

Full Length Research Paper

## Assessing students' knowledge of sub-disciplines in anatomy: A pilot study

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In recent time, anatomy as a discipline has been broadened, providing lodgings for sub-disciplines. Arising from the consequence of this expansion, it is necessary to assess the knowledge of the sub-disciplines among student trainees in anatomy. Hundred pretested and self-administered questionnaires were administered to undergraduate students and graduate students of BSc. in Anatomy of the Ebonyi State University, Abakaliki, Nigeria. Results show bio-anthropology to be least known among the students with only 1% of the individuals claiming to have adequate knowledge of it. Other disciplines like sports science and biomechanics, mortuary science, biometrics and forensic biology were higher in the list while evolutionary biology and comparative anatomy, neuroscience, clinical genetics and embryology and histology and histochemistry were top on the list with the students claiming adequate knowledge to specialize in them. This shows that not all sub-disciplines are understood and appreciated by our students and this assessment will be a guidepost in future re-design and review of our undergraduate and post-graduate curricula.

**Key words:** curriculum, anatomy, anatomy education, sub-disciplines, Nigeria.

### INTRODUCTION

The underlying principle for anatomy as a discipline emerged from its important role within the medical education (Jones, 1997). This has also seen its teachings viewed almost absolutely in terms of medical education (Jones and Harris, 1998). As a result, what should have been core biomedical science programs in Anatomy are almost exclusively tied to the whims of medical education and their roles in the advancement of clinical and experimental research is undermined because of their position as teaching territories.

Historically, these attributes of the departments of Anatomy stems from their absolute constituency of medical students, who required knowledge just adequate

for a career in the medical school. It also stemmed from the clinical predisposition of the then teachers who were only interested in conventional sub-disciplines in anatomy (gross anatomy, histology, embryology, neuro-anatomy). And in these conventional areas, they mostly dwelt within the confines of their related clinical specialty without daring into a methodical extension of the borders of experimental anatomy. Subsequently in the train of history, there was a dearth of anatomy teachers and core science programs were established to train scientists who will train medical students and other scientists to continue the cycle of teaching anatomy without bearing in mind that within the African setting, an average student

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**Table 1.** Order and number of distributed questionnaire.

<b>Students' level</b>	<b>No. of questionnaires administered</b>
300	30
400 (Final year)	35
Graduates	35

primarily studies to “put food on the table” in the foreseeable future.

In Nigeria, these core science programs were established in the 1970s with the narrow philosophy of training to train and a thin and totally malnourished curriculum without basic elements and content that could grant self-sufficiency and professional diversification for the trainees, which are factors that could enhance better living in their future. This myopic scenery of anatomy curriculum in Nigeria adversely narrowed the knowledge of its sub-disciplines which was meant to escalate the speed of research and kindle the interest of researchers (Drake, 1998), a must-achieve in Nigeria.

In recent time, anatomy as an indispensable medical science has been converted into a broader discipline, providing lodgings for an extensive variety of disciplines from topical to erstwhile experimental sciences (Drake, 1998). And 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 (Egwu, 2011). Thus, the concept of anatomy as “structure” has been complexed and apodictically revolutionized to accommodate recent advances in science and technology (Egwu, 2011) and these science departments are beginning to undergo structural and technical repositioning for self-sustainability in the future of her trainees.

Consequently, sub-disciplines such as clinical embryology, cell and molecular biology, biometrics and forensic biology, biomechanics/sports medicine, genetics, neurosciences, evolutionary biology and comparative anatomy, medical ethics, anatomy education, developmental biology, imaging and radiology, bioanthropology/anthropometry and mortuary science are being incorporated into the curriculum and program design of these science departments. This has further given merit to the research, functional and possible collaborative roles of these departments in the medical, biological, physical and biomedical engineering sciences with broadened prospects for the trainees.

Arising from the consequence of this expansion, it is necessary to navigate through the expanded anatomy curriculum with a view to assess the knowledge of the sub-disciplines among student trainees. This assessment will serve as a guide in the design and redesign, improvement, sustainability and desirability among trainees for ease of professional diversification and specialization

in their future. This study will also enkindle in the trainees, the desire and enablement to make a good choice of sub-discipline, for specialization, from a larger perspective.

