

Building A Case For Curriculum Expansion In Anatomy Education In Nigeria.

* Egwu, Ogugua A.

Department of Anatomy, Nnamdi Azikiwe University, Nnewi Campus.

*Author for correspondence

ABSTRACT

For some decades the curriculum of undergraduate programs in anatomy has been relatively static being centered and organized within the confines of a Medical School and being almost inseparable from medical education. However, these programs are organized science programs that should be made self sufficient for the trainees for self-sustainability in the future. This paper outlines why and how the present undergraduate curriculum should be expanded by incorporating some courses and why these science departments should be morphologically positioned to truly present anatomy as a boundless discipline in the Biomedical Sciences.

KEY WORDS: Curriculum expansion, Anatomy education, Nigeria

For some decades the curriculum of undergraduate programs in anatomy in Nigeria has been relatively static being centered and organized within the confines of a Medical School and being almost inseparable from medical education.

Historically, in the 1950s, anatomists were medically qualified, had clinical experience, and may also have been surgically trained. They came into anatomy departments due to their expertise in gross anatomy, and because of the relevance of their clinical interests in anatomical education. Back then, gross anatomy played a huge role in the teaching of medical students, and by definition, the teaching of anatomy was viewed almost exclusively in terms of medical education (Jones and Harris, 1998). Thus, the rationale for anatomy as a discipline stems from its role within the medical education (Jones, 1997).

Allied with this was the context in which anatomy departments found themselves, namely, that of medical schools. Consequently, their constituency was almost entirely medical students. The result was that the brief of anatomy departments was to impart to medical students information considered necessary for their future careers as doctors. As long as vast amounts of anatomical information were required for

this task, anatomy departments remained viable as teaching emporiums (Jones, 1997).

Today, anatomy has gradually evolved into not just a huge biomedical science but a basic science incorporating experimental and clinical scientists who are totally biased, not just in gross anatomy and histology but in cellular and subcellular biology. Thus, anatomy departments in most countries are involved in training medics, paramedics and core scientists who, technically, should champion the course of research in the experimental biomedical sciences.

In Nigeria, the establishment of these science based training in anatomy started in the late 70s and was done basically to address the dearth of teachers in Anatomy. Due to this primary philosophy behind the establishment of these programs, trainees in anatomy were guided almost exclusively within the context of learning to teach medical students and to train individuals who will continue the cycle of teaching only within the confines of a medical school. Other faculties established the program to serve as a starter for individuals who intend to key into the medical profession. These led to a relatively narrowed curriculum as the anatomists are mainly equipped to train future physicians and/or to undergo

training in another medical school. Since then, so many medical faculties have established science departments to train scientists who will sustain the academic cycle and possibly develop research for advancement of medical sciences. As a result, the programs in many Anatomy departments have gradually expanded, accommodating B.Sc, M.Sc and Ph.D programs in Anatomy.

Following this, a good number of scientists have been trained and most medical schools and Anatomy departments are beginning to have "adequate" teachers in Anatomy. However, most of these graduate trainees are left redundant in the outside environment even after venturing into postgraduate programs because the philosophy behind the establishment of their programs was pre-conditioned and so their curriculum thinned by exigencies of yesterdays. Due to this thinned curriculum, the prospects of these Anatomy graduates are also thinned and have created a system deceptively jam-packed with competent graduates and yet presenting gross inadequacy of "anatomists".

Therefore, it is time to assess the curriculum of our science departments/their role and morphology within our medical faculties. Yes we have need for these science departments but how can the graduates be accommodated in the harsh research environment of our country? Why are anatomists trained- is it to teach and carry out research only within the confines of a science department or medical school? Can they fit into the dynamism of modernism and be relevant in the constant rise of scientific knowledge? Do we have an absolute need for expanded prospects in anatomy in Nigeria?

