory (Ochiagha Gburugburu); Dr. Kelly Nwagha (Pharmacist); my only sister, Chinwe Iheme, an educationist; and her husband Mr. Cosmos Iheme; Okey Nwagha, an excellent artist; and Reverend Father Ikechukwu Nwagha, our last born and spiritual father. My brothers-in-law, Obiajulu, Tochukwu, and Chigekwu. My only and one sister-in-law, Dr. Ujunwa Ndu-Okereke. I thank you all for the various roles you have played in my life.

All my teachers at different levels of the formal and semi-formal system of education. Dr. Mrs. Ukabam and Dr. Joanne Udeh (Physiology). Dr. John Okaro, Professors Uchenna megafu, Gabriel Iloabachie, Arthur Ikeme, Professor Benjamin Ozumba, Dr. TC Oguanuo (late), Professors Hycinth Onah, Obioma Okezie, Uzochukwu Aniebue, Martin Aghaji and Bede Ibeh, who encouraged me to accept the appointment in Physiology when I was lost on how to start.

My special tribute goes to late Prof Alloy Aghaji, who fixed my torsion and later appointed me Associate Dean based on recommendations. May God Almighty grant his soul perfect peace.

To all my contemporaries, Professor UzoChukwuEzegwui, and Professor Samuel Obi, Dr Peter Nkwo, Dr Ijeoma Ezeome. I am so grateful for the friendly competitive atmosphere you created.

To all the lecturers in the Departments of Obstetrics and Gynaecology and Physiology, thank you for making me want to continue writing and publishing.

To my resident Doctors, you are great, and I say thank you.
All my colleagues in the College of Medicine, you are something else

To my dear medical students, I thank you.
To the entire University community, I am grateful for the atmosphere of congeniality, which you provided for my success story.

My friends from within and outside the Enugu Sports, I thank you for all the support.

My committee of friends you are just excellent. Dr. Cajetan Onyedum, my associate dean, my friend and classmate, who piloted this event with precision and dynamism. Dr. Valentine Ugwu, who carefully read through the document and made valuable corrections, I will ever remain grateful. Dr. Nwachukwu Ugwunna, our publicity guru, you let the whole world know by your persistent and unrelenting flow of information. To the rest of the committee members who contributed in immeasurable terms, I say thank you.

And to all of us in this hall, may God grant you good health, long life and may you and your family be opulently rewarded. As you travel back to your various destinations, may He grant you journey mercies.

REFERENCES

1. Findlay JK, Kerr JB, Britt K, Liew SH, Simpson ER, Rosairo D, et al. Ovarian Physiology: Follicle development, oocyte, and hormone relationships. *Anim Reprod* 2009; 6: 16-9.
2. **Nwagha UI**, Dim CC, Nwagha TU, Anyahie BU. Some characteristics of menarche in a developing economy. *Biosci Biotechnol Res Asia* 2008; 5(1): 207-10.
3. Abioye-Kuteyi EA, Ojofeitimi, EO, Aina OI. The influence of socioeconomic and nutritional status on menarche in Nigerian school girls. *Nutr Health* 1997; 11(3): 185-95.

4. Abioye- Kuteyi EA. Menstrual knowledge and practices amongst secondary school girls in Ile-Ife, Nigeria. *J R Soc Promo Health* 2000; 120: 23-6.
5. EkenzeSO, **Nwagha UI**, Ezomike UO, Obasi AA, Okafor DC, Nwankwo EP. Management of Sexual Assault-related Large Rectovaginal Fistula in an Eight-Year-Old. *J Pediatr Adolesc Gynecol* 2011; 24(2): e39-e41.
6. Doyle AM, Mavedzenge SN, Plummer ML, Ross DA. The sexual behaviour of adolescents in sub-Saharan Africa: patterns and trends from national surveys. *Trop Med Int Health* 2012; 17: 796–807.
7. Khalilian AR, Masoudzadeh A, Mohseni-Bandpei MA. Frequency of sexual dysfunction in female students at Mazandaran Medical Sciences University. *Res J Biol Sci* 2007; 2: 143-6.
8. Wilson J. Prevalence of female sexual dysfunction among college students. *Undergrad Res J Human Sci* 2004. Available from: <http://www.kon.org/urc/wilson.html>. [Last accessed on 2014 Mar 01].
9. Bechara A, Literat B, Casabe A, Bertolino MV, Secin F. Prevalence of female sexual dysfunction (FSD) and analysis of female sexual function index (FSFI) among students of faculty of medicine in Buenos Aires (UBA). *Int J Impot Res* 2003;15: A21:S7.
10. Fajewonyomi BA, Orji EO, Adeyemo AO. Sexual dysfunction among female patients of reproductive age in a hospital setting in Nigeria. *J Health Popul Nutr* 2007; 25: 101-6.