## **MATERIALS AND METHODS**

A self-administered and pretested questionnaire was used for the evaluation. The questionnaire was administered to one hundred (100) students, cum graduates of the Bachelor of Science in Anatomy of the Ebonyi State University, Abakaliki, Nigeria. The order of distribution and administration as shown in Table 1, incorporates 300 level students (3rd year), 400 level students (final year) and graduates (Including those who just graduated and those awaiting the National Youth Service Scheme). This assessment was done within a week.

While the questionnaires were distributed, emphasis was made on the structure, aim and objectives of the study. Each component of the questionnaire was graded using an apparent lancet scale. As shown in Table 2, the maximum point for each of the questions asked was taken to be three while the least is zero 0.

### **Level of awareness of the subspecialties**

This was determined by the summation of allocated points divided by total number of points. The following scales was taken: Not heard of it (N) =0, Just heard of it (J) =1, Slight knowledge of it (S) =2, Adequate knowledge of it (A) =3, and Sum of the study sample and returned questionnaires (n) = 87.

$$\text{Level of awareness} = \frac{\sum fx}{\sum f}$$

$$\text{Reference value/Determinant} = \frac{0+1+2+3}{4} = \frac{6}{4} = 1.5$$

A student is considered to be aware of a sub-discipline if the mean reaction is greater than the determinant ( $\geq 1.5$ ).

### **Ethical consideration**

Subject to the fact that our study protocol does not represent biomedical or epidemiological research, there was no ethical consideration by the local Institutional Review Academic Board of the Faculty of Basic Medical Sciences of Ebonyi State University (EBSU). However, our procedures complied with data protection rules, and all data were anonymized prior to analysis and the participants gave their verbal consent to participate in the study.

**Table 2.** Questions and allocated points.

Question	Points
Not heard of it (No knowledge/level of awareness, as a matter of fact receiving the information for the first time)	0
Just heard of it (Road-side level of awareness)	1
Slight knowledge of it (Level of awareness is not adequate such that one can desire to specialize in it)	2
Adequate knowledge of it (A grounded knowledge is said to have been attained in this case, such that the individual can desire specializing in it)	3

**Table 3.** Difference in sex among sample of anatomy students.

Sex	Frequency	Percent
Male	68	78.2
Female	19	21.6
Total	87	100

**Table 4.** Comparison of total scores between the modes of admission.

Mode of admission	N	Mean	Standard deviation	T	Df	p-value
Choice	35	15.26	6.423	-	85	0.940
Chance	52	15.37	6.657	0.075		

**Table 5.** Age distribution among the study sample.

Age (years)	Valid N	Minimum	Maximum	Mean	Standard deviation
-	87	18	33	23.64	2.650

### Statistical analysis

The statistical analysis was done using the Statistical Package for Social Sciences version 16 (SPSS 16).

35 and 18 years, respectively with the mean age being 23.64 (Table 5).

## RESULTS

### Sex

As shown in Table 3, a higher percentage of males (78.2%) are more interested in anatomy as a discipline when compared with their female counterparts (21.6%).

### Multiple comparisons between the students level of study

As shown in Table 6 (with their different P-value), result of the comparative analysis of individual's level of study revealed that there is no appreciable difference between the graduate students and the final year students. Much difference is observed between final year and 3rd year students and between the graduates and the 3rd year students also.

### Mode of admission

Comparing the mode of admission (choice and chance), results showed no significant difference between students admitted by choice and those admitted by chance (Table 4).

### Level of awareness of the sub-specialties

In this study, bio-anthropology had the least level of awareness (0.90) with only 1% of the individual claiming to have adequate knowledge of it (Table 7). The student's response on sports science and biomechanics centered (38%) on "Not heard of it", while only 6% had adequate knowledge. Although 30% of the students appeared to

### Age distribution among the study sample

It was observed that the maximum and minimum age is

**Table 6.** Multiple comparisons between the students level of study.

(I) Level of study	(J) Level of study	Mean difference (I-J)	P-value
Graduate	Final year	1.724	0.257
	3rd year	6.530	0.000
Final year	Graduate	-1.724	0.257
	3rd year	4.806	0.005
3rd year	Graduate	-6.530	0.000
	Final year	-4.806	0.005

The mean difference is significant at the 0.05.

