



Academic performance of First Year Medical Students in Tamil Nadu, India

K. Sivasangeetha, S. Mini Jacob, Mohan Das Joe Chandra, Mayil Vahanan Natarajan, D. Shantharam

ABSTRACT

Objective: First year medical students were taught Anatomy, Physiology, and Biochemistry. The Medical Council of India (MCI) provides common syllabus and examination patterns throughout the country. The Tamil Nadu Dr. MGR Medical University (TNMGRMU) proposed new regulations modifying the MCI examination pattern. The main objective of this study was to assess the academic performance of 1st year MBBS students as per the MCI regulations and to compare the results with the TNMGRMU regulations. **Methods:** This was a retrospective analysis of examination results of the three subjects. MCI regulations suggests that a student must obtain 50% in aggregate with a minimum of 50% in Theory (written- Paper I and II) including viva voce and minimum of 50% in practical in each subject for a pass. In TNMGRMU regulations, the student should have scored at least 50% of marks in each component of the subject. **Results:** Totally, 3323 students appeared for the examinations in August 2011. About 63% were from Government colleges, and 37% were from private institutions. About 82% students passed all three subjects as per the MCI regulations while only 61% of students passed all subjects as per the TNMGRMU Regulations. Majority of the students failed in Anatomy Paper I, Physiology Paper II and Biochemistry Paper I. About 64% of students in government medical colleges passed as per TNMGRMU regulations against fifty-three percent in private medical colleges. **Conclusions:** Higher number of students (82%) passed with MCI Regulations than with TNMGRMU regulations (61%) in all three subjects. Students avoid tougher portions and focus on the easier part of the syllabus. Revamping the medical curriculum, syllabi, focusing on applied aspects of Basic Medical Sciences and using innovative learning modalities will help in improving their academic performance.

KEY WORDS: Academic performance, anatomy, biochemistry, physiology, medical students.

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INTRODUCTION

The science and art of treating patients and preventing disease are complex and multi-dimensional. Offering students rigorous, high-quality education and training in the science and skills involved in the provision of care is the goal of undergraduate medical education programs [1]. In India, undergraduate medical education aims to contribute toward the training of a non-specialized physician (general or basic) to meet the health needs of the country, the evolution of medical science; and the requirements springing from the nature and responsibility of the physician's functions and his position in society [2]. Undergraduate medical students in India enter the medical college after 14 years of schooling at an average age of 18 ± 1 year. High school students are encouraged by their parents to apply for medicine even if they are not inclined to the medical profession. Selection of students for state - owned medical schools in India is based almost entirely on scholastic merits. Most of the states conduct premedical test (PMT), a multiple-choice examinations covering physics, biology, and chemistry once a year after high school graduation examinations. A national examination is also offered to allow students from

one state to apply for admission in another. Passing grades required for consideration of admission are stipulated by Medical Council of India (MCI) regulations. Admissions are based almost entirely on the PMT score. Some points in the scoring system for admission are awarded for community service, sports, and military service [3]. In Tamil Nadu, the students of Government medical colleges are the cream of the society who had obtained high marks in their schools, and they are regarded to possess high intelligent capabilities. Private medical colleges admit students who are willing to pay high fees throughout their course irrespective of marks obtained in school.

The quality and standard of the medical education are looked after by MCI. The undergraduate medical program is known as MBBS (Bachelor of Medicine and Bachelor of Surgery). It is four and half year's course followed by 1 year of Compulsory Rotatory Residential Internship.

There are 27 Medical Colleges affiliated to Tamil Nadu Dr. MGR Medical University, Chennai, Tamil Nadu. This is inclusive of 18 Government and 9 Private Medical colleges located all over the state. The Tamil Nadu Dr. MGR Medical

University is the second largest medical University in India. One of the main functions of this University is to conduct examinations and confer degrees to all undergraduates and postgraduates in Medical, Dental, AYUSH and Allied Health Sciences. The University conducts examinations twice a year in February and August for undergraduate students.

