Original Article

DOI: 10.7860/JCDR/2022/56640.16976

Assessment of Performance in Cognitive vs Affective Domain among First Year MBBS Students: A Cross-sectional Study

Education Section

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ABSTRACT

Introduction: National Medical Commission (NMC) has revised MBBS curriculum and incorporated Competency Based Medical Curriculum (CBME) which describes various competencies. Most of the competencies are based on cognitive, psychomotor and affective domain, which an Indian medical graduate should attain. Both cognitive and psychomotor domains were taught as a part of curriculum however, students learned affective domain as a hidden curriculum only. Now CBME has incorporated affective domain as a part of MBBS curriculum in the form of Attitudes Ethics and Communication (AETCOM) module, teaching and evaluating the affective domain demands attention.

Aim: To evaluate the performance of first year MBBS students in cognitive domain vs affective domain from their routine curriculum.

Materials and Methods: This cross-sectional study was conducted in SRM Medical college Hospital and Research Centre, Chengalpattu, India, from September to October 2019 among 149 1st year MBBS students. Three students were absent on day of assessment. Hence, 146 students were assessed in both domains. The performance of both domains (cognitive and affective) were assessed in the form of Objective Structured Practical Examination (OSPE). Chi-square was used to compare the qualitative data and Unpaired t-test was used to compare the means.

Results: The mean age of the students was 18.66±0.64 years. About 76 (52.1%) were male and 70 (47.9%) were female students. Out of total, 22 (15.1%) of students had scored less than minimum mark for pass in cognitive and 8 (5.5%) of students had scored less than minimum mark for pass in AETCOM. Only 2 (1.3%) of students had scored less than minimum mark for pass in both OSPE examinations. In addition, 49 (33.5%) students had scored more than average marks in cognitive and 94 (64.4%) students had scored more than average in AETCOM and 34 (23.2%) of students had scored more than average in both domains. The difference in the mean score was found to be statistically significant (p-value <0.0001).

Conclusion: This study concludes that the learners performed better in affective domain, when compared to cognitive domain.

Keywords: Attitude domain, Competencies, Curriculum, Psychomotor

INTRODUCTION

The MBBS curriculum in India has been reformed after 21 years and came into implementation from 2019-20 academic session onwards. The Competency Based Medical Education (CBME) incorporates many new teaching elements like foundation course, Attitude, Ethics, and Communication Module (AETCOM), early clinical exposure, integration and alignment, student doctor method of clinical training, electives, self-directed learning, critical thinking and research abilities, psychomotor skill development and simulation training, emphasis on primary healthcare centers to meet the global standards [1].

The outcome of CBME is expressed in terms of competencies for various domains such as cognitive, psychomotor and affective. To address the affective domain, the curriculum has integrated the AETCOM module, as a longitudinal program that emphasises the importance of development of proper attitude and communication skills to the student's right from the foundation course itself. Each module offers suggestions of teaching learning methodology and assessment type. The first professional year consists of five AETCOM modules for teaching affective domain and foundations of communication is one among them, which emphasises formative assessment [1]. Cognitive domain were taught in the curriculum in the form of various competences, which includes subject-wise outcomes, so called sub competencies. In subject anatomy 82 total topics were designed by National Medical Commission (NMC) [1].

Graduate Medical Education Regulation (GMER 2019) has also proposed assessment in the form of summative and formative assessments, which covers all the three major domains cognitive, affective and psychomotor domain [1]. Since, importance is given for all the three domains in the assessment part, the biggest challenge for CBME is to integrate 'Knowledge, skill, attitude' components and to bring a paradigm shift in teaching learning and assessment methods [2].

Many assessment methods are available globally which are proved to be effective in assessing the behavioural practice of trainees in clinical settings of attitude and professionalism. A 360° feedback assessment from multiple sources proves to be holistic in evaluating values and behaviour [3]. However, one of the tools to assess the AETCOM competencies are Objective Structured Clinical Examination (OSCE) and Objective Structured Practical Examination (OSPE) in a summative assessment examination setting [4].

The affective domain is taught in the MBBS curriculum as a hidden curriculum for years and NMC has revised the CBME curriculum, which now becomes mandatory for teaching such skills. Incorporation of this affective domain as a part of curriculum demands specific attention in the form of evaluating the progress of the learners. Moreover, there exists a lacuna in comparing the knowledge component with that of affective domain and integrating them. Hence, this study was carried out to evaluate the performance of the first year MBBS graduates in cognitive vs affective domain by an OSPE and to evaluate the progress of learning in teaching affective domain.

MATERIALS AND METHODS

This cross-sectional study was conducted in SRM Medical college Hospital and Research Centre, Chengalpattu, India, from September to October 2019 among 149 1st year MBBS students. The study

was approved by the Institutional Ethical Committee [Ref no. 847/IEC/2019].

Inclusion criteria: This study was a part of academic curriculum; all first year students admitted in the academic year 2019-2020 were included in the study.

Exclusion criteria: All the students were taught in both the domains for a period of two months. However, students who were absent on the assessment day were excluded from the data analysis.

