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Pharmacology

MULTIPLE CHOICE QUESTIONS ARE BETTER EVALUATION TOOLS IN FORMATIVE ASSESSMENT

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ABSTRACT

Introduction: Assessment is an essential part of the learning process in education. Students perceive it as dominant motivator to direct and drive the Learning [3]. It gives insight about students learning and competencies. Formative assessment is a part of the ongoing process to monitor students learning, to provide feedback that can be used to improve learning. Multiple choice questions are a common type of assessment due to their reliability, validity and ease of scoring [20]

Objectives:

1.To study the effectiveness of multiple choice questions (MCQs) as a formative assessment tool.

2. To develop interest in learning Pharmacology subject.

Methodology: After obtaining Institutional Ethics committee approval and informed consent a prospective parallel group comparative study was conducted over a period of 12 weeks at KMC Kurnool. 50 II year undergraduate students as group A were assessed by MCQs, 50 students as group B by Short Answer question (SAQs) in chemotherapy, endocrinology chapters. Each paper consists of 20 questions; carrying 20 marks. Feedback on perception and experience of formative assessment were collected from students and faculty. **Data analysis:** Quantitative analysis by Unpaired student t test to compare scores. qualitative descriptive analysis for feed back was done. **Results:** In Chemotherapy assessment t test is 3.402 Probability <0.001 is significant. In Endocrinology t test is 1.503 Probability <0.5 not significant. According to feed back MCQs easier to attempt needs assess the depth of knowledge over wide coverage of syllabus, Improves learning, Gives practice for pre PG exams and viva , MCQs should be included in university exams **Conclusions:** Observations of present study suggest that MCQs are more effective than SAQs. Their inclusion in University exams can be considered, but in order to avoiding coping coding may have to be done.

KEYWORDS : Formative assessment, learning, multiple choice questions.

INTRODUCTION:

Evaluation is an important component of a teaching-learning curriculum. A significant application of evaluation is for continued monitoring of learning activities for giving a feedback to students and teachers [1] . The evaluation of the competence of undergraduate medical students is a very critical task, as in the future, these 'to be physicians' have to cater with human lives [2] Assessment is an essential part of the learning process in education. Students perceive it as a dominant motivator to direct and drive their learning [3]. At undergraduate level there are three domains of skills to be evaluated i.e. Cognitive, Affective and Psychomotor[4]. Proper cognitive assessment tools reward the students for their higher cognitive skills and abstract thinking [5] . There are various methods to assess the knowledge domain which include Free response examinations (Long Essay Questions, Short answer Questions, Modified Essay questions), Multiple choice questions, Key feature questions, Self- assessment and peer- assessment. Each of these methods has its pros and cons and is addressed to assess different levels of bloom's taxonomy. No single method of evaluation is superior to other and probably a reliable and valid evaluation requires a combination of these methods [2,5]

Though multiple choice questions easy to answer by recognising the answer not by recall. Student may guess the answer by logical analysis or by means simple picking answer randomly to attempt a question until negative mark for wrong answer is there. As MCQs large number of questions can be given, with easier evaluation and results scoring without any bias. But to prepare a valid MCQs is time consuming for faculty and chance of malpractice is more, to avoid coding may have to be done.

Formative assessment (FA) is a part of the developmental or ongoing teaching-learning process. The immediate feedback given in FA, informs learners of their present state of learning and provides opportunity to modify learning during the learning process [6]. Multiple choice questions (MCQ) being versatile, are the most widely used components of objective examinations and are used for formative and summative assessment as well as for various entrance examinations where ranking of students is of paramount importance[7] The Multiple choice questions are very popular in evaluation of undergraduate medical students. They are reliable and valid; moreover they are easy to administer to a large number of students. Well constructed MCQs have a greater ability to test knowledge and factual recall but they are less powerful in assessing the problem solving skills of the students. A large proportion of curriculum can be tested in a single sitting. The scoring is very easy and reliable using computer software, but the construction of good MCQs is difficult and needs expertise. Generally MCQs stimulate students to make a superficial and exam oriented study [8,9] . Any alternative method of assessing applied medical knowledge must therefore provide increased content and response process validity, without resulting in significant reductions in other types of validity, reliability, acceptability, educational impact or an unacceptable increase in cos [10] . Very-short-answer (VSA) questions are a potential solution [11,12] . Another common type of assessment is short or long essay type questions. This format allows students more flexibility in their response and reflects their individuality of approach in which interpretative skills can be evaluated [13].

Numerous studies have compared MCQs and constructed response items, and authors continue to argue strenuously for or against using MCQs [12,14]. In this study the effectiveness of multiple choice questions (MCQs) as a formative assessment tool in improving academic performance of the student is assessed by comparing with very short answer questions. This study was also done for the development of interest in learning Pharmacology subject.

This study was done as a project work under Advanced course in Medical education in 2016 at Nodal centre, Christian Medical college, Vellore, TN.

OBJECTIVES:

To study the effectiveness of multiple choice questions (MCQs) as a formative assessment tool.

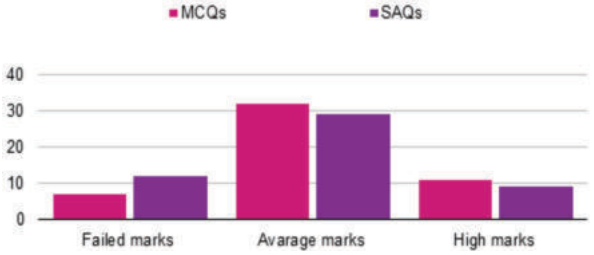
To develop interest in learning Pharmacology subject.