The medical colleges in India conventionally follow a curriculum with large volumes of information that our students imbibe unquestionably [4]. Academic performance is in general the yardstick used to measure the success of an individual. Excellent academic performance is the hope and pride of each and every student [5]. First year medical students were taught Anatomy, Physiology and Biochemistry in 12 months period. Countries such as Nigeria take 18 months to cover these subjects [6] and Thailand takes 2 years [7]. These subjects are integral for clinical year training because medical students are supposed to apply and implement their knowledge during clinical practice [7]. The Medical Council of India provides common syllabus and examination patterns to be conducted (MCI regulations 1997). MCI Regulations suggests that a student must obtain 50% in aggregate with a minimum of 50% in Theory (written- Paper I and II) examination including viva voce and minimum of 50% in practical in each subject for a pass [8]. The Tamil Nadu Dr. MGR Medical University proposed new regulations modifying the MCI Regulations for passing a subject (TNMGRMU regulations) in its 39th Standing Academic Board meeting. The main idea of proposing these new regulations was to make the students learn all the portions in the syllabus in each subject, and they were assessed in each paper in a subject individually. All the members of the board agreed for the new regulations. However, these regulations were not implemented in the State due to legal concerns. As per the TNMGRMU regulations, a candidate is said to have passed in a subject if he/she had scored at least 50% of marks in each component of the subject i.e., Paper I, Paper II, viva voce, practical and Internal Assessments (IA) [9]. Therefore, the objective of this study was to assess the academic performance of the 1st year MBBS students as per MCI regulations and compare with that of TNMGRMU regulations.

MATERIALS AND METHODS

A total of 3323 1st year MBBS Students took up their examination in August 2011. In this retrospective study, the students' results were collected from the database after the examinations for Anatomy, Physiology and Biochemistry under Theory, viva voce, practical and IA components. Each subject had Paper I and II in the theory component. In all theory papers, students were assessed on 2 essay questions, 10 short notes and 10 Short answer questions. Practical Examination in each paper includes spotters, gross specimen discussion in Anatomy, estimation of normal physiological and Biochemical values in physiology and biochemistry respectively. IA is the marks awarded based on the formative assessment throughout the academic year. Scoring 50% in IA was mandatory for the candidate to take up the summative assessment conducted by the University.

The students were aware that they were being assessed as per the TNMGRMU regulations. Pass percent was calculated as per MCI regulations and TNMGRMU regulations, and the results were compared. Pass percent was calculated for each subject. The results were analyzed and compared between Government and Private Medical Colleges. The data was entered into Excel sheet and analyzed.

RESULTS

A total of 3323 students appeared for the examination in August 2011. Out of 3323 students, 1443 (43.3%) students were males, and 1880 (56.57%) were females. About 63% were from Government colleges, and 37% were from private institutions. Of the total students, 82% students passed all three subjects as per the MCI regulations and 61% of students passed in all three subjects as per the TNMGRMU Regulations [Figure 1].

About 90% students passed Anatomy as per the MCI regulations while 76% passes as per the University regulations. In physiology subject, 89% and 84% passed as per the MCI Regulations and TNMGRMU regulations respectively. In biochemistry, 86% and 73% of students passed as per the MCI Regulations and TNMGRMU regulations, respectively [Figure 2]. Majority of the students failed in anatomy I, physiology II and biochemistry I [Figure 3]. About 64% of Students in Government Medical colleges passed as per TNMGRMU regulations against 53% in private medical colleges [Figures 4 and 5].

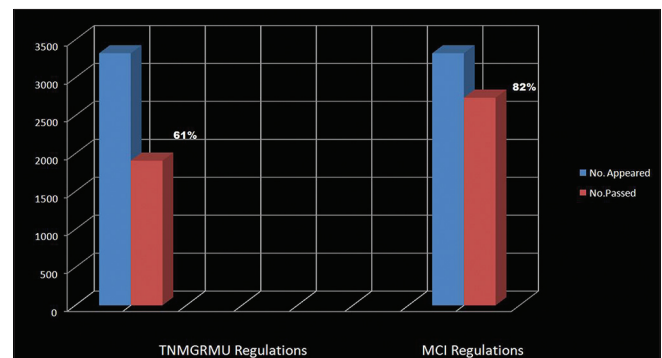


Figure 1: Pass percent of Tamil Nadu Dr. MGR Medical University regulations and Medical Council of India regulations

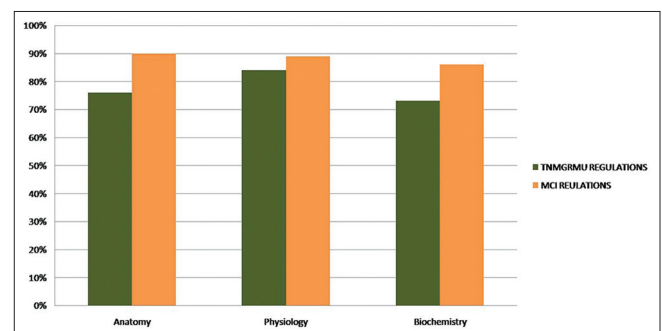


Figure 2: Pass percent in each subject as per Tamil Nadu Dr. MGR Medical University and Medical Council of India regulations

DISCUSSIONS

A significant number of students (82%) passed the 1st year MBBS examination as per the MCI Regulations. When TNMGRMU regulations were applied, only 61% of students passed all the three subjects. The main difference between these two regulations was combining the marks of two theory papers and viva voce marks.

