Perspectives of Final Year Students and Newly Qualified Doctors of the Teaching of Preclinical Courses at the College of Health Sciences, Obafemi Awolowo University, Ile-Ife, Nigeria

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Abstract

Background: It is established that there is a strong relationship between perception and outcome of learners' satisfaction, achievement, and success and that a positive learning environment well received by learners is necessary for positive learning outcomes. This study is a first step in providing an answer to the question "how do learners perceive preclinical medical education in Ife" with the aim of obtaining information which can serve as basis for the review of teaching methods and improvement of learning environment. **Methodology:** A questionnaire adopted from two validated questionnaires (Dundee Ready Education Environment Measure questionnaire from Dundee and another from a study carried out in Bangladesh) was administered to 187 respondents comprising 106 final year students and 81 newly qualified doctors to obtain the information about their perception of teaching and learning of the three major preclinical participants. Items were rated using the 5-point Likert scale, and each item was scored 4-0. Data were analyzed using the descriptive and inferential statistics. Values were expressed as the mean of scores. **Results:** The mean gross scores for the 19 items rated for anatomy, biochemistry, and physiology were 28.92, 35.76, and 45.06 (out of 76), respectively. Physiology had the highest score in all the subdomains examined, with 62% of the respondents rating their overall quality of learning experience in the subject "very good." Scores for perception of learning environment were generally low (7.54 ± 0.43, 10.44 ± 0.42, and 12.51 ± 0.47, out of a total of 28 for anatomy, biochemistry, and physiology, respectively). **Conclusion:** The opinion of learners in this study emphasizes the need for the improvement of teaching methods and learning environment.

Keywords: Anatomy, biochemistry, learning experience, perception, physiology

INTRODUCTION

The course of studies leading to award of M.B.Ch.B/B.Ch.D degree in the Obafemi Awolowo University College of Health Sciences is a 6-year programme. In the 1st year, the students take courses in the basic sciences such as chemistry, physics, and zoology among others, while anatomy, biochemistry, and physiology are the three major preclinical participants taken in the 2nd and 3rd years as is the practice in most other Colleges of Medicine.[1] These participants are expected to prepare the students for clinical years during which they are exposed to the clinical content of the curriculum. The preclinical anatomy, biochemistry, and physiology courses have been taught since inception (47 years ago) using mostly the traditional method of pedagogy while more learner-centred and problem-based

methods are only employed where possible and practicable in light of existing facilities.

It is important that regular evaluation of learners' perception of teaching is conducted from time to time as this may provide information which can be used as basis for the review of teaching methods and improvement of the learning

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environment. It is well-established that there is a strong relationship between perception and outcome of learners' satisfaction, achievement and success and that a positive learning environment well received by the learners is necessary for positive learning outcomes.[2-4] This study is, therefore, a first step in providing an answer to the question, "How do learners perceive pre-clinical medical education in Ife?"

The Dundee Ready Education Environment Measure (DREEM) questionnaire has long been in use as a valid measure of educational environment since it was developed.[5] While some of the questions asked in this questionnaire were taken directly from the DREEM questionnaire, some others were modified to suit our Nigerian context while the remaining was taken from a similar study carried out in Bangladesh.[6]

To the best of our knowledge, there has not been any previous attempt in our college to study students' perception of the way the preclinical subjects are being taught and how the learning environment impacts on the students. This study aims to explore learners' and newly qualified doctors' perspectives on teaching of these participants.

METHODOLOGY

A cross-sectional study involving 187 respondents was employed. A self-administered questionnaire (comprising of direct and modified questions from the DREEM questionnaire and questions obtained from the study by Atokolara and Atapattu, 2014[6]) was first administered to 30 final year students. The data were analyzed to ensure that it was well-understood and could serve to achieve the objectives of the study. Some of the statements were further modified for clarity, and the questionnaire was then administered to 106 final year medical and dental students, 70 medical inductees, and 11 medical interns between April and June 2019. The questionnaire was administered to final year students during their group block lectures for surgery, community health, and medicine while the inductees were given the questionnaires during the leadership workshop organized for them in their induction week. Informed consent was obtained from all participants.