11. **Nwagha UI**, Oguanuo TC, Ekwuazi K, Olubobokun TO, Nwagha TU, Onyebuchi AK, Ezeonu PO, Nwadike K. Prevalence of sexual dysfunction among females in a university community in Enugu, Nigeria. *Niger J Clin Pract* 2014; 17: 791-6.
12. Wiegel M, Meston C, Rosen R. The female sexual function index (FSFI): Cross-validation and development of clinical cutoff scores. *J Sex Marital Ther* 2005; 31: 1-20.
13. **Nwagha UI**, Ugwu EO, Anyaehie UB, Onyebuchi AK, Dim CC. Emergency contraception; knowledge, perception and practice among female undergraduates in aUniversity community in Nigeria. *Biosci Biotechnol Res Asia*; 5(1); 187-92.
14. Gender Equality. Available at <http://www.unicef.org/gender/>
15. Blair ML. Sex-based differences in physiology: What should we teach in the medical curriculum? *Adv Physiol Educ* 2007; 31: 23-5.
16. Kululanga LI, Sundby J, Malata A, Chirwa E. Male involvement in maternity health care in Malawi. *Afr J Reprod Health* 2012; 16: 145-57.
17. Olayemi O, Bello FA, Aimakhu CO, Obajimi GO, Adekunle AO. Male participation in pregnancy and delivery in Nigeria: A survey of antenatal attendees. *J Biosoc Sci* 2009; 41: 493-503.
18. Eguavoan AN, Odiagbe SO, Obetoh GI. The status of women, sex preference, decision-making and fertility

- control in ekpoma community of Nigeria. *J Soc Sci* 2007; 15: 43-9.
19. World Health Organization: Report of the Meeting on the Prevention of Infertility at the Primary Health Care Level. Geneva: WHO; 1983. WHO/ MCH/1984.4.
 20. **Nwagha UI**, Obiora CC, Nwagha TU, Anyaehie UB, Igwe JC, Aronu C; Endocrine assessment of non-obese infertile females in a developing economy. *Biosci Biotechnol Res Asia* 2008; 5(1): 145-50.
 21. **Nwagha UI**. Gender issues in the management of infertility in developing countries. *J Basic Clin Reprod Sci* 2015; 4: 1-3.22.
 22. Sengupta P, **Nwagha U**. The aging sperm: Is the male reproductive capacity ticking to biological extinction? *J Basic Clin Reprod Sci* 2014; 3: 1-7.
 23. Pierce PW. Life in the womb. In the origin of health and diseases. First edition, New York. Procnethaen press. 2005; 363.
 24. **Nwagha U**, Iyare E, Anyaehie U, Onyedum C, Okereke C, Ajuzieogu O, et al. Forced expiratory volume in 6 s (FEV₆) and FEV₁/FEV₆ values as a viable alternative for forced vital capacity (FVC) and FEV₁/FVC values during pregnancy in South East Nigeria: A preliminary study. *Ann Med Health Sci Res* 2014; 4: 516-21.
 25. Sadler TW. Langman's medical embryology. Ninth edition, Lippincott Williams and Wilkins publishers. 2005; 117-23.