The place of Anatomy in Medical Education:

The place of Anatomy in Medical Education has a long history of

inseparability. Being the bedrock of the medical sciences, it has sustained the biomedical and medical essence of learning and absolutely, good training in anatomy is imperative for training in any clinical sciences- ranging from all the medical subspecialties to all the allied health sciences. In the early 20th century, Anatomy by itself constituted preclinical education (Bardeen, 1905). In 1909, gross anatomy occupied about one-fifth of the entire medical curriculum accounting for over 800 hours of lectures (Bardeen, 1909). From the 1930s to the late 1980s, teaching hours gradually decreased- a period described by Pawlina (2009) as being characterized by uncomfortable status quo. Today with the introduction of other biomedical sciences and medical subspecialties, anatomy is becoming a concept of didacticism being used as a learning tool for the advancement of medical sciences. However, its place in medical education is indisputable being a backbone for the basics in the medical sciences.

Anatomy as a boundless science discipline.

The concept of an "anatomist" being a dissector of dead bodies, a person skilled in anatomy may remain valid as long as gross anatomy is involved but cannot be used in the absolute instance. This follows the systematic growth of modern day science. With the advent of electron microscopy in the 1950s, there was an unprecedented inclusion of cellular and subcellular aspects of experimental sciences into the medical curriculum and the concept of "structure" has become complexed and apodictically revolutionalized to accommodate recent advances in science and technology. These inclusions have indirectly given openings for the growth of anatomy as a discipline.

From the aforementioned, Anatomy as a discipline in the basic medical sciences has become broader, accommodating a wide range of

disciplines, from the environmental sciences to the imaging sciences and even other experimental sciences. Therefore, a natural scientific marriage between anatomy and other disciplines has been established. The essence of this marriage has not been absolutely harnessed within our environment and no advantage is taken over developing areas like biomechanics and human robotics, biometrics and forensic biology, molecular and evolutionary biology and even with the biomedical engineering sciences.

Anatomy should not end within the borders of gross and functional anatomy, microscopic anatomy, embryology and teratology, neuroscience and relevant anatomic techniques. Rather, the inherent marriage that has been deciphered overtime should be maximally utilized to develop outstanding sub-disciplines that will be appreciated at both undergraduate and graduate levels. These sub-disciplines will strategically position anatomy as a revitalized discipline, boundless and heterogeneous in its own way, to truly champion research in the experimental and clinical sciences.

Such heterogeneity presents problems for the discipline of anatomy, since it gives the impression that anatomy is a parasite, invading territory more truly the domain of other disciplines. In order to demonstrate that this is not the case, it is imperative to redefine the boundaries of anatomy in terms of the techniques and approaches currently available (Jones, 1997), thereby redefining, by expansion, the boundaries of our undergraduate and graduate curricula.

Expanded curriculum; Expanded prospects

The inclusion of cellular and subcellular aspects of experimental sciences in medical curriculum is definitely in line with recent advances in scientific and technological inventions. Therefore, the basic medical sciences are going more molecular than ever leading to continuous

adjustments in the basic medical curriculum for expansion of research areas and increase in quality of training.

Anatomy, as a super component of medical curriculum and as a discrete scientific entity is following suit and numerous cellular and subcellular aspects of structure are being comprehensively studied in many parts of the developed world. This has exposed anatomists to a wide range of job opportunities- in the forensic departments, morbid anatomy laboratories, stem cell laboratories, Biometric Laboratories, clinical embryology Laboratories etc.

Even though these job opportunities are not common in Nigeria, it is absolutely necessary to equip our teaming undergraduate trainees to enable them establish programs that can sustain them in the seemingly clouded future of career opportunities in Nigeria. The best way to do this is to expand our curriculum, first at the undergraduate level and then the Postgraduate.