Out of total 149 students, admitted in first year MBBS (2019-2020 batch), three students were absent on day of assessment. Hence, 146 students were assessed in both domains.

Affective Domain

The AETCOM module- Foundations of communication skills were taught to the students based on Kalamazoo Consensus Statement for communication skill as per NMC module [5]. The module was taught to them in the form of role play by faculties of Medical Education Unit (MEU) of SRM Medical College Hospital and Research Centre. Kalamazoo module is based on seven essential elements which includes [5]:

- Building the doctor-patient relationship;
- Opening the discussion;
- Gathering the information;
- Understanding the patient's perspective;
- Sharing information;
- Reaching agreement on problems and plans; and
- Finally providing a closure

The role play was designed based on these seven elements step by step. Checklist of the seven essential elements of communication were provided to the students for observation in the role play. The role play was followed by group discussion with the students, based on the observation in the role play for all the seven steps of communication. The duration of role play was 15 minutes and the whole single session including the discussion component was carried for two hours.

The students were divided into 10 groups, with 15 students each in nine group and 14 student in the 10th group with a total of 149 students. Ten interns were trained by MEU faculty who taught the role play to the students to simulate like a patient with a same case scenario and same presenting complains. A patient of acute abdomen was received in Emergency Department and the surgeon diagnosed it as a case of acute appendicitis. The doctor communicates with the patient and the attenders to convince for surgery. Each group were assigned with one simulated patient. After the completion of the module, evaluation was done on different day with prior information to faculties and students in the form of OSPE. Ten faculties were assigned to assess the communication and interpersonal skill (affective domain) of the students with a checklist for a total seven items to evaluate the affective domain and for opening upon the discussion and for sharing information extra 1.5 marks each was given which over all gets to a total score of 10 based on the MEU expert committee.

Cognitive Domain

The core subject Gross Anatomy (GA) was taught to the 1st year students as a part of the curriculum. Practical classes were covered as small group teaching in anatomy where the students were divided into 10 groups with 15 students each in nine groups, except for 10th group with 14 students. Upper limb was taught to the them with a dissected specimen and the structures were demonstrated to them. Corresponding upper limb lecture about 20 sessions for one hour duration were also conducted for a period of about one month.

At the end of upper limb module assessment were kept in the form of OSPE. Ten stations were kept and the students were asked to identify the structures in a dissected specimen along with a case based question to evaluate the cognitive domain. Questions were devised by the faculty members and Department Board of Studies Committee who are expertise in the field validated the questions.

The total score of 10 marks was kept for each domains. The average of 50 percent mark was considered as minimum pass score in both domains. The scores were analysed for less than five marks and greater than seven marks in both domains which reflect the poor performers and good perfomer students respectively. A score of 5-7 was considered as average performer. There is no such previous studies, defining the comparison of both domains. The marks are finalised and validated by Department Board of Study Committee members.

STATISTICAL ANALYSIS

The data were described in the form of frequency, proportions, mean and Standard Deviation (SD). Chi-square was used to compare the qualitative data and Unpaired T-test was used to compare the means. The analysis was done by using software Statistical Package For The Social Sciences (SPSS) version 19.0.

RESULTS

The age of the students were ranging from 18-20 years. The mean age of the students was 18.66±0.64 years. About 76 (52.1%) were male students and 70 (47.9%) were female students. The average marks scored in cognitive domain were 5.37±1.74 and 7.52±1.62 in affective domain. The difference in the mean score between the two methods was found to be statistically significant (t-value 10.974; p-value=0.0001). The range of scores in cognitive domain varies between 1-9, and in affective domain it varies between 1.5-10 [Table/Fig-1].

Domain	Mean	Range	t-test	p-value
Cognitive	5.37±1.74	1-9	10.974	0.0001
Affective	7.52±1.62	1.5-10		

[Table/Fig-1]: Mean score of students in both domains.

There was no statistically significant difference found between mean scores in Cognitive domain between male (5.21±1.69) and female (5.61±1.75) students (p-value=0.166). Similarly, the mean scores in affective domain did not differ between male (7.38±1.71) and female (7.75±1.45) students (p-value=0.162) [Table/Fig-2].

Domain	Gender		t-test	p-value
	Male	Female		
Cognitive	5.21±1.69	5.61±1.75	1.392	0.166
Affective	7.38±1.71	7.75±1.45	1.406	0.162

[Table/Fig-2]: Mean score of both domains in male and female students.

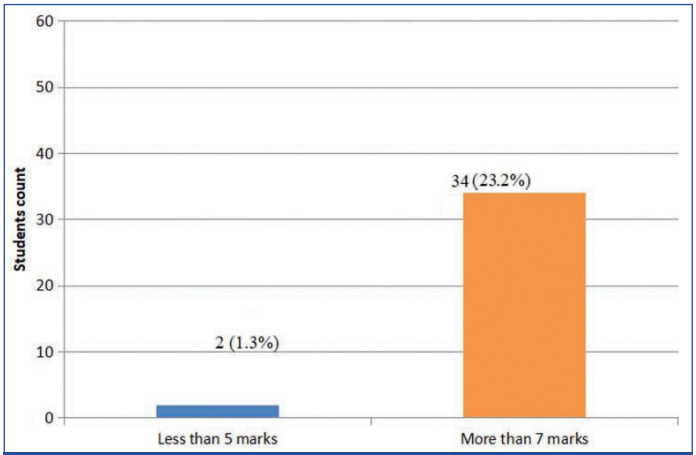
Out of total, 22 (15.1%) students scored less than five marks in cognitive and 8 (5.5%) students scored less than five marks in affective domains. Around 49 (33.6%) students had scored more than seven marks in cognitive domain and 94 (64.4%) students had scored more than seven in affective domain. The difference in the proportion of students in different grades between the methods was found to be statistically significant (Chi-square=28.77; p-value <0.0001) [Table/Fig-3].