26. Ogbodo SO, Okaka AN, **Nwagha UI**, Ejezie FE. Free Radicals and Antioxidants Status in Pregnancy: Need for Pre- and Early Pregnancy Assessment. *Am J Med Med Sci* 2014; 6: 230-5.
27. Ejezie FE, Onwusi EA, **Nwagha UI**. Some Biochemical markers of Oxidative stress in pregnant Nigerian Women. *Trop J Obstet Gynaecol* 2004; 21(2): 122-4.
28. **Nwagha UI**, Ejezie FE. Serum Ascorbic acid levels during pregnancy in Enugu, Nigeria. *Int J Med Health Dev* 2005; 10(1): 43-5.
29. **Nwagha UI**, Ejezie FE, Iyare EE. Evaluation of serum uric acid levels in normal pregnant Nigerian women. *Niger J Clin Pract* 2009; 12(1): 83-6.
30. Ogbodo S, Okaka A, **Nwagha U**. Anti-infective antioxidant minerals levels in uncomplicated pregnancy in some rural communities of South East Nigeria. *J Med Nutr Nutraceut* 2013; 2: 52-7.
31. Miller JK, Brzezinska-Slebodzinska E, Madsen FC. Oxidative stress, antioxidants and animal function. *J Dairy Sci* 1993; 76: 2812-23.
32. Weiss WP. Proc Annual Meeting. Relationship of mineral and vitamin supplementation with mastitis and milk quality. Orlando, Florida USA: National Mastitis Council; 2002. p. 37-44.

33. Ashworth CJ, Antipatis C. Micronutrient programming of development throughout gestation. *Reproduction* 2001; 122: 527-35.
34. **Nwagha UI**, Iyare EE, Ogbodo SO, Ejezie FE and Anyaehie USB. Parity related changes in body mass index and antioxidant Vitamins in healthy non pregnant women in Enugu, southeastern Nigeria. *Niger J Clin Pract* 2012; 15: 380-4
35. Ogbodo SO, Okaka AN, **Nwagha UI**. Parity may determine levels of some antioxidant minerals in pregnancy: An experience from rural South-Eastern Nigeria. *J Basic Clin Reprod Sci* 2014; 3: 27-31.
36. **Nwagha UI**, Ugwu OV, Nwagha TU and Anyaehie USB. The Influence of Parity on the Gestational Age at Booking among Pregnant Women in Enugu, South East Nigeria. *Niger J Physiol Sci* 2008; 23(1-2): 67-70.
37. ACOG. Nutrition during pregnancy. The American Congress of Obstetricians and Gynecologists. (ACOG Education Pamphlet AP001, 2010): Available from: http://www.acog.org/publications/patient_education/bp001.cfm. [Last accessed on 2011 Jan 14].
38. Isenberg MH. Nutrition during pregnancy. Available from: <http://www.ivillage.com/nutrition-during-pregnancy/6-a-144752>. [Last accessed on 2011 Jan 14].

39. Human Pathology. Nutritional deficiencies. (HP 14724, 2010). Available from: <http://www.humpath.com/spip.php?article14724>. [Last accessed on 2011 Jan 14].
40. Crawley J. Reducing the burden of anemia in infants and young children in malaria-endemic countries of Africa: From evidence to action. *Am J Trop Med Hyg* 2004; 71(2 Suppl): 25-34.
41. Fawzi WW, Msamanga GI, Urassa W, Hertzmark E, Petraro P, Willett WC, et al. Vitamins and perinatal outcomes among HIV-Negative women in Tanzania. *N Engl J Med* 2007; 356: 1423-31.
42. Saxena V, Srivastava VK, Idris MZ, Mohan U, Bhushan V. Nutritional Status of Rural Pregnant Women. *Indian J Community Med* 2000; 25: 104-7.
43. Sharma RK, Cooner PP, Sekhon AS, Dhaliwal DS, Singh K. A study of effect of maternal nutrition on incidence of low birth weight. *Indian J Community Med* 1999; 24: 39-43.
44. **Nwagha UI**, Nwachukwu D, Dim C, Ibekwe PC, Onyebuchi A. Maternal mortality trend in South East Nigeria; less than a decade to the millennium developmental goals. *J Womens Health (Larchmt)* 2010; 19: 323-7.
45. Ogbodo SO, **Nwagha UI**, Okaka AN, Ogenyi SC, Okoko RO, Nwagha TU. Malaria parasitaemia among pregnant women in a rural community of eastern Nigeria: Need for combined measures. *Niger J Physiol Sci* 2009; 24: 95-100.

