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Original Article

Education Section

Students Perception on Clinical Application Based Biochemistry Practical Examination

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ABSTRACT

Introduction: In the conventional method of practical examination candidate has to perform the given test/s directly without the need to know its clinical relevance. In this model of clinical application based biochemistry practical examination student has to solve the given case, decide which are the relevant test, perform a given test selected by examiner and then hat o interpret the result. So this method may help to foster clinical reasoning in a student in the current competency based education.

Aim: To assess the perception of first-year MBBS undergraduate students on clinical application based biochemistry practical examination.

Materials and Methods: Prior permission from the institutional Ethics Committee was obtained for the present prospective observational study. A total of 198 first year MBBS students appearing for 3rd sessional practical examination enrolled after obtaining the consent. A questionnaire which consisted of 10 questions were given to the student and asked to answer within 15 minutes. Based on the feedback, Cronbach's alpha and frequency distribution were calculated using SPSS 15.0 version.

Results: Students perception of the clinical application based biochemistry practical examination was much better compared to the conventional method.

Conclusion: Clinical application based biochemistry practical examination should be included as an essential component of practical examination. This will facilitate clinical reasoning amongst students.

Keywords: Clinical reasoning, Clinical vignettes, Medical students, Undergraduate

INTRODUCTION

Learning is always driven by an anticipation of assessment [1]. In the medical curriculum, an important integral component is an appropriate assessment of clinical knowledge and competencies of medical students [2,3]. In recent years, the Problem-Based Learning (PBL) teaching method has been extensively applied as an experimental educational model which has shown to be more effective in improving student's critical thinking than traditional methods [4,5]. Based on this evidence, Medical and Dental council of India, have been advocating a need for outcome based education as a student-centred approach that emphasises on what learners should know, understand, demonstrate. Based on this MCI has already started reforming the postgraduate curriculum on their websites [6].

The vision 2015 document of MCI has recommended the need for early clinical exposure for medical students [7]. To equip them for this, we need to develop clinical reasoning and problem-solving skills among students. This has provoked us to try clinical application based practical examination in biochemistry.

Case-Based Learning is a student-centred teaching methodology that exposes students to real-world scenarios that need to be solved using their reasoning skills and existing theoretical knowledge. Medical students should be able to apply clinical reasoning skills to further their interpretative and diagnostic skills. It is an established pedagogical method that uses case studies as active learning tools, thereby favouring deep learning. Case method involves learning by doing and developing analytical and decision-making skills which are closely related to learning objectives in clinical biochemistry. Case-based learning has not been used as a tool to learn practical in biochemistry. Cases have been used as a stimulus, which would help the student to interpret and then do the appropriate tests related to the case [8].

The Conventional method of practical examination conducted in pre and para-clinical subjects involve the direct performance of a given task followed by questions based on its applications. This will not help in developing clinical reasoning among students. If the same test is linked to a clinical vignettes wherein student has to interpret the case along with all possible investigations, may improve his clinical reasoning and a comprehensive approach to problem-solving during their clinical postings. Based on the above hypothesis some clinical vignettes were introduced to the students in place of conventional approach during their practical examinations. The physiology and biochemical screening of a given disease condition were discussed.

Evaluation also was based on this aspect only and not on clinical examination or any other tests. A feedback was taken after completion of the examination to understand how the students perceived this as compared to their regular examinations. This feedback also can help the faculty of biochemistry to improve or change the methodology of their teaching.

MATERIALS AND METHODS

Prospective single-centre observational study was conducted from April 2017 to June 2017, only first year MBBS students who consented to participate were enrolled at Department of Biochemistry, Kasturba Medical College Manipal, Manipal Academy of Higher Education, Karnatka, India. (Out of 250 students 198 students consented to participate). First-year MBBS students who had undergone conventional practical examinations in their earlier sessional/formative examinations and who have been exposed to clinical oriented/ problem solving exercises before the examination were included in the study. The repeater students who have not been trained in the clinical oriented evaluation were excluded from the study.

