

An Audit of Medical Students' Performance in 2nd MBBS Physiology Examination in a Medical School in Nigeria: A 7-Year Review

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Abstract There is need for periodic evaluation of medical students' performance in professional medical examinations. This helps to identify possible gaps in teaching and may offer solutions that could redress such situations. This study is an audit of medical students' performance in 2nd MBBS professional examinations in physiology at the University of Nigeria Medical School over a 7 year period (2004 – 2010). Data were collected from the Department of Physiology of the university. A total of 2152 students sat for the professional examination over the study period, and 1485 students passed the examination at first attempt giving an overall pass rate of 69%. The pass rate from 2008 when medical doctors (clinicians) with fellowships were employed as lecturers (tutors) to teach physiology was significantly higher than the pass rate before this reform (2004 – 2007) when mainly non-clinicians taught physiology [(76.5%), (n =1646) vs 63.4% (n=1364); P<0.0001]. The ongoing reforms in physiology department that brought about the employment of clinicians as lecturers to teach medical physiology is good and should be reviewed with time. These reforms should further be expanded to include provision of adequate modern infrastructure and teaching aids in order to keep pace with increasing enrolment into medical school.

Keywords: *audit, physiology students' performance, Nigerian medical school*

1. Introduction

The admission of medical students in Nigeria into a 6-year MBBS program is through the Joint Admission and Matriculation Board (JAMB). The first 12 months in medical school is spent on preliminary basic sciences. The next 18 months is the preclinical program which includes basic medical courses: human anatomy, medical biochemistry and human physiology. The basic medical courses run concurrently. The remaining 42 months are clinical training in the teaching hospital.

At the college of medicine, university of Nigeria, Enugu campus (UNEC), teaching activities in physiology consist of formal practical sessions, lectures and tutorial classes. Physiology students attend 6 to 7 hours/week of lectures and practical training sessions made up of lectures (3 hours), tutorial (1 hour), and laboratory practical session (2 – 3 hours).

Physiology classes close by 3.00PM while students study privately in the evenings. Didactic lectures are the predominant teaching method for students in the basic medical courses [1]. Teaching activities are led by the departmental academic staff and the students are the passive recipients. Tutorial classes [2] are also conducted by the departmental academic staff. Tutorial is an

interactive session where students express their opinions, ask questions and enhance their communication skills during tutorials. Physiology teaching is conducted in English language in all cases.

The Department of physiology at College of Medicine, UNEC, Enugu has been implementing a series of reforms in both teaching assessment strategies and recruitment of academic staff since its inception in 1970. Starting in 2008, academic staff in the department of physiology were recruited based on MBBS degree with additional qualifications (M.Sc, PhD, Fellowship of post graduate medical college or fellowship of West African College of Surgeons or Physicians) Thus the recently recruited physiologists are mainly clinicians with thorough training in system physiology and pathophysiology. These reforms/modification in physiology teaching and learning in this medical school are part of the process to improve the quality of teaching and assessment methods. The emphasis of these reforms, are directed toward establishing a solid foundation for the clinical sessions through team work, self directed learning, communication skills and cooperation among students [3,4]. It was intended to develop critical thinking skills, foster independent information gathering and learning and promote student retention of information [5]. This is expected to ultimately result in intellectual frameworks

and a platform for question generation and deeper understanding.

In physiology teaching in the preclinical program, knowledge is usually what is assessed [6], but it is mandatory that a student scores 50% in order to proceed to the clinical session. Students are assessed on essay questions, short answer questions, multiple choice questions (MCQ), practical questions and viva or oral examination. The questions are formulated to test the student knowledge and prepare them for clinical sessions.

This study aims to audit the current situation of physiology learning at the college of medicine UNEC, Enugu, Nigeria and to determine appropriate interventions that may improve physiology learning in Nigerian medical schools.

2. Methods

This was a retrospective study of medical students' performance in 2nd MBBS examinations at the College of Medicine, UNEC, Enugu, Nigeria over a 7-year period (2004-2010). Data were retrieved from records in the department of physiology.

Ethical review and clearance was obtained from the College of Medicine, University of Nigeria Enugu Campus. The study protocol was approved by the College Review Board. Department protocol included informed written consent prior to data collection. Confidentiality was maintained as there was no disclosure of the names of the students from where the data were retrieved.

The College of Medicine, University of Nigeria, Enugu Campus, Enugu, Nigeria was established in 1970 as the only Medical School then in South East Nigeria. This college was modeled on the British system and awards the MBBS after 6 years of study or 5 years for direct entry admission for those with higher school certificate (HSC) or First degree or Interuniversity and intrauniversity transfers from related academic programs. Admission into the college of medicine is mainly through a Unified National University Matriculation Examination [UME]. Annual admission into this medical school varies between 250 and 370 students. Examination grades are modeled on the British System whereby $\geq 70\%$ is a distinction grade, 50 – 69% is a passing grade and $< 50\%$ is a failing grade.

There is an intensive preclinical program of basic medical sciences lasting 18 months prior to a final physiology examination. Students were assessed via long essays, short answer questions, multiple choice questions (MCQ), practicals and oral examinations. The students were given 6 questions (five essay and one short answer question) to attempt 5 questions and had 30 minutes to answer each question. The MCQ consisted of 100 questions with a 2 hour time limit. The MCQ paper was divided into two sections. The main section consisted of questions with one correct answer out of five options. The other section included questions with one or more correct answers out of the five options. The continuous assessments contributed 30% of the total 2nd MBBS examination, while the final examination at the end of 18months training contributed 70% of the total 2nd MBBS examinations.