46. Allen LH. Biological mechanisms that might underlie iron's effects on fetal growth and preterm birth. *J Nutr* 2001; 131: 581S-9S.
47. Scholl TO. Iron status during pregnancy: Setting the stage for mother and infant. *Am J Clin Nutr* 2005; 81: 1218S-22S.
48. Ejezie FE, **Nwagha UI**, Ikekpeazu JE, Maduka IC, Neboh E, Nwachukwu DC et al. Evaluation Serum Iron Status of Lactating Mothers on Exclusive Breastfeeding in Enugu, South East Nigeria. *Int J Med Health Dev* 2009; 14(2): 15-21.
49. Ejezie FE, **Nwagha UI**, Ikekpeazu EJ, Ozoemena OFN, Onwusi EA. Assessment of Iron Content of Breast Milk in Preterm and Term Mothers in Enugu Urban. *Ann Med Health Sci Res* Jan 2011; 1(1): 85-90.
50. Ejezie FE, **Nwagha UI**. Zinc concentration during Pregnancy and lactation in Enugu, South-East Nigeria. *Ann Med Health Sci Res* Jan 2011; 1(1): 69-76.
51. **Nwagha UI**, Ogbodo SO, Nwogu-Ikojo EE, Ibegbu DM, Ejezie FE, Nwagha TU, Dim CC. Copper and selenium status of healthy pregnant women in Enugu, southeastern Nigeria. *Nig J Clin Pract* 2011; 14(4): 409-13.
52. Ogbodo SO, **Nwagha UI**, Okaka A, Okeke AC, Chukwurah FE, Ezeonu PO. Low levels of some nutritional parameters of pregnant women in a rural community of South East Nigeria: Implications for the attainment of the

- millennium developmental goal. *Ann Med Health Sci Res* 2012; 2: 49-55.
53. Ejezie FE, Okaka AN, **Nwagha UI**. Reduced Maternal Selenium during Pregnancy and lactation; should routine Selenium Supplementation be advocated. *Niger J Med* 2012; 21: 98-102.
 54. Van Den Broek N. Anaemia in pregnancy in developing countries. *Br J Obstet Gynaecol* 1998; 105: 385-90.
 55. Fleming AF. Iron status of anaemic pregnant Nigerians. *J Obstet Gynaecol Br Common* 1969; 76: 1013-17.
 56. Suhamo D, West CE, Muhilal KD, Hautvast JG. Supplementation with vitamin A and iron for nutritional anaemia in pregnant women in West Java, Indonesia. *Lancet* 1993; 342: 1325-28.
 57. Van Den Broek NR, White SA, Neilson JP. The relationship between asymptomatic human immunodeficiency virus infection and the prevalence and severity of anemia in pregnant Malawian women. *Am J Trop Med Hyg* 1998; 59: 1004-7.
 58. Rush D. Nutrition and maternal mortality in the developing world. *Am J Clin Nutr* 2000; 72: 212S-240S.
 59. Ratten GJ and Beischer NA. The significance of anaemia in an obstetric population in Austria. *J Obstet Gynaecol Br Common* 1972; 79: 228-37.
 60. Harrison KA and Ibeziako PA. Maternal anaemia and fetal birth weight. *J Obstet Gynaecol Br Common* 1973; 80: 798-804.