After obtaining the clearance from Institutional Ethics Committee (IEC 292/2017) Kasturba Hospital, Manipal, clinical application based questionnaire was developed and validated by the faculties Department of Biochemistry and tested on 198 first year MBBS undergraduate students taking Biochemistry sessional

examinations. After the questionnaire was prepared it was discussed with all faculty of present department and was then piloted to a small group of postgraduate students to understand their response. The questionnaire was to know the perceptions of students on conventional practical method versus vignette based practical examination method. Before conducting the clinical application based practical examination students were trained using a prototype of clinical vignettes in the form of PBL activity in the small group. The vignettes were also given for the formative practical exams. One clinical case study was given to individual student; 15 minutes were given to go through the case and to arrive at the provisional diagnosis and to list possible biochemical tests related to the case which were taught to them during the theory classes. Following this, the student has to perform the specific tests indicated by the faculty who was made to evaluate the students based on the ability of student to link test reports to the case. After completion of the examination, a validated Predesigned Likert's scale based questionnaire was given to the students to understand their each question [Table/Fig-1]. Likerts scale was used to understand undergraduate student's attitude to topic, mainly used in survey type of studies. The scale used in the present study was: 1=strongly disagree, 2=disagree, 3=not sure, 4=agree, 5=strongly agree.

STATISTICAL ANALYSIS

Statistical analysis was done using SPSS software 15.0 version. Cronbach's alpha was used for measuring the internal consistency or reliability of questions. Frequency distribution was used for evaluation of student's perception.

RESULTS

After collecting the responses from 198 first-year undergraduate medical students (105 male students and 93 female students) reliability of questionnaire was done using Cronbach's alpha [Table/Fig-1].

The internal consistency or reliability of questions was good which was measured using a tool called cronbach's alpha. A value of more than 0.6 was said to be good.

Analysis of feedback showed 102 (87.93%) undergraduate students want clinical application based practical examination due to fact that it was valid, objective and reliable tool. A total of 134 (67.3%) of students feel that clinical application based practical examination was more useful than conventional method. About 145 (73.22%) undergraduates perceive that it covers the learning objectives and 153 (77.26%) perceive that it covers appropriate skills and knowledge. A total of 105 (53.02%) student felt it can identify their area of weakness in the practical skills and in future help them to improve on the same.

Around 129 (60.14%) students felt the level of information asked was appropriate and 153 (77.26%) of students felt it helped them to understand how to apply the clinical knowledge that they had learned in theory.

The students felt that clinical application based practical examination was more encouraging than conventional method (71.70%) along with added value of problem solving skills (74.24%). This new method of practical examination was less stressful than older conventional method [Table/Fig-2].

DISCUSSION

Methods for student assessment in medical education have changed over the past 50 years. The concept of competencies in medical education has provoked in developing quality assessment methods those are reliable, valid, practical, generalisable, and replicable. Medical students today are tested on knowledge, attitudes, and skills across multiple settings and methods. With a major focus on skill acquisition, new strategies for assessing learning and competence in these "higher" areas have evolved [9-11]. One of the limitations in using these methods in preclinical years is that students have not

S No.	Questions	Cronbach's alpha
1	Less useful than conventional practical examination	0.886
2	Covers appropriate knowledge and skills	0.769
3	Consistent with learning objectives of the syllabus	0.769
4	Highlighted the area of my weakness in the subject	0.777
5	Highlighted the area of my weakness in practical skill	0.776
6	Level of Information asked was appropriate	0.780
7	Helped me to understand how to apply clinical biochemistry knowledge that I learned in theory	0.768
8	More encouraging than conventional examination	0.785
9	It tests interpretation and problem solving skills in addition to practical skills	0.773
10	It is more stressful as compared to conventional examination	0.851

[Table/Fig-1]: Students perception on clinical application based biochemistry practical examination questionnaire and Cronbach's alpha for each questions.

