Assessing students' knowledge of subdisciplines in Anatomy

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Abstract:

CONTEXT: In recent times, the knowledge of anatomy has been broadened to a wide range of subdisciplines such as forensic science, sports medicine, and medical genetics. Despite these recent trends, anatomy undergraduates are faced with challenges of areas of specialization and limited or no job placement for a degree in anatomy.

AIM: This study was therefore aimed at assessing the students' knowledge of subdisciplines in Anatomy.

SETTINGS AND DESIGN: This study was a cross-sectional survey study that involved the use of questionnaires and was carried out in Delta State University Abraka and University of Benin, Benin City.

MATERIALS AND METHODS: Two-hundred and ninety-seven semistructured, close-ended questionnaires were administered to Delta State University Abraka and University of Benin undergraduates, from whom due consents have been obtained to fill. Respondents' sociodemographic factors, university levels, and awareness of the various subspecialties in Anatomy were recorded.

STATISTICAL ANALYSIS: The results obtained are presented in simple percentages and frequencies, with illustrations represented in tables and figures.

RESULTS: The study recorded the highest percentage in Histochemistry and Histology which accounted for 14.06%. This was followed by Clinical Embryology, Cellular and Molecular Biology, Mortuary Science, and Neuroscience which constituted 13.71%, 12.49%, 11.73%, and 11.38%, respectively. Lower percentages were recorded in Comparative Anatomy (8.80%), Biometrics and Forensic Biology (9.00%), and Clinical Genetics (9.81%). It further showed the lowest percentages in Sports Science and Bioanthropology which constituted 3.74% and 5.20%, respectively. The findings from this study also showed no differences between males and females as to who is more interested in Anatomy. Furthermore, results from the mode of admission showed that a higher percentage of students were admitted by chance (56.6%) than by choice (43.4%).

CONCLUSION: The present study demonstrated that students have an adequate knowledge of subdisciplines introduced during their course of study but lacked adequate knowledge in some major career prospects in Anatomy.

Keywords:
Biometrics, clinical embryology, curricula

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Introduction

Anatomy, an important subject in the medical sciences, has been described as the knowledge of the structure of human body down to the molecular level (Anand, *et al.* 2004). It has been shown to be essential in the understanding of bodily functions in relation to diverse processes (McCuskey, *et al.* 2005).

The 21st-century anatomist have been able to incorporate Human Anatomy into broader disciplines and subspecialties, which has provided lodgings from tropical to experimental sciences (Drake, 1998). The study of anatomy has gradually evolved from artistic representations in the medieval

periods to a huge biomedical science that incorporated experimental and clinical sciences, genetics, gross anatomy, and histology in subcellular, cellular, and molecular levels (Egwu, 2011).

Its emerging principles have played essential roles in medical education as it has become a compulsory course in the training of personnel where it is lectured at both undergraduate and postgraduate levels (Jones, 1997). Studies have stated that anatomy has been demonstrated to be imperative in training of doctors and supporting modern clinical practices, but only 1.5% of preclinical medical students have been reported to take up a career in anatomy in a study conducted by Turney (2007) and Oyebola and Adewoye (1998).

According to Egwu (2011), subdisciplines such as Clinical Embryology, Cell and Molecular Biology, Biometrics, Biomechanics and Sports Medicine, Genetics, and Neuroscience have now been incorporated into the curriculum design of Anatomy which has extended the diverse horizon in medical, biological, physical, and biomedical sciences (Egwu, 2011).

Despite these advances, Mustapha *et al*. (2012) reported a stagnancy in undergraduate program curriculum. However, another study reported that the curriculum is centered, structured, and organized within the confines of the medical school, leading to neglect of their roles in experimental and clinical research (Pawlina, 2009).

Cohort studies have reported a lack of knowledge in the prospects and subdisciplines in Anatomy as one of the factors motivating graduate preferences for disciplines other than medical researches (Mustapha, *et al*. 2012; Pawlina, 2009) One of the challenges encountered by anatomy undergraduate is limited areas of specialization (Pawlina, 2009). A study stated that anatomy graduates barely make a career from Human Anatomy and thus resort to other sectors such as banking due to lack of awareness on areas of specialization (Pawlina, 2009). This has left the students with the mindset that there is limited or no job placement for a degree in Anatomy. Hence, this study is aimed at assessing the students' knowledge of the subdisciplines in Anatomy and will further expose anatomy students to a wider range of subdisciplines in Anatomy.