61. Allen LH, Rosado JL, Casterline JE, Lopez P, Munoz E, Garcia OP, et al. Lack of hemoglobin response to iron supplementation in anemic Mexican preschools with multiple micronutrient deficiencies. *Am J Clin Nutr* 2000; 71: 1485-94.
62. Beaton GH, McCabe GP. Efficacy of intermittent iron supplementation in the control of iron deficiency anaemia in developing countries: an analysis of experience. Toronto: The Micronutrient Initiative, 1999.
63. Marchant T, Schellenberg JA, Nathan R, Abdulla S, Mukasa O, Mschinda H, et al. Anaemia in pregnancy and infant mortality in Tanzania. *Trop Med Int Health* 2004; 9(2): 262-6.
64. Brabin B, Prinsen - Geerlings P, Verhoeff F, Kazembe P. Anaemia prevention for reduction of mortality in mothers and children. *Trans R Soc Trop Med Hyg* 2003; 97(1):36-8.
65. Ogunbode O. Management of anaemia in pregnancy. *Nig Med Pract* 1984; 8(5/6): 105-7.
66. Ogunbode O. Anaemia in pregnancy. In Ogunbode T (ed). *Medical disorders in Tropical obstetrics*. Ibadan, Evans Brothers 1997; 1-20.
67. Simmons WK. Control of iron and other micronutrient Deficiencies in English speaking Caribbean. *Bull Pan Am Health Organ* 1994; 28(4): 302-11.
68. Okafor LA, Diejomaoh FM, Orosaye AU. Bone marrow Status of anaemic pregnant women on supplemental iron and folic acid in a Nigerian Community. *Angiology* 1985; 36(8): 500-3.
69. AcKurt F, Wetherrilt H, Loker M. Hacibekiroglu M.

- Biochemical assessment of nutritional status in pre and postnatal Turkish women and Outcome of pregnancy. *Eur J Clin Nutr* 1995; 49(8): 613-22.
70. Knight Em, Spurlock BG, Edwards CH, Johnson AA, Oyemade UJ, Cole OJ, *et al.* Biochemical Profile of African American women during three trimesters of pregnancy and at delivery. *J Nutr* 1994; 124: 943S-53S.
71. Pardo J, Peled Y, Bar J, Hod M, Sela BA, Rafel ZB, *et al.* Evaluation of low serum B (12) in the non anaemic pregnant patients. *Hum Reprod* 2000; 15(1): 224-6.
72. Dejmek J, Ginter E, Solansky I, Podrazilova K, Benes I, Sram RJ. Vitamin C, E, and A levels in Maternal and fetal blood for Czech and Gypsy ethnic group in the Czech Republic. *Int J vitam Res* 2002; 72(3): 183-90.
73. Pressman EK, Cavanagh JL, Mingione M, Norkus EP, Woods JR. Effects of maternal antioxidants supplementation on Maternal and fetal antioxidant levels: a randomized double blind study. *Am J Obstet Gynecol* 2003; 189(6): 1720-5.
74. Ma AG, Chen XC, Wang Y, Xu RX, Zheng MC, LI JS. The multiple vitamin status of Chinese pregnant women with anaemia and non anaemia in the last trimester. *J Nutr Sci Vitaminol* 2004; 50(2): 87-92.
75. **Nwagha IU**, Okeji N, Clems-Anunwa O, Ejezie FE, Nwagha TU, Ocheni S. The role of Some micronutrients (Eldervit-12) in the management of anaemic pregnant women in Nigeria; a preliminary report. *Trop J Obstet Gynaecol* 2010; 27(2): 34-9.

76. Greenwood BM, Bradley AK, Greenwood AM, Byass P, Jammeh K, Tulloch S, et al. Mortality and morbidity from malaria among children in a rural area of The Gambia, West Africa. *Trans R Soc Trop Med Hyg* 1987; 81: 478—86.
77. Sowunmi A, Ilesanmi AO, Akindele JA, Abohweyere AE, Fawole AO, Falade CO, et al. Placental falciparum infection and out- come of pregnancy in Nigerian mothers from an endemic area. *J Obstet Gynaecol* 1996; 16: 211—6.
78. McGregor IA. Epidemiology, malaria and pregnancy. *Am J Trop Med Hyg* 1984; 33: 517—25.
79. Riley EM, Hviid L, Theander TG. Malaria. In: ICIERSZENBAUN F, editor. *Parasitic infections and the immune system*. New York, NY: Academic Press; 1994, p. 119—43.
80. Riley EM, Schneider G, Sambou I, Greenwood BM. Suppression of cell-mediated immune responses to malaria antigens in pregnant Gambian women. *Am J Trop Med Hyg* 1989; 40: 141—4.
81. Elliott SR, Brennan AK, Beeson JG, Tadesse E, Molyneux ME, Brown GV, et al. Placental malaria induces variant-specific antibodies of the cytophilic subtypes immunoglobulin IGG1 and IGG3 that correlate with adhesion inhibitory activity. *Infect Immun* 2005; 73: 5903—7.
82. Brabin BJ. An analysis of malaria in pregnancy in Africa. *Bull World Health Org* 1983; 61:1005—16.