**Table 7.** Level of awareness of the subspecialties.

Sub-discipline	N	J	S	A	Level of awareness
Bio-anthropology	33	31	22	1	0.90
Sports science and biomechanics	32	28	22	5	1.00
Biometrics and forensic biology	22	33	26	6	1.18
Mortuary science	22	23	31	11	1.35
Clinical genetics	9	28	37	13	1.62
Clinical embryology	6	24	47	10	1.70
Evolutionary biology and comparative anatomy	11	25	29	22	1.71
Neuroscience	13	22	28	24	1.72
Cell and molecular biology	6	23	31	27	1.91
Histology and histochemistry	1	15	35	36	2.22

have a slight knowledge of biometrics and forensic biology, only 7% have adequate knowledge to specialize in it. Although 36, 45 and 54% of the students had slight knowledge of mortuary science, clinical genetics and clinical embryology, only 13, 15 and 11% of the students appeared to have enough information. Students seem to be more aware of evolutionary biology and comparative anatomy, neuroscience, cell and molecular biology, histology and histochemistry as a sub-discipline of anatomy with 25, 28, 31, and 41% of students claiming to have adequate knowledge of them, respectively (Table 7).

## DISCUSSION

The aforementioned sub-disciplines are tactically and strategically within the borders of anatomy which is ceaseless and diverse in its own way, to contribute immensely and beyond doubt, to research in the biomedical and clinical sciences. Hence the need for their knowledge cannot be overemphasized.

The rationale behind graduate preference for discipline other than medical science research and the factors motivating these choices might be lack of

definite knowledge of the sub-disciplines of anatomy as shown in our study (Paris and Frank, 1983; Wright et al., 2004).

As a result of misguided orientation and absence of awareness of these sub-disciplines, many graduates cannot see a future in anatomy. It has been established that within the African setting, an average student primarily studies to be able to "put food on the table" in the foreseeable future. Inadequacies in meeting up with this self-laid demand has scared off a mass of young people and as such have a say in the exodus of anatomy graduates to other spheres of life.

In Nigeria, only few graduates of anatomy acquire a step further by enrolling for a postgraduate program, while majority either opt to study "Medicine" or "work in the bank" as the case may be, without giving a thought on the wide research opportunities associated with anatomy as a discipline. The popular conception that an anatomist is a dissector of dead bodies or an individual who works in a morgue as a mortuary attendant has done nothing but abbreviate their self-worth, enthusiasm and interest, and by this means contributing to the mass departure of the said graduates (Jones, 1997). Their colleagues who end up studying for a postgraduate program remain superfluous in the outside

environment as a result of the pre-conditioned inspiration that begat the establishment of their programs (Pawelczyk et al., 2007; Mustapha et al., 2012).

It is imperative to note that notwithstanding the advances seen in a range of sub-discipline mentioned earlier, the curriculum of undergraduate programs in anatomy has been quite stagnant. This is made worse by the curriculum being centered, structured and organized within the confines of a medical school (Mustapha et al., 2012; Pawlina, 2009).

In urbanized countries such as the United State of America and England, some cellular and sub-cellular aspects of structure are painstakingly investigated in details. This has brought several anatomists to an ample range of career opening from forensic and morbid units, stem cell research institutes to even sport sciences. However these job opportunities are not regular in Nigeria, it is absolutely essential to establish and equip programs that can sustain our teaming undergraduate trainees in the seemingly clouded future of career prospects in Nigeria (Egwu, 2011).

Students are still being offered admission just for the ego of being called students without standard measures to checkmate and balance the knowledge of their field of study. It is no gain to say that the need for emphasis on the awareness of the sub-disciplines needs be blown louder than ever.

According to Jones and Harris (1998), it is crucial and insistent to redefine the precincts of anatomy in requisites of the techniques and approaches available at present, thereby recentralizing, by spreading out the restrictions of our undergraduate and graduate curricula (Mustapha et al., 2012; Dorsey et al., 1996; Saigal et al., 2007).

Even though prospect specialization in postgraduate study can make available a set of skills which may be the highest degree to augment the worth of anatomy graduates, individuals are at variance, having like chalk and cheese attitudes, interests and abilities (Mustapha et al., 2012; Crimlisk and McManus, 1987; Craig, 2010).

