

Factors Affecting Study of Clinical Anatomy among Undergraduate Medical Laboratory Students

Clinton D. Orupabo^{1,*}, Progress D. Victor¹, Kenneth S. Ordu¹, Barinua K. Gbaranor², Elvis T. Godam¹

¹Department of Human Anatomy, Faculty of Basic Medical Sciences, College of Medical Sciences, Rivers state University, Nkpolu-Oroworukwo, Port Harcourt, Nigeria

²Department of Human Physiology, Faculty of Basic Medical Sciences, College of Medical Sciences, Rivers state University, Nkpolu-Oroworukwo, Port Harcourt, Nigeria

Abstract Anatomy being a major course in medical school is generally believed to be the foundation subject of medicine. The aim of our study therefore is to determine the possible factors affecting study of clinical anatomy among Medical Laboratory students. The introduction of the study of clinical anatomy to medical laboratory students may not be entirely weird. This is a cross-sectional study carried out on undergraduate medical laboratory students of Rivers State University. 266 students (males=118, females=148) aged 15-38years participated in the study drawn from two hundred to five hundred levels. The percentage of students who like the anatomy subject in class 2, 3, 4 and 5 are 73.68%, 72.91%, 71.58% and 57.14% respectively. The data is statistically significant ($p < 0.05$) for students who like or dislike anatomy. There is no correlation between class level and number of students who passed at first attempt ($r=0$). There is no significant gender variation with first attempt pass in anatomy (males=59.32%, females=57.43%). Most prevalent circumstances affecting study of clinical anatomy among the respondents include: insufficient practical sessions, too many other courses, short semester calendar, no conducive atmosphere, voluminous course content, overcrowding and no good lecture classrooms. Therefore a well taught student within a conducive learning environment could lift one from poorer grades to better grades.

Keywords Clinical Anatomy, Medical Laboratory, Students, Factors

1. Introduction

Several arguments have bedeviled some cogent reasons to students' performance in their academics. Again students of African descent popularly owe their performances if poor, to some folklore or evil spells. More so anatomy being a major course in medical school is generally believed to be the foundation subject of medicine. The aim of our study therefore is to determine the possible factors affecting study of clinical anatomy among Medical Laboratory students. The introduction of the study of clinical anatomy to medical laboratory students may not be entirely weird. This is because clinical anatomy is studied at various capacities, volume of work and application for the various fields of medical experience. For instance a surgeon may appreciate more in-depth anatomy to the radiologist and as well the clinical anatomist to the nurse. Clinical laboratory sciences (also known as medical technology) is a biology/chemistry-based bachelor's degree that prepares

students for exciting, challenging and dynamic careers in places such as hospital labs and clinics, forensic labs, veterinary clinics, industrial research labs and molecular biotechnology. [1] Therefore everyone in the medical arena needs some anatomy to work in the medical field. The often aversion to some subjects especially anatomy and the under-performance of students in the anatomy subject has necessitated this research. Some students who could not proceed with their medical career were most probably withdrawn for failure in anatomy. Poor academic performance was identified in Henderson repository nursing research as caused by distraction from family events, absence of group studies and lack of motivation from awards, scholarships and teachers. [2] Also in a study on factors affecting self regulated learning in medical students, major factors implicated included family, peers, instructors, educational environments and personal characteristics of the students. [3] The strongest positive factors which influenced the academic performance of all the female medical students were the facility available for study, family support, and awareness about the medical course. Anxiety and stress and lack of sleep were the strong negative factors. There was significant difference ($p < 0.05$) between preclinical and clinical students regarding the time for self-study and lack of sleep. [4]

Clinical anatomy thus emphasizes aspects of structure and

* Corresponding author:

clinton.orupabo@ust.edu.ng (Clinton D. Orupabo)

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function of the body that are important in the practice of medicine, dentistry, and the allied health sciences. [5] Dissection experience as an aspect of clinical anatomy is important not only for learning cadaveric material, but also for understanding anatomical relationships tested conceptually during lecture-based written examination. [6-9]

