



Difficult Courses in Physiology Subject as Perceived by Undergraduates Students of Faculty of Basic Medical Sciences, Bayero University Kano, Nigeria

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Abstract

Generally, physiology subject appears to be difficult to most undergraduate students, more especially in their first and second years in medical school. In this study, an attempt was made to find out which among the 12 different courses taught including the practical in the Faculty of Basic Clinical Sciences Bayero University Kano proves to be difficult among the students. Two hundred and eighty (280) students were interviewed through a structured questionnaire, but 266 (95%) responded on why some of the topics taught appear to be difficult to them. Neurophysiology appears to be the most difficult course 64 (24.1%), followed by Excitable tissues 42 (15.8%), then Blood and Body Fluids 41(15.4%) and Cell Physiology 32(12%). Practical sessions even though not limited to a particular course appear to be difficult among the respondents 27 (10.2%). The course Special Senses is the least difficult, as only 1 (0.4%) of the respondents admitted it to be difficult to him. Part of the reasons why these courses are difficult include; voluminous nature of the identified courses, abstract instructional contents especially with regard to Neurophysiology, Lecturers' negative attitudes and students' lack of seriousness or interest to concentrate and understand what is being taught to them. The findings of this study, supports the Joel's "Three – factor model" that include discipline, teaching and students factors as constituting to difficulty in the identified courses.

Keywords: Difficult courses, Physiology, Students, Basic Medical Sciences, Kano, Nigeria

Introduction

Physiology is well known to be a discipline that presents most students with a challenge.^[1] Many have highlighted this fact from the perspective of both students and staff alike.^[2, 3] Human Physiology course is a prerequisite for all students admitted into the Faculty of Basic Medical Sciences, Bayero University Kano within their first two years in their respective programmes. Traditional method of teaching (whiteboard and marker) still remains the mainstay of imparting knowledge to students, though few of the lecturers use power point presentation in addition to the old method. Students must obtain a minimum score of (50) grade "C" in all the 12 courses taught before they are allowed to proceed to the clinical departments. In the first year, six courses are offered: Cell physiology, Blood and Body fluids, Respiration, Cardiovascular system

(CVS), Excitable Tissues and Autonomic Nervous System (ANS), while in the second year the remaining six courses; Reproduction, Gastro intestinal tract (GIT), Endocrine, Renal Physiology, Special Senses and Neurophysiology are taught. Practical sessions are taken concurrently with the respective courses until completion. This study was conducted in order to find out which among the 12 courses taught in the Faculty of Basic Medical Sciences is more difficult to students and the reason why it is difficult, this will proffer a solution that will improve learning and application of the instruction received by the students.

Hypotheses

The following hypotheses were generated before conducting the study; The courses are difficult

because the lecturers did not teach the students very well due to lecturers' attitudes. The lecturers taught very well but the students' capacity to understand the courses was very low due to their inadequate residual knowledge. The lecturers and students both do their best, but the content of physiology subject is difficult for the students to comprehend.

Methodology

Study Area: The study was conducted in the Faculty of Basic Medical Sciences, Bayero University Kano, which is made up of three major departments; Human Anatomy, Biochemistry and Human Physiology. These departments handle all the seven different programmes offered by the faculty, five of which are professional and two single honour programmes. The professional programmes are; Medical Bachelor and Bachelor of Surgery (MBBS), Dentistry, Bachelor of Medical Laboratory Science (BMLS), Bachelor of Medical Radiography and Bachelor of Physiotherapy. The single honours courses are Bachelor of Human Anatomy and Bachelor of Human Physiology.