Materials and Methods

The study adopted a cross-sectional survey design that involved a self-administered questionnaire which were used for evaluation. Approval for this study was sought from the Department of Human Anatomy and Cell biology, Faculty of Basic Medical Sciences, Delta State University Abraka, and University of Benin, Benin city. A total number of 297 students in Human Anatomy

Department Delta State University and University of Benin, respectively, between 200 and 400 levels were assessed on their knowledge of subdiscipline in Anatomy. Three questionnaires which were not properly filled or incompletely filled were excluded. There was no specific order for the distribution of questionnaires, but emphasis was on the structure, aims, and objectives of the study. Students were asked to tick YES or NO depending on their awareness on a particular subspecialty. Data obtained were subjected to Statistical Package for Social Sciences (SPSS) software version 21 manufactured by IBM. Values are expressed in frequencies and simple percentages and illustrations are represented in tables and figures.

Results

Figure 1 shows the distribution of the studied population according to gender. One-hundred and forty-nine (50.2%) of the subjects were females, while 148 (49.8%) of the studied population were males.

Table 1 reveal the age range of subjects to be between 16 and 40 years. Subjects who were 20 years were studied with a higher frequency followed by those who were 21 years and subjects in the age range between 30 and 40 years were studied with a lower frequency.

Table 2 shows that a higher number of students gained admission to study anatomy by chance with a lower percentage in those who chose it as a course.

Figure 2 shows the various subspecialties and students' response to each subspecialty. Sports Science received the lowest percentage (3.74%). This was followed by Bioanthroplogy (5.20%), Evolutionary Biology and Comparative Anatomy (8.80%), Biometrics and Forensic Biology (9%), and Clinical Genetics (9.81%). Subspecialties such as Neuroscience, Mortuary Science, Molecular Biology, and Clinical Embryology had higher responses of 11.38%, 11.73%, 12.49%, and 13.71%, respectively, with the highest percentage response of 14.06% from Histochemistry and Histology.
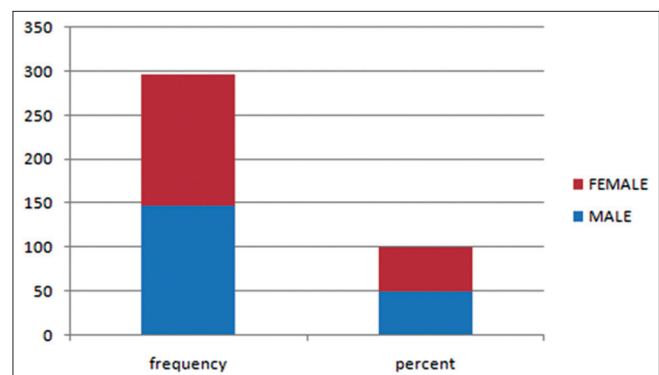

Figure 1: Descriptive statistics of the study population according to gender

Table 1: Age distribution among the study population

Age	Frequency (%)
16.0	3.0 (1.0)
17.0	6.0 (2.0)
18.0	15.0 (5.1)
19.0	37.0 (12.5)
20.0	54.0 (18.2)
21.0	52.0 (17.5)
22.0	32.0 (10.8)
23.0	38.0 (12.8)
24.0	28.0 (9.4)
25.0	15.0 (5.1)
26.0	4.0 (1.3)
27.0	4.0 (1.3)
28.0	3.0 (1.0)
29.0	2.0 (0.7)
30.0	1.0 (0.3)
31.0	2.0 (0.7)
40.0	1.0 (0.3)
Total	297 (100.0)

Table 2: Subjects' mode of entry into university

Mode of admission	Frequency (%)
Chance	168 (56.6)
Choice	129 (43.4)
Total	297 (100)
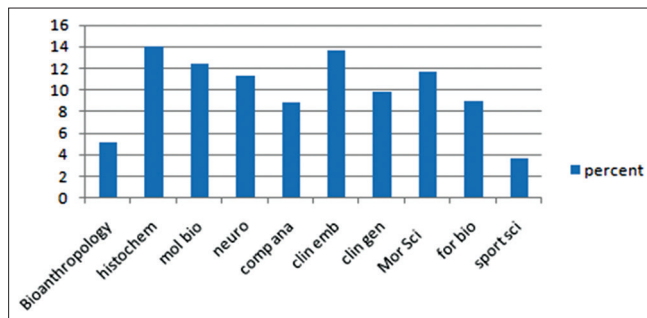
Figure 2: Students awareness in various subspecialties in Anatomy. Histochem- Histochemistry. Mol bio- molecular biology. Neuro- neuroscience. Comp ana –evolutionary biology and comparative anatomy. Clin emb- clinical embryology. Clin gen – clinical genetics. Mor sci – mortuary sience. For bio – biometrics and forensic biology. Sports sci – sports science. Histochem – Histochemistry and histology.