S No.	Questions	1 N (%)	2 N (%)	3 N (%)	4 N (%)	5 N (%)
1	Less useful than conventional practical examination	60 (30.3%)	74 (37%)	36 (18.18%)	17 (8.58%)	7 (3.53%)
2	Covers appropriate knowledge and skills	8 (4.04%)	13 (6.56%)	23 (11.6%)	108 (54.54%)	45 (22.72%)
3	Consistent with learning objectives of the syllabus	8 (4.04%)	12 (6.06%)	28 (14.14%)	102 (51.51%)	43 (21.71%)
4	Highlighted the area of my weakness in the subject	8 (4.04%)	13 (6.56%)	51 (25.75%)	83 (41.91%)	42 (21.21%)
5	Highlighted the area of my weakness in practical skill	8 (4.04%)	22 (11.11%)	56 (28.28%)	71 (35.85%)	34 (17.17%)
6	Level of Information asked was appropriate	9 (4.54%)	17 (8.52%)	39 (19.69%)	98 (49.49%)	31 (15.65%)
7	Helped me to understand how to clinical application of the knowledge I learned in theory	10 (5.05%)	10 (5.05%)	18 (9.09%)	101 (51.01%)	52 (26.26%)
8	More encouraging than conventional examination	10 (5.05%)	16 (8.08%)	26 (13.13%)	89 (44.94%)	53 (26.76%)
9	It tests interpretation and problem solving skills in addition to practical skills	8 (4.04%)	10 (5.05%)	28 (14.14%)	101 (51.01%)	46 (23.23%)
10	It is more stressful as compared to conventional examination	30 (15.15%)	57 (28.78%)	49 (24.74%)	35 (17.67%)	23 (11.61%)

[Table/Fig-2]: Frequency distribution of responses answered by the undergraduate students for each questions.
Conventional-14 (12.06%); Vignette based-102 (87.93%); N: Number

yet been exposed to real patients or problems. So most evaluation is based on recall and rote learning and can sometimes discourage the medical students in acquiring clinical reasoning. Studies on competency assessments and PBL have shown that it may facilitate a more standardized approach to clinical evaluation [12-14].

The main goal of the present study was to produce clinically competent medical undergraduate personnel with practical skills in diagnosing the health-related problems. Vignette based practical examination stimulates student's interest and helps them to inculcate active self-directed approach towards solving the health issues. Clinical application based biochemistry practical examination facilitates the process of active learning and makes them use the theoretical knowledge base in clinical practice in an effective manner [15].

Student assessment should be based on learning outcomes and the ability to approach core clinical problems so as to groom them as competent doctors. In this regard, assessment as far as possible should be integrated and oriented towards clinical relevance rather than theoretical aspects. A range of appropriate assessment instruments should be available to enable assessment of the outcomes at the level required at each stage of the curriculum to allow assessment of knowledge, application, competence, performance and professionalism [16,17].

The conventional practical examinations in the subject-based curriculum in preclinical years have been criticised for lack of relevance and clinical application [18]. This has provoked us in modifying it to clinical vignette-based practical examination along with its interpretation. As medical students are adult learners they will be encouraged to participate if it helps in their future applications. So, most students appreciated this change which was evident in their feedback.

To support the results of the present study other studies concluded that competency-based clinical education may facilitate a more standardised approach to clinical evaluation [12]. Studies done on PBL have concluded that PBL aims to develop lifelong skills to solve practical problems rather than limiting learning to theoretical knowledge [13,14].

LIMITATION

Authors did not have enough number of questions for the clinical application based biochemistry practical examination for all students, so case based questions were repeated. Also, seven students who participated in the study did not completely answer all ten questions.

CONCLUSION

As medical students are not exposed to patients in first year, using case based evaluation exercise will not only kindles the student interest in the subject but also help them to grow as more competent doctors.

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