Data were collected on the following domains: Students' perception of learning (8 items), perception of atmosphere of learning (7 items), academic self-perception (2 items), and perception of teaching (2 items). All items were rated using the 5-point Likert scale, ranging from strongly disagree to strongly agree and each item was scored 4-0 with 4 = strongly agree, 3 = agree, 2 = not sure, 1 = disagree, and 0 = strongly disagree. Negative items were scored in a reverse manner.

Respondents were also asked to do an overall rating of the quality of learning experience for each of the preclinical participants on a 4-point scale from very good to poor.

Data were analyzed with IBM Statistical Package for the Social Sciences software (IBM SPSS Statistics for Windows version 20.0. Armonk, NY: IBM Corp.), Chicago using descriptive and inferential statistics. Maximum score for each domain was as follows: Students' perception of learning = 32, perception of atmosphere of learning = 28, academic self-perception = 8, and perception of teaching = 8. Total score: 76. Values were expressed as the mean of scores, and *t*-test was used to determine statistically significant differences ($P < 0.05$) for male versus female respondents and final year students versus inductees/interns across the three preclinical participants.

Permission to publish the findings from the study was sought and obtained from the Ethics Committee of the College of Health Sciences, Obafemi Awolowo University.

RESULTS

The demographic characteristics of 187 respondents comprising 137 males and 50 females (ratio 2.7:1) are shown in Table 1. Their age range was 22–39 years (mean age = 25.2 ± 2.6 years). Most (73.3%) of the respondents were <25 years.

Scores for individual items and domains are shown in Table 2 as follows:

Perception of learning (total score: 32)

Overall, physiology has a higher perception of learning by the respondents with a total score of 22.79; this is distantly followed by biochemistry (16.95) and anatomy (14.1). The respondents agreed that the pre-clinical participants were interesting to learn and that teaching of the participants encouraged them to search for additional knowledge and information. However, they did not agree that the level of instruction received in the anatomy was adequate, appropriate, or well-focused compared to biochemistry and physiology. Respondents also opined that they are not free to ask questions in anatomy and biochemistry classes and that teacher-student interaction during lectures was inadequate.

Perception of atmosphere of learning (total score: 28)

Atmosphere of learning was generally perceived to be poor. Mean scores for the various items were below 2.0 except that the respondents perceive that the teaching atmosphere for physiology is motivating (2.5). However, the rating of newly qualified doctors was slightly better than those of final year

Table 1: Demographic characteristics of respondents

Characteristics	Frequency (%)		
	All participants (*n*=187)	Clinical 3 students (*n*=106)	IND/INT (*n*=81)
Sex			
Male	137 (73.3)	78 (73.6)	59 (72.8)
Female	50 (26.7)	28 (26.4)	22 (27.2)
Age group			
<25	137 (73.3)	84 (79.3)	53 (65.4)
25- 29	35 (18.7)	12 (11.3)	23 (28.4)
30+	15 (8.0)	10 (9.4)	5 (6.2)
Mean age±SD years	25.2±2.6	24.9±2.8	25.5±2.3