In Nigeria and most developing countries, numerous medical schools have established a Bachelors degree program in Anatomy with the aim to train competent scientists who are not Doctors but are well informed of the course and can comfortably design and conduct research that will be of benefit to the advancement of the medical sciences and can participate in the training of medics and paramedics. But most of these designed programs have been confined within the borders of our conventional sub-disciplines in Anatomy- Gross and Neuro-Anatomy, Histology and Histochemistry, Embryology and Teratology, Relevant Anatomical techniques, Comparative Anatomy and Cell Biology; with pharmacology and at times, microbiology in some schools as the only inclusions. Even with these inclusions and the inclusions of other basic medical sciences like physiology

and biochemistry in the curriculum of B.Sc Anatomy, it is absolutely necessary to expand the existing curriculum for a more effective and up-to-date training. The expansion will not only expose our teeming number of students to a spectrum of disciplines but will expand the Anatomical territory and encourage interdisciplinary marriage for more encompassing research and career prospects. One of the major concerns of university education in Nigeria as outlined in the National Policy on Education is to enable students to develop intellectually and acquire skills that can enable them to be self-reliant and useful members of the society (National Policy on Education, 2004). The current curriculum may not have created ample avenues for student self reliance because over the years, graduates of Anatomy are compelled to go back to school for a degree in Medicine and Surgery or remain on the path of teaching Anatomy. Some have gone as far as breaking out of an imagined shell to work in banks and insurance companies just to show their desire to succeed. If an expansion of the curriculum is accommodated, it will afford our teeming students the opportunity to diversify and create social, economic and scientific impact in millennium development goals. Our Students will have knowledge to offer in the developing discipline of Human Biomechanics and Robotics, Forensic Science and Biometrics, Occupational and Sports Medicine, Medical Imaging and Advanced Microscopy, Medical ethics and Anatomy Education, Molecular and Developmental Biology etc. Since university education delves into conducting research, teaching and learning: extension of the frontiers of

knowledge and community services (Ozioko, 2005) and University education in Nigeria intensifies and diversifies programs for high level manpower development that contributes to national development by developing professional course contents to reflect national requirements (Ugwu et al, 2010), Anatomy education curriculum should absolutely be directed towards expanding the frontiers of Anatomical knowledge that will trigger professionalism and consistency (with modern scientific trend) in clinical and experimental research and requirements for national development: A truly integrated and expanded curriculum that must also meet the needs of the institution and students (Drake, 1998).

The expansions/courses for inclusion recommended in the anatomy education curriculum in Nigeria and how they can be accommodated in the conventional existing curriculum are stated as follows:

- 1) Introduction to Human Biomechanics (Osseokinematics and Arthrokinematics)
- 2) Human Biometrics and Forensic Biology
- 3) Introduction to Pathology.
- 4) Medical Ethics and Psychology for Anatomists
- 5) Entrepreneurship in Anatomical Sciences
- 6) Evolutionary Biology
- 7) Clinical posting: In areas like Anesthesiology, Ophthalmology, Radiology, Neurology, ENT and other areas deemed necessary by the council of Society for Experimental and Clinical Anatomists of Nigeria.
- 8) Introduction to Medical Imaging

Even though some of these courses have been silently incorporated into our existing conventional curriculum, they should be distinct to avoid the preconditioned rigidity of the status quo.

Table 1: Course distribution for Second year Science Students

First Semester	Second Semester
Gross Anatomy (Upper and Lower limb) (5)	Gross Anatomy (Thorax, Abdomen, Pelvis and Perineum) (5)
Introduction to Anatomy and General Embryology and Medical Genetics (2)	Systemic Embryology I (2)
Introduction to Cytology and Basic Histology (1)	Systemic Histology I(2)
Biochemistry of Macromolecules/ Carbohydrate Metabolism (2)	Neuroscience II (3)
General physiology/excitable tissues (3) Blood Physiology (2)	Biochemistry of Nucleic acid (2) Clinical Biochemistry (3)
Neuroscience I (2) Introduction to Medical Imaging (2)	Renal Physiology and Body fluids (3) Introduction to Human Biomechanics (2)