Anatomy competence is defined as the possession of appropriate anatomy knowledge, and practical and clinical application of the knowledge. [10, 11] In a study by Oluwatoyin *et al.*, 2009 [12], 98% of respondents who were medical students agreed that anatomy was an important subject in medical science. 71.1% said knowledge of anatomy was important in investigating patients with certain diseases. Esom *et al.*, 2010 [13] reported in a study to determine factors that affect medical students performance in the subject of anatomy in the University of Nigeria, that 111 (55.2%) of respondents implicated overcrowding as major cause of students aversion for dissection resulting in poor performance. 55.2% also believed that audio-visual aids offered students adequate exposure to learning of anatomy. In another study by Bergman *et al.*, 2013, [14] students stated that repetitive studying of the subject of anatomy increases retention of knowledge to a greater extent than stricter assessment, and teaching in context enhances motivation and transfer. Innovations in teaching and assessment, like spiral curriculum, teaching in context, teaching for transfer and assessment for learning (rewarding understanding and higher order cognitive skills), are required to improve anatomy education. Sbayeh *et al.*, 2106 [15] and Craig *et al.*, 2010 [16] in a study reported that Anatomy educators indicated dissatisfaction with the time available for anatomy within the medical curriculum. Sitticharoon *et al.*, 2014 [17] in a study on first preclinical year medical students detected no significant difference in academic scores of the three main subjects (anatomy, physiology and biochemistry) between sexes. Our study focused on finding the possible factors associated with learning anatomy among medical laboratory students, who are one of the allied health students.

2. Materials and Method

This is a cross-sectional study carried out on undergraduate medical laboratory students of Rivers State University, Nkpolu-Oroworukwo, Nigeria for a period of 1 month. Participants were drawn from students between two hundred to five hundred levels. Year one students were excluded from this study because they are yet to undertake the subject anatomy. Year two students were those presently undertaking anatomy as a course. Year three to five had undertaken anatomy during their second year. All the students recruited for this study had in one time or the other undertaken anatomy as a course for both first and second semester. They had also undertaken both continuous assessments and examinations for anatomy. 266 students (118 males and 148 females) at 15 – 38 years were recruited

for this study through cluster sampling method. Self administered, well structured questionnaires were completed by participants after they were given instructions by the researchers. The data were analyzed with Microsoft Excel and P value < 0.05 was considered significant. T test was used to determine level of variation in the mean among students who like or dislike anatomy. Pearson's correlation was applied to the various class levels to evaluate the correlation in first attempt pass in anatomy.

3. Results

The results are shown in tables 1 – 5 and figures 1 – 5. The data displays in elaborate presentation the factors affecting appreciation, understanding and performance level of clinical anatomy among Medical Laboratory students. Class levels 2 – 5 were studied for various responses in our questionnaire. The percentage of students who like the anatomy subject in class 2, 3, 4 and 5 are 76.09%, 76.08%, 74.72% and 64% respectively (table 1). Year 5 students were the least among students who like anatomy and were the greatest among students who dislike anatomy. Most probably year 5 students' exposure to anatomy may have been accompanied with some peculiar circumstances compared to others. There appears to be no significant variation among various class levels for students who either like or dislike anatomy. There was a marked mean difference between students who like anatomy (mean=47.25) and those who dislike anatomy (mean=16.25). T test also shows some variation ($p < 0.05$) between those who like anatomy and those who dislike anatomy (table 2). The data is thus statistically significant ($p < 0.05$) for students who like or dislike anatomy.