The data were entered and analyzed by descriptive and inferential statistics using statistical software for social

sciences (SPSS) version 15 (SPSS Inc. Chicago IL). Data was presented descriptively as proportions and percentages. The chi-square test (χ^2) was used to determine the association between the students' performance before and after clinicians was used as lecturers (tutors). Furthermore, binary logistic regression was equally used to determine the association between students' performance before and after clinicians was used as lecturers (tutors). The level of significance was set at $p < 0.05$.

3. Results

There has been an increase in student population admitted into the medical school since 2004 as shown in Table 1. Academic staff initially included seven instructors (two with PhD, five with M.Sc) in 2007 but was increased to fourteen in 2008. The increase in student admission was not matched with a corresponding increase in academic staff or existing lecture halls. In 2008, the College of Medicine employed clinicians with MBBS and additional clinical qualifications to augment the pre-existing M.Sc or PhD academic staff in Physiology department. There was an improvement in 2nd MBBS physiology passes since 2008 with percentage pass rate of over 70% since 2008.

Specifically, the overall pass rate in the 2nd MBBS physiology examinations over the 7-year period of this study was 69.0%. The pass rate from 2008 – 2010 when clinicians were additionally employed as lecturers was 76.5%, whereas the pass rate from 2004 – 2007 was 63.4%. This difference was statistically significant ($P < 0.0001$) see Table 2.

The obvious problems on ground were poor infrastructure, funding gaps, increasing class sizes without provision for expansion in the existing lecture halls. The learning environment was completely unfriendly backed with a lot of shortcomings. There was evidence of declining interest in didactic lectures and practical sessions with an increased preference for interactive and interesting sessions in form of peer tutored discussion classes. All lectures were delivered as scheduled with inherent limitations such as administrative barriers, limited funds, funding gaps, poor infrastructure and unfriendly learning environments. The students are eager to pass and continue with the clinical sessions. The students had no hands in evaluation of their teachers or academic curriculum.

The factors that may have contributed to an increase of pass rate in physiology examination are peer-assisted learning, more student-centered learning techniques, collaborative team work, active participation of both teachers and students, and a decrease in total number of students admitted from 2008-2010.

4. Discussion

Physiology is the basis of medicine. Thus, a good understanding of basic physiology enhances clinical training. The principles of physiology teaching are relatively constant but instructional methods vary from centre to centre [7].

Physiology education worldwide is currently undergoing innovative evidence based changes to teaching and learning environments. These changes favour student-centered learning [8]. These changes are rudimentary in most medical schools in Nigeria. Student assessments are largely by examinations with its limitations since the examinations are set and graded by the same teachers [1]. External examiners play limited role in assessing the students as they only participate in the final assessment of 2nd MBBS examinations.

In the past, the department of physiology had limited funds and administrative barriers with limited number of tutors. However, in 2008, we added seven additional academic staff members with MBBS and additional clinical qualifications. This appears to have resulted in a higher pass rate in our physiology examinations. With this introduction of clinicians as academic staff in 2008, the pass rate increased from roughly 60% to 70% and above. The obvious reasons for this increase in pass rate is still not very clear because there was no change in the content of the physiology course, no change in the presentation of material, the scientific rigor has not changed, the student assessment has not changed, the examination pattern and student assessment have not changed and there were no changes in the educational infrastructure. However, what have changed were introduction of peer-assisted learning, more student-centered learning techniques [9,10], and a

decrease in total number of students admitted from 2008-2010 and an increase in the number of faculty from 2008.

Thus, it may be of help for students in their clinical sessions to have tutors with primary degrees in medicine and surgery to teach physiology in order to lay more emphasis on applied physiology in the preclinical studies. These clinicians are usually well versed in physiology because as medical students they were taught physiology of all the human systems. This assertion was supported in this study by the significant increase in medical students pass rate in 2nd MBBS physiology examination following the employment of clinicians to teach physiology.

We suggest that the current reform in medical physiology education should include peer-assisted learning, collaborative team work, active participation [10,11], improvement in learning environment, reduction in students admission, students involvement in evaluation of their teachers or academic curriculum [1,4,12,13]. These are factors that may be considered for an excellent academic performance in physiology learning in Nigerian medical schools.

The limitation of this study, was the restriction of this study to college of medicine, Enugu campus. Furthermore, the retrospective nature of the study allowed for finding associations but did not allow for definitive conclusions on cause and effect. However, this is a stepping stone towards further research on physiology evaluation among medical students in Nigeria.

Table 1. (Yearly Distribution of Performance of Medical Students' in 2nd MBBS Examination)

Year	Total number of students	Total number that passed	Percentage pass	Total number that failed	Percentage fail	Total score	All 1 st attempt
2004	285	197	69.1	88	30.9	14,168	Yes
2005	290	188	64.8	102	35.2	14,133	Yes
2006	347	196	56.5	151	43.5	14,407	Yes
2007	370	233	63.0	137	37.0	19,205	Yes
2008	309	238	77.0	71	23.0	14,576	Yes
2009	258	202	78.3	56	21.7	14,097	Yes
2010	293	217	74.1	76	25.9	15,642	Yes

Table 2. Performance of medical students' in 2nd MBBS Physiology Examination before and after recent employment of Doctors (fellows) as Lecturers in the Department

	Total number of students that passed	Total number of students that failed	Total
Before (2004 – 2007)	814	478	1292
After (2008 – 2010)	657	203	860
Total	1471	681	2152

$\chi^2 = 42.194$; $df = 1$; $p < 0.0001$ (significant)

Disclosures

No conflicts of interest, financial or otherwise, are declared by the authors.

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