SD - Standard deviation; IND/INT - Inductees/Interns

Table 2: Mean scores for items in each domain across preclinical subjects

	Subjects, mean score (SEM)		
	Anatomy	**Biochemistry**	**Physiology**
Perception of learning			
Found subject interesting to learn	2.1 (0.07)	2.4 (0.08)	3.6 (0.05)
Level of instruction received adequate	1.8 (0.08)	2.2 (0.07)	3.2 (0.06)
Level of instruction received appropriate	1.9 (0.08)	2.3 (0.07)	3.1 (0.06)
Level of instruction received excessive	1.2 (0.08)	1.5 (0.08)	1.6 (0.09)
Teaching is well-focused	1.8 (0.09)	2.3 (0.08)	3.2 (0.06)
Teaching encourages me to search for additional knowledge and information	2.0 (0.09)	2.2 (0.08)	3.0 (0.07)
I feel free to ask questions	1.9 (0.09)	2.2 (0.08)	2.9 (0.07)
There is adequate teacher-students interaction during lectures	1.5 (0.09)	1.8 (0.09)	2.3 (0.09)
Sub-total	14.1 (0.41)	16.95 (0.42)	22.79 (0.36)
Perception of atmosphere of learning			
The teaching atmosphere motivates me as a learner	1.3 (0.08)	1.8 (0.07)	2.5 (0.09)
Teaching facilities are good and adequate	1.2 (0.07)	1.5 (0.08)	1.9 (0.09)
There is good support system for students	1.0 (0.08)	1.5 (0.08)	1.9 (0.09)
The class size is conducive to learning	1.1 (0.08)	1.4 (0.08)	1.6 (0.09)
The class environment (lighting, ventilation, space) is conducive to learning)	1.1 (0.08)	1.4 (0.08)	1.6 (0.09)
The laboratory set up during practical classes is conducive to learning	1.1 (0.08)	1.5 (0.08)	1.6 (0.09)
Number of students to laboratory space/cadaver is appropriate	0.9 (0.08)	1.3 (0.08)	1.4 (0.09)
Sub-total	7.54 (0.43)	10.44 (0.42)	12.51 (0.47)
Perception of teaching			
Teachers are knowledgeable	2.5 (0.08)	2.8 (0.07)	3.3 (0.06)
Teachers have good communication skills	1.7 (0.08)	2.2 (0.07)	3.1 (0.07)
Sub-total	4.23 (0.14)	5.01 (0.12)	6.44 (0.11)
Academic self-perception			
I studied just to pass the course	2.0 (0.09)	2.3 (0.09)	1.4 (0.09)
I wish to pursue postgraduate studies in this course	1.1 (0.08)	1.1 (0.08)	1.9 (0.09)
Sub-total	3.04 (0.12)	3.37 (0.12)	3.31 (0.14)
Gross score	28.92	35.76	45.06

SEM - Standard error of mean

students. A significantly higher number of female students also had more positive perception that there is good support system for students in physiology (males 1.77 vs. females 2.14 [$P = 0.02$]).

Perception of teaching (total score: 8)
Final year students and newly qualified doctors agree that teachers are knowledgeable across anatomy, biochemistry, and physiology. Physiology teachers are perceived to have good communication skills (3.1), whereas the scores for anatomy and biochemistry were rather low (1.7 and 2.2, respectively).

Academic self-perception (total score: 8)
Most of the respondents do not wish to pursue postgraduate studies in any of the preclinical subjects, with more females in this category, especially for anatomy (males 1.16 vs. females 0.74 [$P = 0.02$]). Most respondents admitted that they studied just to pass the courses, except physiology (2.0, 2.3, 1.4).

Table 3 shows statistically significant differences between final-year students and newly qualified doctors across the preclinical participants. Newly qualified doctors had a more positive perception of all domains studied than the final year students except academic self-perception. The same trend is

observed for biochemistry, while the reverse is the case for physiology.

The individual mean domain scores are shown in Figure 1. For overall rating of quality of learning experience, the proportion of respondents who rated their experience as "very good" for anatomy, biochemistry, and physiology were 15.5%, 17.5%, and 62%, respectively, whereas 27.8%, 5.4%, and 2.2% rated their experience as "poor" for the subjects, as shown in Figure 2.

DISCUSSION AND CONCLUSION
Obafemi Awolowo University (OAU) College of Health Sciences has produced hundreds of doctors, nurses, and physiotherapists since inception 47 years ago. This study reveals the general perception of final year students and newly qualified doctors toward the three major preclinical subjects (anatomy, biochemistry, and physiology) which are taught in the second and third years of the M.B.Ch.B program of the College.

The opinion of learners in this study has revealed the need for improvement of teaching methods and learning environment.

Table 3: Statistically significant differences between clinical 3 students and inductees/interns across preclinical subjects