METHODOLOGY:

A prospective parallel group study was conducted over a period of 12 weeks at Kurnool Medical College, Kurnool from July 2016 to Aug 2016. Study was started after obtaining Institutional Ethics committee approval, and informed oral consent from the students. Second year medical students were divided into two groups each group consisting of 50 students, these students were assessed simultaneously. To one group of students pre validated Short Answer question (SAQs) paper to another group multiple choice question paper was given to assess. Each question paper consists of 20 questions; carrying total of 20 marks, from chemotherapy, endocrinology chapters in Pharmacology subject as formative assessment tool. 25 minutes of time is given to answer questions, scores of the formative assessment are compared. Qualitative analysis was done by Unpaired student t test to compare assessments scores.

Five point Likart's scale based Feedback forms are given to students

consisting 12 pre validated questions on perception and experience of formative assessment, after completion of formative assessment. Feed back from faculty and postgraduate students on conducting a formative is also taken. Quantitative analysis was done by descriptive analysis and represented in table 3



RESULTS:

quantitative analysis student t test was done to compare scores of students in chemotherapy charter. Data is tabulated as table 1

Chemotherapy	Total Marks	Score	Mean	SD	t Test	Probability
MCQs	1000	681	13.64	2.75	3.402	<0.001 (significant)
SAQs	1000	582	11.64	3.05		

Graph-1 Comparison of quantitative analysis by MCQs Vs SAQs. In chemotherapy chapter.

quantitative analysis student t test was done to compare scores of students in Endocrinology charter. Data is tabulated as table 2

Endocrinology	Total Marks	Score	Mean	SD	t Test	Probability
MCQs	1000	664	12.88	2.66	1.503	<0.5 (not significant)
SAQs	1000	603	12.06	2.79		

Graph-2 Comparison of quantitative analysis by MCQs Vs SAQs

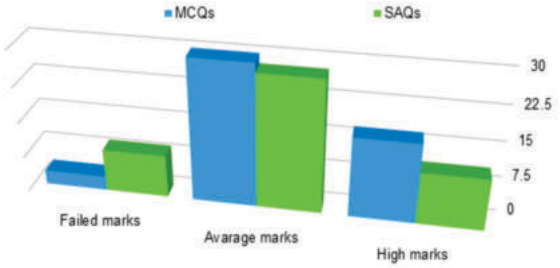


Table 3: feed back on conducting formative assessment from faculty and students.

1- strongly agree, 2- Agree, 3- Neutral, 4- disagree, 5- Strongly disagree,

S.No	Question	1	2	3	4	5
1	Are MCQs easier to attempt	20	43	25	15	5
2	Are SAQs easier to attempt	23	34	28	17	6
3	MCQs - Fair evaluation without bias	60	22	18	5	3
4	MCQs - Needs thorough preparation	55	25	25	10	3
5	MCQs- Adequacy of time given	60	30	10	6	2
6	MCQs- Better assessment of depth of knowledge	40	25	25	10	8
7	MCQs- Wider coverage of syllabus	55	30	25	8	7
8	MCQs- Accessible for more scoring	35	40	15	10	8
9	MCQs- Improves learning	30	45	20	8	5
10	MCQs- Gives practice for pre PG exams	45	30	25	6	2
11	MCQs- Gives practice for Viva	40	25	24	15	4
12	MCQs should be included in University exams	30	40	22	12	4

DISCUSSION:

It was noted in our study that the overall scores for the MCQ were more than to SAQ in chemotherapy chapter. That there was a statistically significant overall correlation between student performance of MCQ and SAQ at 98 degrees of freedom and with p= <0.001. This indicated that in general students who performed well in the MCQs. A similar observation of higher scores in MCQs and Short essay questions compared with structured integrated questions was reported by Moqattash et al(16,17) . Yogeeta Sushant C(18).

Another finding in our study was that there was no difference between the number of students who got average scores in either SAQ or MCQ. This showed that the students had unique strengths in either one or the other examination format. Students with strong factual recall abilities scored higher in the MCQ component, whereas students with strong analytical skill and the ability to organize and apply knowledge scored higher in SAQ. Anbar (19) also observed a lack of difference in the performance of competent students in MCQ tests compared with open-ended tests and a positive correlation for less competent students.

In our study we find that there was no significant difference between the scores in the two examination formats in Endocrinology chapter as unpaired t-test shows probability of <0.5 means failed to show any significant difference between the marks scored in MCQs and SAQs at 98 degrees of freedom. Same was found Yogeeta Sushant C(16) study that the overall scores for the SAQ were equivalent to MCQ that may be attributed to some degree of objective marking schemes of SAQ as compared with comparable objective nature of MCQs. It is generally assumed that SAQs are more difficult than MCQs because it is easier to recognize the correct answer than to recall it. Sam et al. (2019) .

Though MCQs are included in university summative assessment for 20% in theory exams, answer books of MCQs are to be taken within time constrain to avoid malpractice or copying, which is cumbersome for invigilators. Feedback for implementing MCQs is taking regularly to improve learning performance of students.

CONCLUSIONS:

Observations of present study suggest that MCQs are more effective than SAQs. This study can extended to one year and by increasing the frequency of assessment effectiveness of MCQs in learning can studied to reduce bias. Their inclusion in University exams can be considered as one section in questions paper , but in order to avoiding coping coding may have to be done. In 2020 our Dr. YSRUHS Vijayawada included MCQs in university summative assessment for 20% of marks . Students should be assessed with 5-10 MCQs at the end of each session to increase interest in subject and highlight the must know areas of topic.

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