Study Design: This is a cross sectional study, involving 280 first and second year students of the faculty. Fifteen to Twenty-five (15-25) students were selected from each program as appropriate

using a randomized sampling method. Approval was obtained from the institutional review board. Those that consented to be included in the study were then allowed to complete the questionnaires. A structured questionnaire was used to collect information about age, sex, programmes of study and student's level in the respective programmes. Open questions were asked in relation to what was perceived to be contributing to difficulty in understanding some of the courses in physiology subject in order to allow students express hidden facts that will reflect the true situation as it regards to teaching and learning the physiology subject as a whole. The study was conducted towards the end of the second semester of the 2014/2015 Academic session. Students were informed that the data will be anonymous and participation attracts no incentive and likewise no penalty for declining to participate. Students were given 20 to 30 minutes to complete the questionnaires during physiology lecture time. Data analysis was performed using Epi – info 3.2.2 and Minitab 12.1 computer statistical software. Quantitative variables were summarized using mean and standard deviation, while categorical variable were summarized using frequencies and percentages as appropriate. A confidence interval of 95% was used and a p-value of < 0.05 was considered significant.

Results

Table 1: Biological and academic characteristics of the students

Characteristic	Frequency (n = 280)	Percentage
Age (Years)		
17 - 24	208	74.3
25 - 32	61	21.8
33 - 40	11	3.9
Sex		
Male	174	62.1
Female	106	37.9
Programmes of study		
BSc. Physiology	23	8.2
MB; BS	112	40.0
Allied Sciences	145	51.8
Level of study		
200 level (First year)	102	36.4
300 level (Second year)	178	63.6

Majority of the students were less than 24 years of age, studying Allied Science courses and in the second year of their study.

Table 2: Difficult physiology courses reported by students

Course	Frequency (n=266)	Percentage difficulties (100%)
Neurophysiology and ANS	64	24.1
Excitable tissues	42	15.8
Blood and body fluids	41	15.4
Cell physiology	32	12.0
Practical sessions in physiology	27	10.2
Cardiovascular system	22	8.3
Endocrine physiology	15	5.6
Respiratory system	11	4.1
Gastrointestinal tract	7	2.6
Renal physiology	4	1.5
Special senses	1	0.4

Neurophysiology was the most difficult course among the students interviewed.

Table 3: Identified causes of failure

Responses	Freq (%) of failure (n=280)
<i>Causes of failure</i>	
Bulky course content	80 (28.7)
Negative/ Unfriendly attitude of lecturers	62 (22.2)
Students' lack of seriousness/ interest	56 (20.1)
Poor communication/ teaching skills of the lecturers	47 (16.9)
Inadequate infrastructure and equipment	10 (3.6)
No guidance/ counselling	9 (3.2)
No revision session(s)	1 (0.4)
None	15 (5.4)

Bulky course content, lecturer's negative attitudes to teaching physiology and student's lack of seriousness were the main reason of failure in physiology subject.

Table 4: Highly Failed Courses and the Reason/s of Failure

Course	Reason of the Failure	Percentage (%)
Cell Physiology	Poor attitude of the Lecturer; starting lecture late, rushing students to complete lecture at the end of semester and making the lecture bulky	12.0
Blood and body fluids	Lack of seriousness from the students because the lecturer is not friendly. Also the cause is simple, but students do not read it very well	15.4
Excitable Tissues	Strange medical terminologies, inaudible voice of the lecturer	15.8
Neurophysiology and ANS	It is bulky, Needs critical thinking, strange medical terminologies and inappropriate time of teaching the course	24.1

Inappropriate time of teaching Neurophysiology and the need to apply critical thinking to understand the course constitute the reason of poor performance in the physiology courses.

Discussion

This study identified four out of twelve courses as the most difficult among the students interviewed. These are Neurophysiology, Excitable Tissues, Blood & Body fluids and Cell physiology. The later three are taught in the first year and form the basic foundation of understanding the second year courses. This shows that the problems start right from the basic foundation level. One will expect zeal and commitment from the first year students of basic sciences because they are absorbed into the mainstream of the career(s) they are wishing to aspire for in future.