83. Bray RS, Sinden RE. The sequestration of *Plasmodium falciparum* infected erythrocytes in the placenta. *Trans R Soc Trop Med Hyg* 1979; 73: 716—9.
84. Duffy PE, Fried M. Malaria during pregnancy: parasites, antibodies and chondroitin sulphate A. *Biochem Soc Trans* 1999; 27: 478—82.
85. **Nwagha UI**, Ugwu VO, Nwagha TU and Anyaehie USB. Asymptomatic *Plasmodium* parasitaemia in pregnant Nigerian women; almost a decade after Roll Back Malaria. *Trans R Soc Trop Med Hyg* 2009;103(1); 16-20.
86. OgbodoSO,OkakaANC,**NwaghaUI**,EjezieFE,OkaforCS. Oxidative Stress in Symptomatic Malaria Parasitemic Pregnant Women from Malaria Endemic Area of Nigeria. *Am J Med Sci*2014; 4(5):168-174.
87. **Nwagha UI**, Okeke TC, Nwagha TU, Ejezie FE, Ogbodo SO, Dim CC, et al. Asymptomatic malaria parasitemia does not induce additional oxidative stress in pregnant women of South East Nigeria. *Asian Pac J Trop Med* 2011; 4(3): 229-33.
88. Nwagha TU, **Nwagha UI**, Dim CC, Anyaehie UB, Ebugara M, Onwasigwe C. Benefit incidence analysis of free insecticide treated nets distribution in urban and rural communities of Enugu state, South East Nigeria. *Niger J Clin Pract* 2014; 17: 168-73.
89. Ogbodo SO, **Nwagha UI**, Chukwurah EF, Okafor CS. Intermittent preventive treatment in pregnancy in malaria-endemic rural areas: Outcomes and areas of improvement. *J Med Sci* 2012; 3(13): 819-24.

90. Anyaehie UB, **Nwagha UI**, Aniebue PN, Nwagha TU. The effect of free distribution of insecticide-treated nets on asymptomatic Plasmodium parasitemia in pregnant and nursing mothers in a rural Nigerian community. *Nig J Clin Pract* 2011; 14; 19-22.
91. Okereke CE, Anyaehie UB, Dim CC, Iyare EE, **Nwagha UI**. Evaluation of some anthropometric indices for the diagnosis of obesity in pregnancy in Nigeria: a cross-sectional study. *Afr Health Sci* 2013; 13(4): 1034 – 1040
92. Okereke C, Okeke TC, Anyaehie BU, **Nwagha UI**, Iyare EE, Nwogu-Ikojo E, et al. The Effect of Gravidity on Anthropometric Indices of Pregnant Women in Enugu, South East, Nigeria. *Afr J Biomed Res* 2012; 15: 165 – 170.
93. Nwagha UT, **Nwagha UI**, Ibegbulam OG, Ocheni S, Okpala I, Ezeonu PO, Azubuike O. Increased prevalence of activated protein C resistance during pregnancy may implicate venous thrombo embolic disorders as a common cause of maternal mortality in Nigeria. *J Basic Clin Reprod Sci* 2012; 1:19-24.
94. **Nwagha UI**, Agu KA, Nwankwo TO, Egbuji CC. Emergency myomectomy during pregnancy; a case Report. *Trop J Obstet Gynaecol* 2005; 22: 79-80.
95. Melzack K, Taenzer P, Feldman P, Kinch R. Labor is Still Painful After Prepared Childbirth Training. *CMAJ* 1981; 125: 357-63.
96. Lederman R, Lederman E, Work B, McCann D. Relationship of Psychological Factors in Pregnancy to Progress in Labor. *Nursing Research* 1979; 28(2): 94-97.