Discussion

The present study evaluated the students' knowledge of the subdisciplines in Anatomy. Numerous subspecialties have been added within the confines of Human Anatomy. These various areas have been reported to contribute immensely to clinical research at both cellular and molecular levels.

This study showed a higher response from subjects between the ages of 19 and 21 years and a very low response from subjects between the ages of 16 and 29–40 years. This finding could be attributed to the fact

that tertiary institution entrance age is 18 years, and usually between 23 and 26 years, an individual must have graduated from university (Huebler, 2005). In addition, this study involved students who were either in their 2nd, 3rd, or 4th year in the university, which therefore implied that students at these academic levels were mostly between 19 and 21 years.

The current study demonstrated that a higher percentage of students were admitted by chance compared to those who applied to study Human Anatomy in Tertiary Students by choice. This, therefore, implied that most graduates and students of Human Anatomy did not have a knowledge of anatomy before gaining admission into universities, and as such did not choose it as a course of study. Subjects who claimed to have a knowledge of it were ignorant of its prospects and as such chose other courses which they described as professional courses. These observations could be attributed to a lack of knowledge in the varying subdisciplines of Human Anatomy as was previously reported (Egwu, 2011). In addition, misguided orientation, absence of awareness, and negative perception toward anatomy could be leading factors to this resultant pattern.

The index study revealed that students have no knowledge on some specialties in Anatomy such as Sports Science and Bioanthropology and as such are not aware of the vital role an anatomist plays in those fields. These observations could be due to the fact that these subfields are not within the confines of B.Sc. Human Anatomy curriculum but could be enlisted in the postgraduate program curriculum in the Western world. In Nigeria, only few graduates of anatomy acquire a step further by enrolling for a postgraduate program, while majority either opt out to study medicine or engage in other white-collar jobs without giving a thought of the wide research opportunities associated in the field of anatomy and its numerous roles in diagnostic medicine. Egwu *et al*. in 2014 stated that anatomy graduates who ended up studying for a postgraduate program remain superfluous in the outside environment as a result of the preconditioned inspiration that begat the establishment of the programs (Egwu, *et al*. 2014). Reasons for this observation may be attributed to the fact that moreover, the curriculum of undergraduate and postgraduate programs in anatomy has been stagnant due to the fact that it has been centered, structured, and organized within the confines of a medical school, which has led to the neglect of their roles in experimental researches as was previously reported (Pawlina, 2009).

The study demonstrated a maximal response in Histology and Histochemistry which was followed by subfields such as Neuroscience, Mortuary Science,

Cellular and Molecular Biology, Clinical Embryology, Evolutionary Biology and Comparative Anatomy, Biometrics and Forensic Biology, and Clinical Genetics. This could be attributed to the fact that these subfields were introduced into the students' curriculum during their course of training at graduate and postgraduate levels, but some students lacked awareness on their roles and how they fit in each of the particular subspecialties.

In the Western world, researches at cellular and subcellular levels are investigated in detail as such because every scientist/specialty has a role to play (Saigal, 2007). This has provided a career opportunity to a majority of anatomists who specialized in the different subdisciplines of Anatomy such as Forensic and Morbid Anatomy, Stem Cell Research, Molecular Genetics, and Sports Medicine, just to mention but a few. Consequently, in developing countries such as Nigeria, there is a limited opportunity for anatomy graduates, which has led to a loss of interest amongst students undergoing a career in Nigeria and also coupled with the belief that an average anatomist is a dissector of dead body and a mortician has reduced their self-worth and scared many away in building a career in anatomy (Saigal, *et al*. 2007).

Conclusion

The index study has demonstrated a lack of knowledge by students toward some major career prospects in anatomy. The study also revealed that students have a knowledge of the subdisciplines introduced during their course of study.

Recommendations
In line with the findings from this study, choosing a career in anatomy has become a major challenge that anatomy undergraduates face. As such, the following measures will be imperative in putting this to a check.
1. Government should enact an anatomical act that will guide and protect the interest of an anatomist
2. Orientation programs should be organized annually to new students of anatomy so as to educate them on the various subdisciplines in Anatomy
3. Internship should be introduced in the training of an anatomist so as to increase the graduates' skills and level of awareness in areas of specialization

4. Industrial trainings should be made compulsory at undergraduate levels as this will facilitate the learning of anatomy
5. Anatomy conference meetings should be made compulsory to students and academic staffs in Human Anatomy
6. Quality control assessment measures should be encouraged in all the departments of Anatomy
7. Redesign and restructuring of curriculum at postgraduate and undergraduate levels should be actively implemented.

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Conflicts of interest
There are no conflicts of interest.

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