Domain	Less than 5 marks	Between 5-7 marks	Greater than 7 marks	Chi-square value	p-value
Cognitive	22 (15.1%)	75 (51.3%)	49 (33.6%)	28.77	0.0001
Affective	8 (5.5%)	44 (30.1%)	94 (64.4%)		

[Table/Fig-3]: Proportion of students with different grades.

The [Table/Fig-4] represents students who have scored less than five marks in both cognitive and affective domains (poor performers)

and greater than seven above average students in both domains. Only 2 (1.3%) students had scored less than 5 marks in both examinations, whereas 34 (23.2%) students had scored more than 7 in both domains.



[Table/Fig-4]: Students who scored less than five and greater than seven in both cognitive and effective domains.

DISCUSSION

Various misconceptions about teaching communications skills to medical students, like communication skills are not teachable and would be learned by experience, self awareness and self reflective do exist [6,7]. Various studies had revealed that mixed teaching methodology using various teaching tools was the highlight of teaching ethics and professionalism [8-10]. Multiple choice questions, assignments, presentations, open questions were the assessment methods mostly practiced in Germany [11]. Goldberg GR et al., stated that in the United Kingdom ethics was assessed as student reflections at the end of the course [12]. Ekmekçi PE and Bilgin AC et al., mentioned that in Turkey written exams and assignments were the assessment methods [13,14]. Formative and summative assessment through problem based cases by the faculty was the assessment method in Spain [15]. The performance of health professionals was effective while communication skills was trained through conceptual issues, experiential learning and through various Communication Skills Training program (CST) [16,17].

While analysing the scores of the two domains obtained in both OSPE examinations, only 8.5% of the students has not attended the minimal pass score in AETCOM, which was comparatively high about 15.1% in gross anatomy. In addition, while analysing and comparing the individual score 7.5% of students who got very low marks in gross anatomy has more than average marks in AETCOM. Communication skills are better for few students when compared with subject content. However, only 1% got more than seven in gross anatomy OSPE but got very less scores in AETCOM.

The present study reveals that, students perform better in communication skills while teaching the AETCOM module as prescribed by NMC guidelines and the results were so promising. Hence, teaching AETCOM in a structured protocol helps the students to achieve the learning outcomes in a better way. However, only 1.5% of the students failed in both the OSPE examination, conveying that a reasonable percentage of students falls in the poor performer category and needs to have remedial classes. While 22.8% had scored above average level in both examinations.

The best approach for assessing AETCOM is in a real world simulated environment as a practical examination rather than in a written theoretical way [18]. To ensure successful implementation of communication skills developing best practices in training as a part of curriculum can be helpful [19].

The academic quality of the medical curriculum was designed to address specific learning objectives by addressing primarily three domains: cognitive, psychomotor and affective [20]. With the above mentioned details to practice a physician of first line contact, the student demands a good clinical knowledge rather than having just good communication skills.

Limitation(s)

The study is restricted with just upper limb session of gross anatomy in cognitive domain and one module in AETCOM i.e., communication skills due to time constrain. It should be evaluated for various sub competencies and other modules of the curriculum of 1st year MBBS.

CONCLUSION(S)

This study concludes that the learners performed better in affective domain, when compared to cognitive domain. In addition, it is recommended that the communication skills training can be incorporated along with the regular curriculum for the undergraduate training program in order to achieve a balance between the various domains as required by the curriculum to meet the global standards. This can be integrated along with other new CBME components like early clinical exposure, student's doctor training programs along with the AETCOM module for achieving the academic quality and to produce physicians of first line contact. Moreover, it can be further elaborated to next phase MBBS students since all the domains are taught to them in their routine curriculum and even be compared with others domains of teaching.

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PLAGIARISM CHECKING METHODS: [Jain H et al.]
- Plagiarism X-checker: Apr 07, 2022
- Manual Googling: Jul 14, 2022
- iThenticate Software: Aug 29, 2022 (18%)

ETYMOLOGY: Author Origin

AUTHOR DECLARATION:
- Financial or Other Competing Interests: None
- Was Ethics Committee Approval obtained for this study? Yes
- Was informed consent obtained from the subjects involved in the study? Yes
- For any images presented appropriate consent has been obtained from the subjects. No

Date of Submission: **Mar 28, 2022**
Date of Peer Review: **Jun 11, 2022**
Date of Acceptance: **Jul 23, 2022**
Date of Publishing: **Sep 01, 2022**