97. Hodnett ED, Gates S, Hofmeyr GJ, Sakala C. Continuous support for women during child birth. *Cochrane Database of Systematic Reviews 2007, Issue 3* No.: CD003766. DOI: 10.1002/14651858.CD003766.pub2
98. Teshome M, Abdella A, Kumbi S. Parturients' need of continuous labor support in labour wards. *Ethiop. J. Health Dev* 2007;21(1): 35-9.
99. Dim CC, Ikeme AC, Ezegwui HU, **Nwagha UI**. Labor support: an overlooked maternal health need in Enugu, south-eastern Nigeria. *J Matern Fetal Neonatal Med* 2011; 24(3):471-4.
- 100. Nwagha UI**, Okaro JM, Nwagha TU. Third stage of Labour; a time Bomb!! – Review. *Int J Med Health Dev* 2004; 9(1): 14-9.
- 101. Nwagha IU**, Okaro JM, Nwagha TU. Placenta percreta, a Review of literature, *Niger J Med* 2005; 14: 261-6.
- 102. Nwagha IU**, Okaro JM and Nwagha TU. Intraoperative uterine packing with mops; an effective but underutilized method of controlling post-partum haemorrhage; experience from South East Nigeria. *Niger J Med* 2005; 14: 279-82.
- 103. Igweh JC**, **Nwagha IU**, Okaro JM. The Effects of menopause on the serum lipid profile of normal females of south East Nigeria. *Niger J Physio Sci* 2005; 20(1-2): 48-53.
- 104. Nwagha UI**, Igweh JC. Atherogenic Index of Plasma: A significant indicator for the onset of Atherosclerosis during

menopause in hypertensive females of South East Nigeria. *Int J Med Health Dev* 2005; 10(2): 67–71.

105. Castelli WP. Cholesterol and lipids in the risk of coronary artery disease: the Framingham Heart study. *Can J Cardiol* 1988; 4: 5–10.
106. Hokanson JE, Austin MA. Plasma triglyceride level is a risk factor to cardio vascular disease independent of high density lipoprotein cholesterol level: a meta-analysis of population based prospective studies. *J Cardiovasc Risk* 1996; 3: 213–9.
107. Guerin M, Legoff W, Lassel TS, VanTol A, Steiner G, Chapman MJ. Proatherogenic role of elevated CE transfer from HDL to VLDL and dense LDL in type 2 diabetics. *Arterioscler Thromb Vasc Biol* 2001; 21:282–287.
108. Gaziano JM, Hennekens CH, O'Donnell CJ, Breslow JL, Buring JE. Fasting triglycerides, high density lipoprotein, and risk of myocardial infarction. *Circulation* 1997; 96: 2520–5.
109. Dobiasova M, Frohlich J. The plasma parameter log (TG/HDL-C) as an atherogenic index: correlation with lipoprotein particle size and esterification rate in apo B- lipoprotein-depleted plasma. (FERHDL) *Clin Biochem* 2001; 34:583–8.
110. Tan MH, Johns D, Glazer NB. Pioglitazone reduces atherogenic index of plasma in patients with type 2 diabetes. *Clin Chem* 2004; 50: 1184–8.

111. Allain CC, Poon LS, Chan CS, Richmond W, Fu PC.
Enzymatic determination of total serum cholesterol.
Clin Chem 1974; 20: 470-5.