Therefore, their performance is expected to be impressive, but it is contrary to what was observed in 2014/2015 session students for both first and second year students. The question then, is why is the students' performance in these courses poor? Three hypotheses were developed to help answer these questions; 1) could it be that the courses are difficult because the lecturers did not teach very well due to Lecturers' poor attitudes? 2) Or the lecturers taught very well but the students' capacity to understand the lectures was very low due to inadequate residual knowledge brought in by the students? 3) Or the lecturers and Students both do their best, but the content of physiology subject is difficult for the students to comprehend? Responses from this study shows that at the first year in basic science departments, lecturers, students and course content all contribute to failure in some of these courses, while in the second year, it is the bulky course content alone that proves difficult to some students.

Part of the lecturer's problem especially in cell physiology was the failure to teach the course very well, coming to the lecture very late and rushing the lectures at the end of the semester. Responses from the students have indicated poor understanding of basic physiological processes that take place in the cell, like how the ion channels both voltage-gated and voltage insensitive interact to excite a given cell, effect of an ion current on the excitability, concept of Resting Membrane Potential (RMP) and Equilibrium Potential. Failure of the students to ascertain the role of Nernst equation, Gibbs Donan equilibrium and Goldman's equation all of which are the basic necessary stuff needed to understand the

introductory physiology render them to be weak in grasping the basic concept and this add to their weakness for the courses ahead especially the ANS and the Neurophysiology courses that require critical thinking and reasoning in understanding their scope. This inability to transfer adequate instructions to students poses a great danger in understanding physiology as a subject.

One fascinating finding in this study is the students' un-seriousness in attending Blood and Body fluids lectures. The question was; what contributed to this un-seriousness? Responses from the students indicated poor class control by one of the lecturers concerned, while the other lecturer discourage the students to learn the subject; "telling them they don't know everything". These made the students lose interest with regards to attending the lectures or attended the lecture late or even absented themselves since they had the believe that the course is simple to understand, only the lecturer's attitude reduced their morale to pay attention on the course. To this end, Lecturers should try to engage the students in a manner that will make them to have interest in their lectures and also build students' confidence even when they make mistakes in answering questions during the class session.

For the Excitable Tissues, the lecturer's capacity was said to be average in terms of his ability to discuss the content of the topic, but most of the students came late and even absent themselves from his lessons because of the inaudible voice of the lecturer. Students could not hear his voice clearly, hence resorted to attending his lectures late or even absent themselves, knowing well they will copy what he taught from the students that attend the lesson early or those who stay on the front seat. In order to improve in understanding excitable tissues very well, both the lecturers and Students need to play their role very well.

For the lecturer, there is need to talk loudly or use sound address system to reach to those students that stay at the extreme of the lecture rooms. They must make the students grasp the concept of electrotonic potential, which can either be anelectrotonic or catelectrotonic. They must also be made to know the properties of a single nerve fibre more especially the

principle of excitability and conductivity of a given nerve and the compound action potential of a group of different nerves with different sizes and different conduction velocities. They must know the role the ion channels play in nerve electrical activity because, neuronal excitability is a property that emerges from the interactions between ion currents.^[4] It is important for them to appreciate the characteristics of a synaptic transmission, postsynaptic potentials and end plate potential. The role of calcium ion in excitation-contraction coupling and the physiology of a sarcomere are necessary in understanding molecular basis of contraction. They should be able to differentiate membrane potentials of a single nerve fibre, a skeletal muscle, a cardiac muscle and that of smooth muscles. This will allow them to differentiate the rhythmicity of a cardiac as against that of a smooth muscle. Therefore, students' attitude needs to be modified to attend lesson early and also pay attention to instructions given to them by the tutors.

The lecturers must also carry the students slowly in to the topic, and explain the technical areas in a simpler format to allow for easy grasp of the lesson. They should also device means of making the lecture lively, to help generate interest in the topic. To this end, lecturers' capacity on professionalism in education is encouraged in form of postgraduate diploma in education, which is available within the university, and the surrounding institutions in Kano State. For the students, it is not an excuse to come to class late or absent themselves because of inaudible voice of the lecturer. Their class representative should strive hard to collect a sound address system from the department prior to any lesson with lecturers that do not talk loudly, so as to encourage students' attendance and also get the lecture's attention. This will improve interactive class participation and synergy in achieving the desired goal.