Table 1. Students Perception on Anatomy

Class level	N	Students who like Anatomy		Students who do not like Anatomy	
		N	%	N	%
Year 2	92	70	76.09	22	23.91
Year 3	46	35	76.08	11	23.91
Year 4	91	68	74.72	23	25.27
Year 5	25	16	64.00	09	36.00

N=number of students, %=percentage, S.D=standard deviation, Total Nil response=12/266 (4.5%)

Table 3 shows that year 3 and 4 were highest among students who passed anatomy at first attempt with 77.08% and 80% respectively. There is no correlation between class level and number of students who passed at first attempt ($r=0$). There is a statistically significant difference ($p<0.05$) between various class levels (table 3). There is no significant gender variation with first attempt pass in anatomy as seen in table 4, though slightly higher in males (males = 59.32%, females=57.43%).

Majority of the respondents said they passed anatomy after their first attempt while most of them disliked the

subject because it is too difficult to understand and has a lot of topics to be covered, which are not properly taught (fig.1 & 2). However, most respondent (146/ 174, 84%) like anatomy because it helps them to understand the human body and appreciate its functions (table 5). Our study also demonstrates that students who spent longer duration (15-19hrs, 20-24hrs, 35-39hrs and 40-44hrs) had better performances in anatomy assessment and examination compared to those who spent less time per week (fig 3).

Most prevalent circumstances affecting study of clinical anatomy among the respondents include: insufficient practical sessions, too many other courses, short semester calendar, no conducive atmosphere, voluminous course content, overcrowding and no good lecture classrooms (fig 4). Most of the respondents think that inclusion of more practical sessions, having dedicated lecturers, reducing course content, using visual aids and cadaveric demonstrations would help improve their performance in anatomy (fig 5).

Table 2. Statistical Analysis of Students Perception on Anatomy

Students Perception	N	Mean	S.D	T score	P value (<0.05)	Inference
Students who like Anatomy	189 (74.4%)	47.25	26.30	0.048	<0.002	Significant
Students who do not like Anatomy	65(25.6%)	16.25	7.24		0.021	Significant

N=number of students, %=percentage, S.D=standard deviation, Nil response=12

Table 3. Statistical Analysis of Students who Passed Anatomy at First Attempt

Class level	N	Students who passed at first attempt					
		N	%	Mean	P value	Inference	Pearson's correlation (r)
2	95	32	33.68	41.00	<0.001	Significant	0
3	48	37	77.08				
4	95	76	80.00				
5	28	19	67.86				

N=number of students, %=percentage

Table 4. Gender Variation of Students who Passed Anatomy at First Attempt

Sex	N	Students who passed at first attempt	
		N	%
Male	118	70	59.32
Female	148	85	57.43