	Anatomy				Biochemistry				Physiology			
	Clinical 3	IND/INT	*t*-test	*P*	Clinical 3	IND/INT	*t*-test	*P*	Clinical 3	IND/INT	*t*-test	*P*
Perception of learning												
Found subject interesting to learn									3.65	3.48	1.86	0.046
Level of instruction received adequate	1.48	2.12	4.11	<0.01	2.12	2.37	1.7	0.019				
Level of instruction received appropriate	1.68	2.22	3.39	0.001					3.24	3.85	3.18	0.002
Teaching is well-focused	1.61	2.07	2.73	0.007					3.35	2.94	3.41	0.001
Teaching encourages me to search for additional knowledge and information	1.73	2.31	3.21	0.002					3.19	2.85	2.41	0.017
I feel free to ask questions	1.63	2.22	3.41	0.001					3.07	2.77	2.13	0.034
There is adequate teacher-students interaction during lectures	1.20	1.79	3.55	<0.01								
Perception of atmosphere of learning												
The teaching atmosphere motivates me as a learner	0.97	1.65	4.43	<0.01	1.66	1.95	1.84	0.047	2.67	2.31	2.10	0.036
Teaching facilities are good and adequate	1.58	1.96	2.41	0.017					3.36	2.85	3.96	<0.01
There is good support system for students	0.88	1.21	2.17	0.031								
The class size is conducive to learning	0.78	1.43	4.03	<0.01	1.11	1,70	3.67	<0.01				
The class environment (lighting, ventilation, space) is conducive to learning)	0.91	1.42	3.17	0.002	1.31	1.62	1.87	0.036				
The laboratory set up during practical classes is conducive to learning	0.70	1.52	5.31	<0.01	1.32	1.63	1.89	0.006	1.44	1.74	0.70	0.019
Number of students to laboratory space/cadaver is appropriate	0.55	1.25	4.84	<0.01								
Perception of teaching												
Teachers are knowledgeable	2.36	2.67	2.06	0.041					3.43	3.14	2.60	0.01
Teachers have good communication skills	1.58	1.96	2.41	0.017					3.36	2.85	3.96	<0.01
Academic self-perception												
I wish to pursue postgraduate studies in this course									2.10	1.57	2.92	0.003

IND/INT - Inductees/Interns

The general trend observed in all the four domains studied is that physiology has the highest score, followed by biochemistry and then anatomy. Although mean scores were generally low for perception of atmosphere of learning, physiology still obtained higher scores than the other two subjects. In addition, students had very positive perception of the teaching of physiology and wish to pursue the subject at postgraduate levels. Physiology also had the highest overall rating of quality of learning experience. These findings are in agreement with a previous study by Ebomoyi and Agoreyo in which students identified physiology as the subject with which they were most satisfied with the quality of teaching and most confident of passing.[7] In another study carried out in Bangladesh, physiology was selected as the most retained and clinically
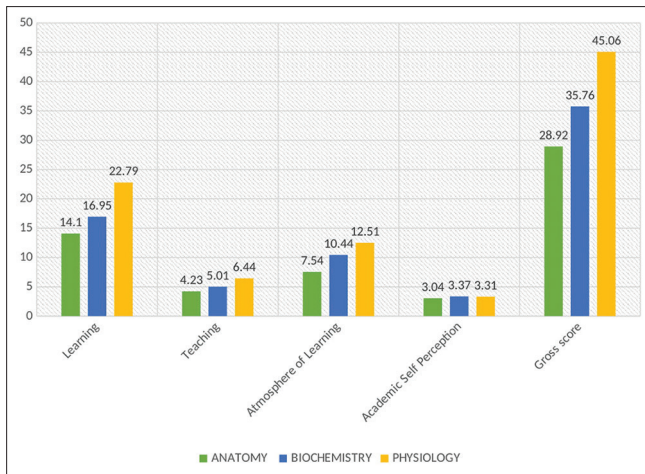
Figure 1: Mean domain scores across subjects

Figure 2: Overall rating of quality of learning experience

relevant subject.[6] Furthermore, our academic records reveal that more students usually pass physiology than the other two subjects. However, there is always room for improvement as reported by a study which found that interactive lectures, case-based lectures, and structured interactive sessions are very useful tools in teaching and learning of physiology.[8]

In general, respondents in this study had poor perception of anatomy. They perceived that the level of instruction received was not appropriate for clinical training but rather excessive. This observation is also not peculiar to this study. In previous similar studies, students identified anatomy as one of the courses with overloaded content,[9,10] and the most difficult to understand.[7] They opined that the anatomy curriculum should only cover the general concepts to provide a working knowledge of the subject. However, in a study carried out to investigate the opinions of newly qualified doctors in a UK medical school, close to half of the respondents believe that they received insufficient anatomy teaching, with a substantial proportion calling for the integration of anatomy teaching throughout the medical school.[11] Turney in his article "Anatomy in a modern medical curriculum" expressed the need to introduce newer teaching modalities and modern technology which will encourage interest and retention of anatomical knowledge and its clinical relevance. The author also believes that detailed knowledge should be integrated into specialist training where it becomes clinically relevant, allowing specialists to practice safely and accurately.[12,13]