Table 2: Course Distribution for third year science students

First Semester	Second Semester
Gross Anatomy (Head and Neck) (5)	Cell Biology II (2)
Systemic Embryology II (2)	Histochemistry I&II (4)
Systemic Histology II (2)	Clinical Posting and Seminars (6)
Introduction to Pharmacology (2)	SIWES and Seminars (6)
Physiology of the Endocrine System (2)	
Physiology of Special Senses (2)	
Human Biometrics and Forensic Biology (2)	
Introduction to Pathology (2)	
Relevant Anatomical and Cytological Techniques (2)	
Cell Biology I (2)	
History of Anatomy (1)	

Table 3: Course Distribution for Fourth Year Science Students

First Semester	Second Semester
Functional and Comparative Anatomy (5)	Entrepreneurship in Anatomical Sciences (2)
Research Methodology and Biostatistics (3)	Seminars (4)
Medical Ethics and Psychology (2)	Research Project/Viva (6)
Introduction to Community Medicine (2)	
Advanced Embryology and Evolutionary Biology (3)	

If these courses are incorporated into the present curriculum and fine-tuned by members of Anatomy Community in Nigeria, a truly integrated curriculum could be designed. As anatomists we should not shy away from this process of change/expansion. With progressive educational approaches, we can listen to this wind of curricular expansion/reform and champion a gradual change that will open up avenues for more prospects in this great discipline called Anatomy.

Another issue that may enhance this curriculum expansion is the nomenclature we have adopted over the years as the name of these departments. Most departments are called "Department of Anatomy", which portrays the department as a centre of dissection and separation of parts only. A slight modification of nomenclature may express the true borders of Anatomy and the major research interests of the department. In Australasia, schools have adopted nomenclatures like anatomy and neurobiology, anatomy and human biology, anatomy and structural biology, anatomical sciences, anatomy and developmental biology, anatomy and histology, cell biology and anatomy, organismal biology and anatomy, cell and structural biology etc (Jones, 1997). We must not imitate the Australasians but we can design ours based on our research interests in our different departments. Some nomenclatures like anatomy and forensic biology, anatomy and clinical biology, anatomy and evolutionary biology, anatomy and developmental biology, anatomy and microscopic sciences, anatomy and human mechanics, anatomy and experimental biology etc could be adopted and the certificate of our trainees should reflect these nomenclatures to mirror the revitalized curriculum in anatomy.

CONCLUSION:

Just as a part of the preface to the 37th edition of Gray's Anatomy reads- "Human

Anatomy is a part, not merely of medical science, but also, beyond that, a biological knowledge, and beyond that also a part of the totality of mankind's understanding of his universe." Let us know truly that Anatomy is a boundless discipline; our curriculum in this great discipline determines what it is as a discipline and by expanding our curriculum, we expand the boundaries and prospects of Anatomy and Anatomists.

REFERENCES

- Bardeen CR (1905). Anatomy in America. Bull Univ. Wis 115: 87-205.
- Bardeen CR (1909). Report of the sub-committee on anatomy to the Council of Medical Education of the American Medical Association. Anat Rec 3:415-439.
- Drake RL (1998) Anatomy Education in a changing medical curriculum. Anat Rec 253:28-31.
- Federal Government of Nigeria (2004) National policy on Education, Lagos. NERDC.
- Jones DG (1997) Anatomy Departments and Anatomy Education: reflections and myths. Clin Anat 10:34-40
- Jones DG and Harris RJ (1998) Curriculum Developments in Australasian Anatomy Departments. Clin Anat 11:401-409.
- Ozioko RE (2005) The imperatives of exploiting the library for effective knowledge generation in tertiary institutions. In, knowledge generation, dissemination: issues and challenges in Nigerian Universities. Enugu. Pearls and Golds Publishing Co.
- Pawlina W (2009) Basic Sciences in Medical Education: why? How? When? Where? Med Teach 31:787-789.
- Ugwu AC, Ukwueze AC, Erondu OF, Nwokorie E (2010). Affective and cognitive learning outcomes of radiography students in a Nigerian University. The South Afr Rad Vol 48 (1)
- Williams PL, Warwick R, Dyson M, Bannister LH eds. (1989). Gray's Anatomy. London: Churchill Livingstone.