N=number of students, %=percentage

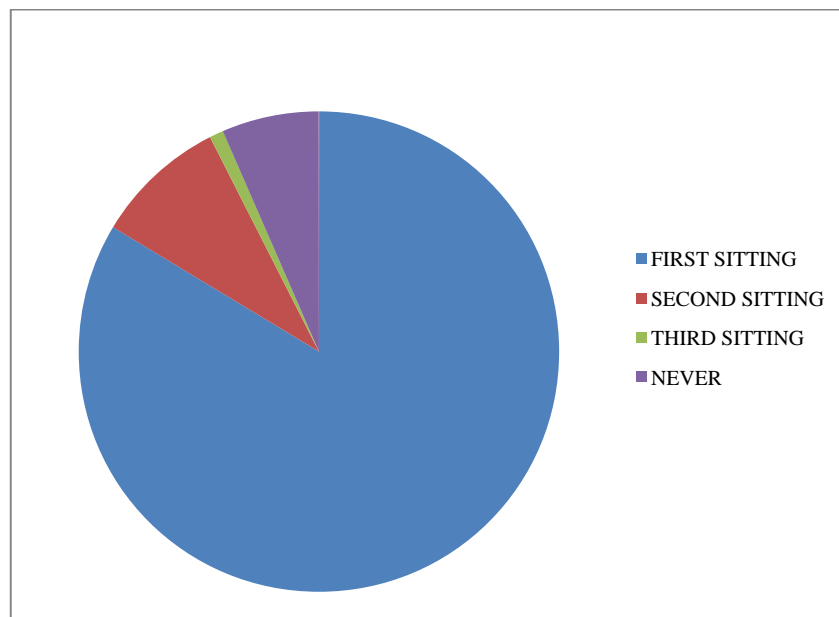


Figure 1. Number of Attempts before Passing Anatomy

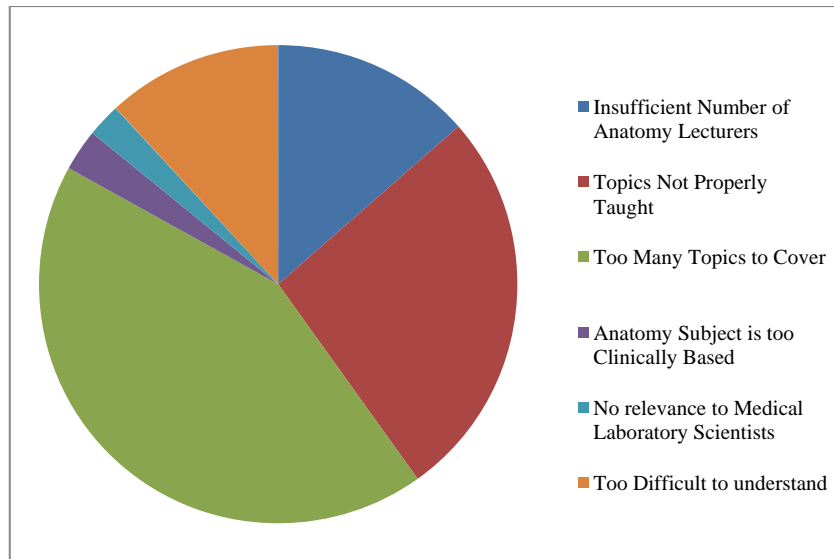


Figure 2. Possible Reasons for Dislike of Anatomy Subject

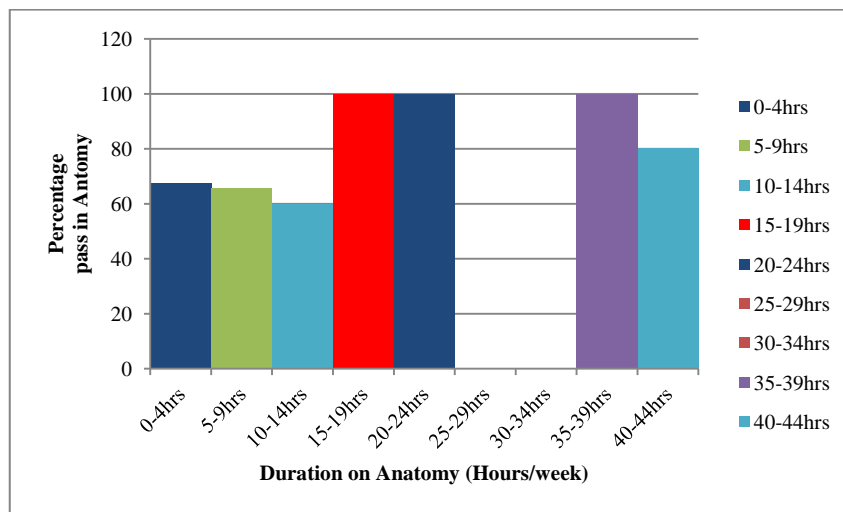


Figure 3. Performance Grading with Duration Spent on Anatomy

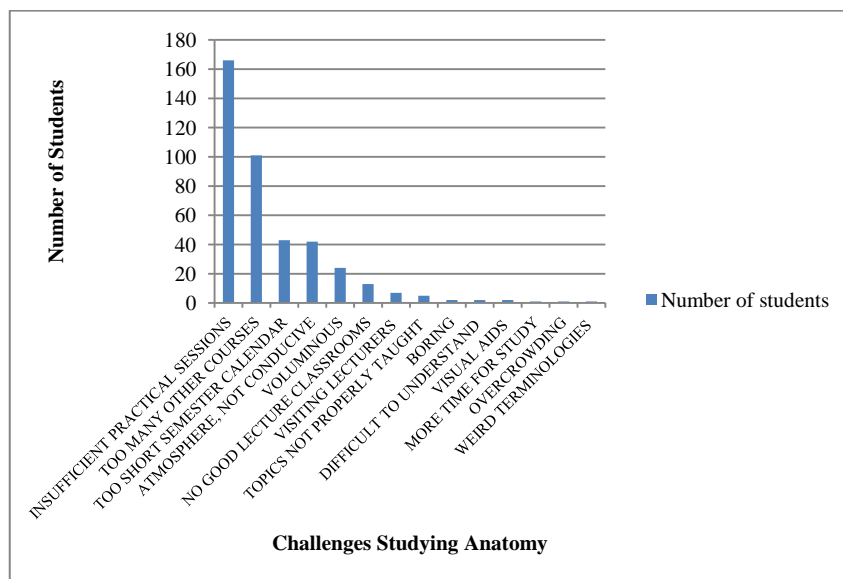


Figure 4. Students Challenges with Study of Anatomy