Anatomy has been the cornerstone of medical education for hundreds of years, and it provides a platform of knowledge

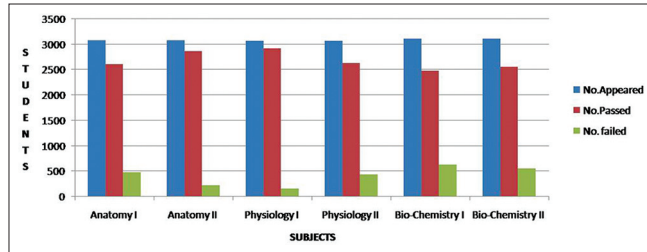


Figure 3: Results as per Tamil Nadu Dr. MGR Medical University regulations

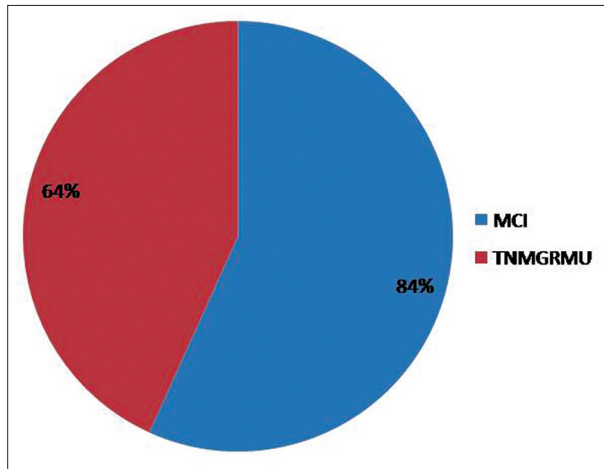


Figure 4: Pass percent in Government Medical colleges

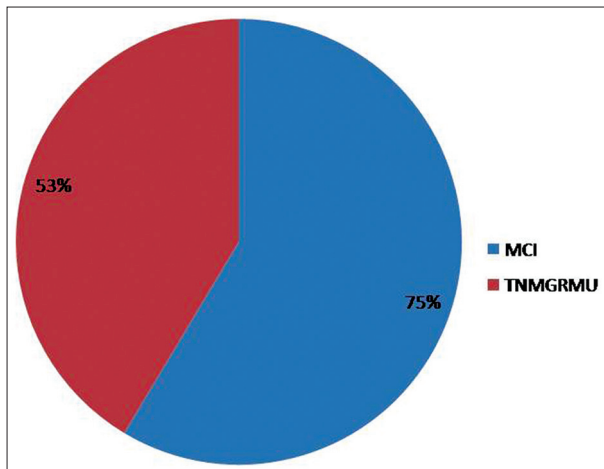


Figure 5: Pass percent in Private Medical colleges

suitable to all medical careers [10]. Physiology is a rapidly evolving basic science that teaches new things on how the body functions [11]. Biochemistry by definition is the chemistry of life, and life is a system of cooperative enzyme-catalyzed reactions [12].

Higher pass percentage in MCI regulations was mainly because combining of two theory papers and viva voce marks [8]. Whereas the TNMGRMU regulations were more stringent that the candidate should secure a minimum of 50% in Paper I, Paper II, viva, practical and IA separately. TNMGRMU regulations are based on the fact that the syllabus for each paper is well demarcated in all the three subjects. Paper I in Anatomy consists of upper limb, lower limb, abdomen and thorax and Paper II consists of head and neck and brain. Similarly, the syllabi in Paper I and II of Physiology and Biochemistry are clearly separated and hence the students are expected to learn all the portions in the syllabus.

Majority of the students failed anatomy I, physiology II and biochemistry I. This shows the trend of medical students focusing more on a certain part of the syllabus and avoiding the tougher portions. A medical student is expected to have a basic knowledge in Paper I and Paper II of a subject.