Biochemistry has also not been in the good books of medical students as far as perception of its teaching and learning are concerned. Although this study reports fairly good perception of learning and teaching, the perception of atmosphere of learning and academic self-perception was poor. Only few respondents agreed that they wish to pursue the subject at postgraduate level, and many perceived that the course content was excessive. Previous studies reported that most students perceived that they do not retain most of the information received in this subject during their preclinical years[7,8] and are not likely to make it their specialty choice.[6] The fact
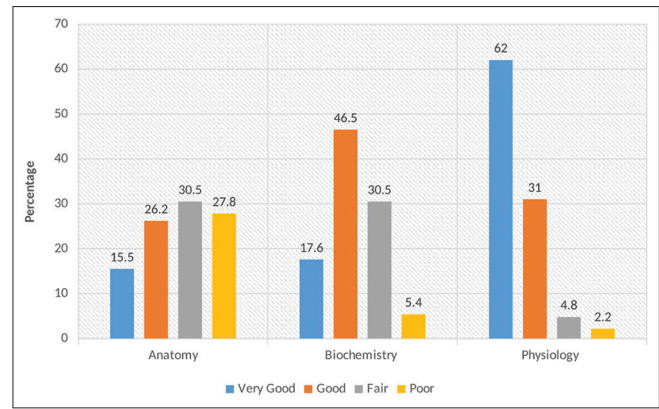
remains that biochemistry is the common language of the life sciences, and a working knowledge of the subject is necessary to understand health and disease at the molecular levels.[14] Many people have advocated problem-based learning[15] as the way out, but the practical truth is that basic information still has to be passed across before it can be related to clinical settings. In doing this, however, there is a need to simplify the language of expression and review course content to remove unnecessary details.[16] A departure from the traditional way of teaching is necessary, with the introduction of innovative learner-centered methods of teaching such as student presentations, assignments, and virtual teaching aids.[17] This, however, will require reduction of class sizes and hence more hands on the teaching job.

Means scores for atmosphere of learning were generally low in this study [Table 2 and Figure 1], with respondents having poor perceptions of teaching facilities, support systems, class size, and laboratory space. This calls for urgent intervention on the part of stakeholders. Over time, these facilities have become dilapidated and grossly inadequate to meet up with the growing student population.

In this study, newly qualified doctors seem to have more positive perception than the final year students in all the domains investigated, especially for anatomy and biochemistry [Table 3]. This could be because they have the benefit of being more knowledgeable about what is required in the clinical practice, and this may have influenced their responses. This finding may also be a pointer to the fact that the learning environment is slowly depreciating, especially in a situation where increase in student intake is not matched with improvement of facilities.

In general, the integrated curriculum being proposed by the National Universities Commission (NUC) will be of help as students will be able to harmonize the teaching and learning of the three subjects and directly understand their relevance to medicine. This will require cooperation and coordination on the part of the various departments and underscores the need to set up a medical education unit in the college which will coordinate and bring together the activities of the various units.

The study concludes that there is an urgent need to improve learning environment, revise teaching methods, and embrace interdisciplinary integration in OAU Medical School. This is expected to improve, not just the perception of learners but the overall quality of training and ultimately, global output of the college. The need to improve teaching facilities such as classroom and laboratory space cannot be overemphasized, as the response of learners indicate that these facilities are inadequate. The new integrated medical curriculum being proposed by NUC is a welcome development as it is expected to promote better understanding of the preclinical subjects and further demonstrate their relevance to clinical training and practice. The present study also underscores the need to have a medical unit in the college to oversee and harmonize the activities of the various departments. Areas of future studies will include investigation of how students of physiotherapy and nursing science perceive teaching of anatomy, biochemistry and physiology, investigation of doctors' perception of the relevance of their overall learning experience to professional practice, and a comparison of learners' perception across medical schools in Nigeria.

Conflicts of interest
There are no conflicts of interest.

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