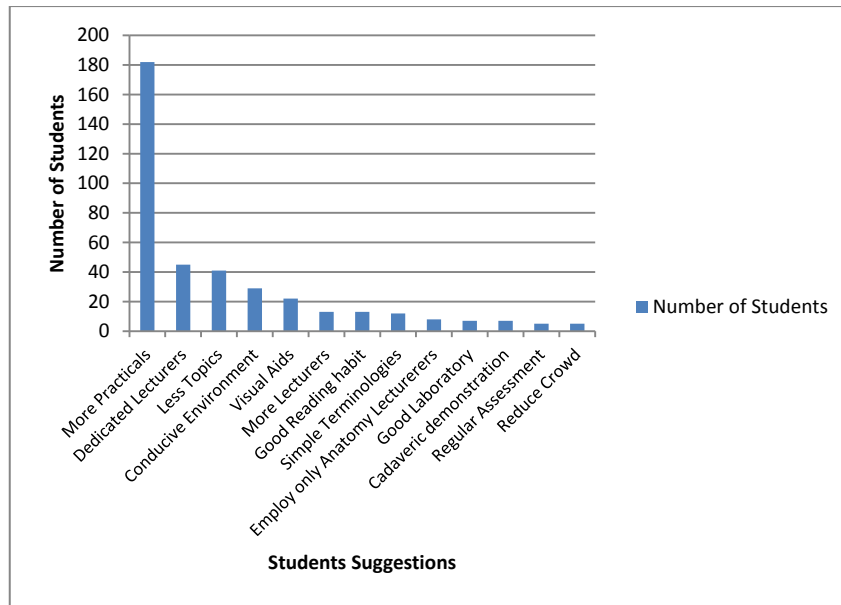


Figure 5. Students Suggestions to Improving Anatomy Performance

Table 5. Reasons Students like Anatomy

Students Reasons	N (%)
Understanding human body and functions	146 (84%)
It is practical and realistic	6 (3.4%)
It is interesting	11 (6.3%)
Well taught	1 (0.5%)
Basics of medical science	3 (1.72%)
Easy to understand	2 (1.14%)
Good Lecturers	1 (0.5%)
Educative	3 (1.72%)
Very broad	1 (0.5%)