Students often work ‘backward’ through the curriculum, focusing first and foremost on how they will be assessed and what they will be required to demonstrate [13]. The written examination is a useful evaluation format to assess students’ ability to recall facts and higher order cognitive functions such as interpretation of data and problem solving skills [14]. The reliability in the present way of written examination is limited and can be improved by structuring the marking process and using a correction scheme [15]. On the other hand, viva voce examination is a general encounter between a candidate and one or more examiners [14]. Viva Voce examinations are less reliable as they are essentially subjective in nature, afflicted with halo effects, errors of central tendency, a general tendency toward leniency and errors of contrast [16]. According to Miller’s pyramid of competence, written test (Essay and factual test) and viva voce assess the cognitive domain by testing the ‘knows’ and ‘knows how’ [17,18]. As both the theory and viva voce tests the ‘knows’ and ‘knows how’, MCI regulations would have combined the theory (written marks) with viva marks for declaring a pass. In the present study, most of the students scored above 50% in viva voce and secured <50% in one of the theory papers. Torke *et al.* reported that there is not much correlation between student’s performance in viva voce examinations and that of theory. They observed that the performance of passed students in viva voce was poorer than that in theory while the performance of failed students in viva voce was better than their performance in theory [16].

Moreover, in India, the duration of 1st year MBBS is only 12 months. It may not be sufficient for the 1st year medical students to get oriented and focus on the basic medical science subjects. Effectively, these students will have a training period of 8-9 months only in their 1st year MBBS [2]. During this period, they would be encountering 3-4 formative assessments,

performance in this assessment will also be taken into account for their appearance in the Summative examinations. Further in states like Tamil Nadu, the admissions to MBBS are based on the marks obtained in state board examinations, where the students are expected to rote text as per the standard books and produce the same in the examination. These students would be in the same mindset after they enter into medical colleges. Further, the students who cleared all the subjects in 1st year MBBS shall be permitted to go to 2nd year. If they fail in any one subject, they lose a 6 months period in their duration of the study.

Academic performance of students varies even though they attend the same class and has been taught by the same teachers. Datta *et al.* had reported on study pattern and materials used by undergraduates in India, where students are serious about studies 2 months prior to examinations and tends to study 8-12 h a day and concentrate more on notes, last 5-10 year question bank and important topics from examination point of view [4]. In the present study, pass percentage in Government Medical colleges are high in both the regulations. This could be explained by the fact that all meritorious students are admitted in Government Medical colleges. A significant proportion of students in private schools are admitted based on a combination of test scores and their ability to pay high tuition fees and/or a high capitation fee [19]. Lower pass percentage in private medical colleges may be due to shortage of experienced medical teachers and admission of less meritorious students when compared to Government Medical colleges. In India, Postgraduate selection is based on scoring and ranking in the entrance examinations which is a multiple choice based examination, which covers the entire portion of the MBBS curriculum. Number of postgraduate seats available is limited, i.e. one-third of the available undergraduate seats [20]. On following TNMGRMU regulations of passing each paper individually, the students are made to familiarize and study the entire syllabus, hence indirectly equipping them to face postgraduate entrance examinations with confidence.

The aim of medical education is to bring out competent medical doctors. The Indian medical education system mainly follows a traditional, discipline-based curriculum with lectures being the primary mode of teaching and learning [21]. This study suggests that the improvement in standards of Medical Education can be made by revamping the medical curriculum, syllabi, focusing more on applied aspects of Basic Medical Sciences and changing the evaluation methods. Interactive lectures may represent the best practice of teaching in medical school with a sizable enrollment of students with diverse backgrounds [22]. Moreover, the performance in the examination is considered the most important indicator of a student's progress [23]. However, it is also important to keep in mind that the medical colleges and schools educate their students in the preparation for the role of a doctor [24].

The main limitation of the study were that as per TNMGRMU regulations, a student would fail if he/she scores <50% *in viva* separately. This can be overcome by standardizing viva questions, viva topics and time of examination for each student.

Academic performance of medical students can be improved using innovative teaching- learning modalities like use of simulations, problem-based learning and microteaching, etc. Establishing a Medical Education unit in each medical college [25], encouraging the entry level and mid-level medical teachers to participate in Teaching Learning methodology and Evaluation workshop [26] conducted by MCI recognized centers for training is essential to uplift the medical training in India. Need of the hour is to have a relook of the existing syllabus, curriculum reforms, teaching methodologies and evaluation methods. To address these issues, MCI has brought about curriculum changes to bring about improvement of quality standards [27].

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