Hence, career choice in anatomy consequently requires students taking into deliberation the whole variety of sub-disciplines and then marking out those which they adequately judged as broadly acceptable (Mustapha et al., 2012; Colin and Anthea, 2005; Weil and Schleiter, 1981).

In other for a researcher to flourish in any of the aforementioned sub-discipline, an underpinning knowledge from an effective university medical education is required (Ten and Durning, 2007). For this, medical education must be seen as a gamut, integration of the sub-discipline throughout the curriculum with emphases laid on self-directed and lifelong learning (Drake, 1998).

When seen by anatomist and the students as a boundless discipline and as a substratum of the biomedical sciences, it would become principal that the

need for awareness be more prominent.

## RECOMMENDATION

From the onset of admission, student's willingness to take up the course should be examined. This will help initiate/imbibe some level of seriousness among the students. If possible, admission should be strictly based on choice of students who must have fared well in their O' level and JAMB examinations.

A periodic assessment strategy should be mapped out to evaluate the student's level of awareness of these sub-disciplines. The learning of anatomy should be spiced up with some interesting programs which could tame students who have had wrong orientation about the discipline.

## Conflict of Interests

The author(s) have not declared any conflict of interests.

## REFERENCES

- Colin S, Anthea L (2005) Career counseling. In: Hastie A, Hastie I, Jackson N (eds.), *Postgraduate medical education and training: a guide for primary and secondary care*. Oxford: Radcliffe Publishing Ltd. Chapter 7, pp. 73–80.
- Craig Blake (2010). *Careers in Science – Graduate Carrers in Australia*. Monash University, Faculty of Science. [http://www.graduaterecareers.com.au/wp-content/uploads/2011/12/careers\\_for\\_science\\_graduates.pdf](http://www.graduaterecareers.com.au/wp-content/uploads/2011/12/careers_for_science_graduates.pdf)
- Crimlisk HL, McManus IC (1987). The effect of personal illness experience on career preference in medical students. *Med. Educ.* 21(6):464–467.
- Dorsey ER, Jarjoura D, Rutecki GW (2005). The influence of controllable lifestyle and sex on the specialty choices of graduating U.S. medical students, 1996-2003. *Acad. Med.* 80(9):791–796.
- Drake RL (1998). Anatomy Education in a changing medical curriculum. *Anat. Rec.* 253:28-31.
- Drake RL (1998). Anatomy Education in a Changing Medical Curriculum. *Anat. Rec.* 253:28–31.
- Egwu OA (2011). Building a Case for Curriculum expansion in Anatomy Education in Nigeria. *J. Experimental Clin. Anat.* 10:1.
- Jones DG (1997). Anatomy Departments and Anatomy Education: reflections and myths. *Clin. Anat.* 10:34-40
- Jones DG, Harris RJ (1998). Curriculum Developments in Australasian Anatomy Departments. *Clin. Anat.* 11:401-409.
- Mustapha B, Akin-Tunde AO, Ousman N, Bintou J, Akinyinka OO (2012). Medical students' choices of specialty in the Gambia: the need for career counselling. *BMC Med. Educ.* 12(1):72.
- Paris J, Frank H (1983). Psychological determinants of a medical career. *Can. J. Psychiatry* 28:354–357.
- Pawelczyk A, Pawelczyk T, Bielecki J (2007). The effect of some factors on medical student specialty choice of non-primary care- a synthesis of the literature. *Pol. Merkur Lekarski* 22:575–579.
- Pawlina W (2009). Basic Sciences in Medical Education: why? How? When? Where? *Med. Teach.* 31:787-789.
- Saigal P, Takemura Y, Nishiue T, Fetters MD (2007). Factors considered by medical students when formulating their specialty preferences in Japan: findings from a qualitative study. *BMC Med. Educ.* 7:31.
- Ten Cate O, Durning S (2007). Dimensions and psychology of peer teaching in medical education. *Med. Teach.* 29:546-552.

Weil PA, Schleiter MA (1981). National Study of Internal Medicine Manpower: VI. Factors Predicting Preferences of Residents for Careers in Primary Care or Subspecialty Care and Clinical Practice or Academic Medicine. *Ann. Intern. Med.* 94(5):691–703.

Wright B, Scott I, Woloschuk W, Brenneis F, Bradley J (2004). Career choice of new medical students at three Canadian universities: family medicine versus specialty medicine. *CMAJ* 170(13):1920–1924.