N=number of students, %=percentage

4. Discussion

This study demonstrates the factors affecting study of Clinical Anatomy among Medical Laboratory students. Most respondents in our study liked the subject anatomy with the highest being year 2 & 3 at 76.09% and 76.08% respectively. The reason for appreciation of anatomy was because it helps them to understand body structure and functions. This agrees with the study by Oluwatoyin et al., 2009 [12] where respondents affirmed that anatomy is an important subject in the medical sciences and helps in the investigation of patients with certain diseases. Anand MK et al., 2004 [18] in a study also reported that 77% of respondents strongly agree that anatomy is not just study of body structure by dissection, but an important pillar of medical science. Most year 5 students in this present study disliked anatomy probably because it is too voluminous and the topics were not well taught. Few respondents think anatomy is either too difficult to understand or has no relevance to medical laboratory scientist. Male students in our study had highest number with 59.32% among those who had first attempt pass in anatomy than the female students (57.43%). The data however shows

no significant gender variation. This is in consent with Sitticharoon et al., 2014 [17] who in their study on first preclinical year medical students detected no significant difference in academic scores of the three main subjects (anatomy, physiology and biochemistry) between sexes. Our study also shows that year 3 & 4 students had the highest first attempt pass in anatomy with 77.08% and 80% respectively. Pearson's correlation shows no relationship between class levels and number that passed anatomy at first attempt. There was however a statistically significant difference between class levels of respondents who passed at first attempt.

This study also demonstrated student's possible reasons for dislike of anatomy. Majority of our respondents said they disliked anatomy because the subject is quite voluminous, difficult to understand, insufficient number of anatomy lecturers and topics not properly taught. Some though few said anatomy is too clinically based and has no relevance to medical laboratory scientist. Some of the findings complement that of Anand MK et al., 2004 [18] who reported in their study that 17% (50) of respondents said anatomy is difficult to understand. Likewise, Speech and Language science students were reported to find the amount of topics to cover in anatomy daunting, and with difficulty in retention (Smith et al., 2014). [8] Most prevalent factors affecting study of anatomy was identified in our study as insufficient practical sessions, too short semester calendar, too many other courses, voluminous course content, no conducive environment for learning and overcrowding. These factors were also reported by various researchers as affecting study of anatomy or learning generally. For instance, Anand MK et al., 2004 [18] in their study documented that 40% of respondents strongly agree that time allotted for teaching anatomy in their curriculum is one year, and is not adequate. Note that our respondents also have about one year to study anatomy which bothered on too short semester calendar as one of the identified factors. Again

Sbayeh *et al.*, 2016 [15] and Bergman *et al.*, 2008 [19] reported that anatomy educators indicated dissatisfaction with time available for anatomy in the medical curriculum. Esom *et al.*, 2010 [13] in a study in a Nigerian medical school also reported overcrowding as a major cause for students aversion to anatomy dissection. On the contrary however, despite the many reasons for dislike of anatomy, 84% (146/174) of our respondents like the anatomy subject for its peculiarity to body structure and functions.

Our study also revealed that students who spent longer duration in their personal studies got better performances in anatomy. Thus having good performance could also depend on personal study time. Most of our respondents suggested that more practical sessions, dedicated lecturers, reduced course content, use of visual aids, cadaveric demonstration among others could improve their performances in anatomy. Some of these suggestions were highlighted in a related study were students recommended proper training before examinations, conducive and peaceful environment (Rasal *et al.*, 2011, Pinyopornpanish *et al.*, 2004). [20, 21] Also Bergman *et al.*, 2011 [7] suggested repetitive learning of anatomy to increase retention of knowledge. Aleyamma *et al.*, 2012 [2] suggested award of scholarships and prizes to boost academic performance. Some other researchers suggested cadaveric demonstrations (Marshall *et al.*, 2017, Bergman *et al.*, 2011, Smith *et al.*, 2014). [6, 7, 8]

5. Conclusions

It is obvious that the interplay of many factors have contributed to students academic performance. Some of these factors are very much within the control of the student, the public and the stakeholders. Hence the suggestions offered by our respondents are as well within the controlling powers of all concerned to improving performances in the anatomy subject and others generally. A well taught student within a conducive classroom and/or learning environment could lift one from poorer grades to better grades. More so a disciplined student with respect to time and availability to academic work could be the pendulum for success.

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