For the second year students, Neurophysiology is the toughest cause due to bulky course content, wrong timing for the lecture; usually slotted late in the afternoon when students are exhausted and poor understanding of multiple connections and pathways with Latin nomenclature requiring cramming and critical thinking. While the department can modify timing for the teaching of this course, the main

reason of failure is simply because of poor understanding of the pathways and functions of different areas of the brain and spinal cord. This is not limited to students of Bayero University Kano, as it was asserted by other workers that; the principles of neurophysiology are challenging for undergraduates to master.^[5] The missing link is probably the weak foundation from the first year as depicted in poor understanding of basic foundation courses that are requisite to appreciating Neurophysiology. It must be emphasized that a logical approach is needed coupled with basic knowledge in Neuro-Anatomy structures before a sound knowledge of Neurophysiology is attained.

First and foremost in understanding Neurophysiology, is to appreciate that the Dura mater (one of three meningeal coverings of the brain) forms the Falx cerebri, with its free concave lower border over hanging the dorsum callosum, which in its self a mass of nerve fibres joining the two cerebral hemispheres.^[6] The septum pellucidum extends between the fornix and the corpus callosum to separate the anterior horns of the right and left lateral ventricles^[7] and over hangs the third ventricles. The two cerebral hemispheres rest on the tentorium cerebelli, which is a transverse sheet of Dura mater that separates the forebrain from the midbrain.^[6,7,8] The third ventricle communicates with the fourth ventricle through the aqueduct of Sylvius that traverses the mid brain^[8].

The mid brain connects the fore brain and hind brain and the medulla exits the skull through the foramen magnum and continues as a spinal cord up to the filum terminale⁸. The cranial nerves distribute themselves in such a way that, the olfactory and optic nerves reside in the cerebral cortex, the Oculomotor and Trochlea nerves reside in the midbrain, the Trigeminal nerve, is located on the upper part of the pons, the Abducent nerve at the middle towards the inferior border of the pons, the Facial and Vestibulochochlea nerves lie in the inferior border of the pons toward the lateral sides, while the Glossopharyngeal, Vagus, Accessory and Hypoglossal nerves are located on the lateral border of the Medulla oblongata.^[6,7,8,9,10] Having understood the basic anatomy, there is a need to understand the primary motor cortex, the somatosensory area and the pre motor area. This forms the basis of

understanding the functional localization in the brain tissue. The topographical presentation of different parts of the body is such that there is lateral inversion of different organs of the body inside the brain, with an organ having a significant function occupying a wider presentation area in the cerebral cortex.^[6,7,8,9,10]

Recommendations

1. Lecturers must keep to their statutory responsibilities of teaching and research. Not just mere teaching but an interactive engagement of students in a simpler format that will allow easy understanding of the topics they taught.
2. There should be regular supervision of lecturers by the heads of departments to ensure early commencement of lectures and to avoid rushing to cover syllabus at the detriment of students.
3. Provision of conducive atmosphere for learning, including a good sound address system from the departments will help disseminate lecture effectively to students and reduce late coming and absenteeism from lectures.

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Conclusion

Neurophysiology was found to be the most difficult course among the students interviewed largely because of combined factors of lecturers' negative attitude to teaching and students' un-seriousness which start right from the first year of medical training, culminating to poor student's performance in this topic.

4. The University must devise a means of reducing excess private practice activities to tame lecturers to concentrate on their primary assignment.
5. The way to encourage students is by making the lectures to be lively and friendly and also to maintain strictness on the 70% attendance to any academic activities in the University.
6. There should be reward from the University Management to encourage those lecturers that perform very well through certification or leverage on seminars and conferences and punishment by means of queries where negative attitude of the lecturer contributed to massive students' failures.

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