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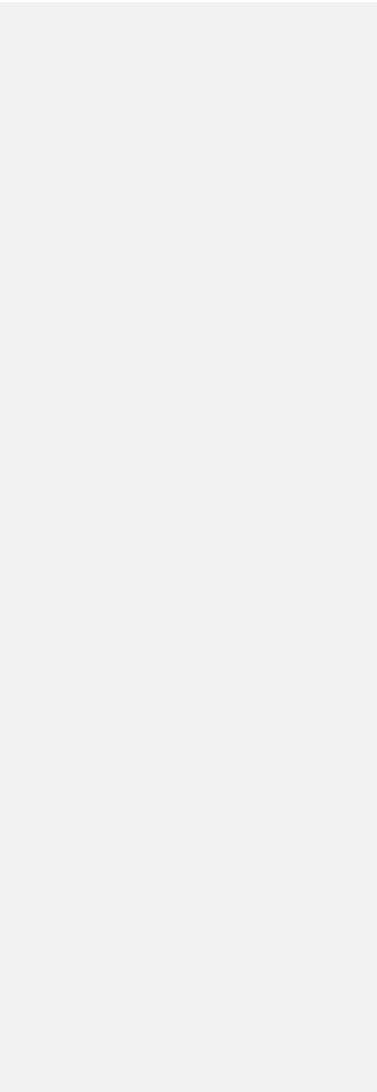
Title: Stress-Illness Connection: Critical Factors Moderating the Link

110. Professor Ignatius Ani Madu – June 16, 2016

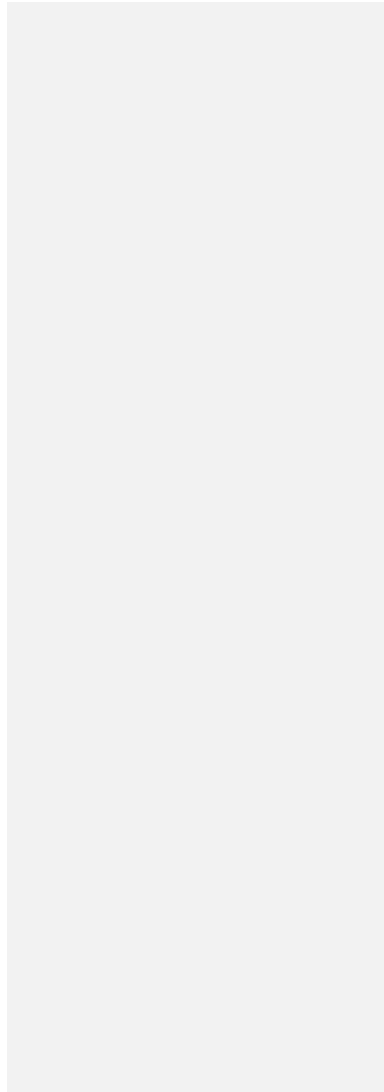
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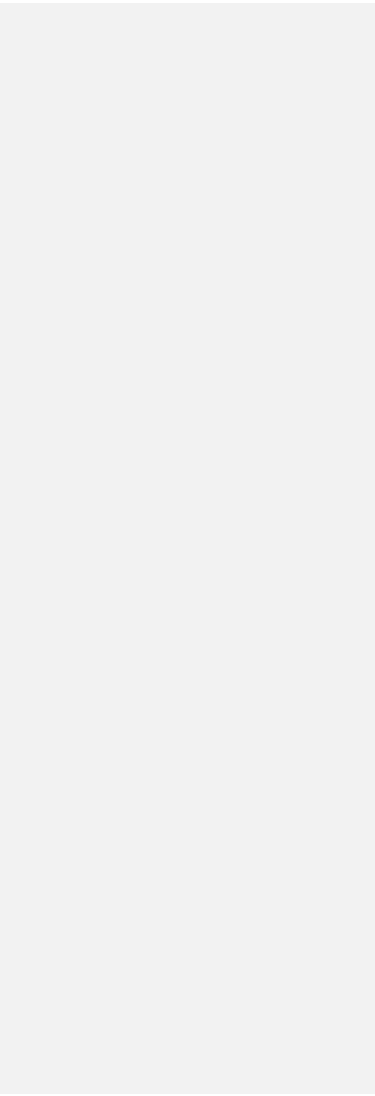


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