

COGNITIVE LEVEL OF MCQS IN PHARMACOLOGY

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ABSTRACT

Introduction: Medical universities have started MCQs as assessment tools in various disciplines for the last few years. However, maintaining the standards and quality of these MCQs is very much necessary. This study aims to evaluate the quality of MCQs by determining the level of cognition of Pharmacology exams at Bacha Khan Medical College.

Study Design: a Cross-sectional study the cognitive level of MCQ”

Duration and place of study: department of Pharmacology Bacha Khan Medical College Mardan, from Jan 2014 to Jan 2015

Methods: This analytical study evaluated the quality of MCQs used in the final pharmacology exams at Bacha Khan Medical College. The cognitive Levels of MCQs (C1, C2, C3) were evaluated.

Results: A total of 100 MCQs were analyzed. The cognitive cost of the MCQs’ cognitive level was at recall level (C1) (70%). MCQs in C2 were 30%. There were no MCQs at the C3 level.

Conclusion: Most of the items were at a low (C1) level of cognition. A structured faculty development program, along with the development of test blueprints, is recommended to improve the quality of MCQs. A fully dedicated, honest, full-time staff in sufficient numbers with enough time, space, planning, and material resources is needed to carry out this purpose.

Key Words: Assessment, MCQs Quality, Evaluation, Cognitive level.

INTRODUCTION

In medical exams, multiple choice questions (MCQs) are progressively replacing the outdated, ambiguous essay format. MCQ has good construct validity at each of the three cognitive domain levels¹⁻⁸. Their viability has significantly enhanced with the use of current technologies. Assessing a large number of pupils is rather simple. Many medical schools have adopted this structure for their high-stakes examinations because of the benefits. The modified Bloom’s Taxonomy¹⁵

classifies cognition into three levels.

Level 1(C1): “Include questions which attempt to check recall of information.”

Level 2(C2): “Include questions which attempt to test understanding and interpretation of data.”

Level 3(C3): “Include questions which attempt to test the application of knowledge for solving a particular problem.”

As medical students will encounter clinical problems and management of patients, a higher level of clinical reasoning is required for the proper application of medical knowledge. Therefore, they should be assessed at levels C2 and C3. MCQs that are created at higher levels of cognition are considered to be good quality. Most of the studies in the literature have asserted that MCQs are effective in evaluating a higher level of cognition^{14,16,20,21}. Some of the studies²¹

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have declared MCQs superior to Essay Questions in evaluating higher levels of cognition. Studies have shown a high percentage of C2 and C3 level MCQs in examinations ^{14, 16, 22}.

This is because Tarrant et al. suggested another disadvantage of low level (C 1): MCQs at a low cognitive level had more item writing flaws (IWF)⁵ than those of higher cognitive level ¹⁷. Several studies have discussed clinical reasoning problem-solving ability by constructing MCQs ^{11, 12, 18, 19, 20}.

In addition to these benefits, the multiple-choice question (MCQ) test style has several drawbacks. Making an appropriate MCQ takes a lot of time +. Assessors must also have the appropriate training for their formatting to follow the suggested norms. Because of this, most multiple-choice questions (MCQs) in today's exams don't meet the requirements, which lowers cognitive abilities like recall and recognition. Because they need to understand the subject thoroughly, they can only guess their way to the right response. Higher degrees of analysis, synthesis, and problem-solving may be assessed by appropriately constructing multiple-choice questions (MCQs). Guessing is only permitted after pupils have reached a certain cognitive level.

The criteria above make it necessary to maintain the standard and quality of multiple-choice questions (MCQs), particularly when designing MCQs at a higher level of cognition. Determining each MCQ's cognitive level has been shown via a peer review process involving numerous assessors.

MATERIALS AND METHODS

The research used one hundred (100) multiple-choice questions (MCQs) from the MCQs Bank of the Bacha Khan Medical College Mardan final examinations on pharmacology. According to a modified Bloom's Taxonomy, two assessors independently evaluated each multiple-choice question (MCQ). They compared it to predetermined criteria to determine its level I, II, or III of the cognitive domain. Additionally, item analysis was performed to ascertain the Discriminative Index.

RESULTS

This study showed that most MCQs were of C1 level (70%). The MCQs at the C2 level were 30%. There were no MCQs at the C3 level in the MCQ bank. Figure -1 shows the details of these findings.

Discriminative Index (D.I) was obtained by Item Analysis ⁴. The findings also showed an association between Poor DI and C2 level ². 65% of MCQs C2 level were of Poor DI level.

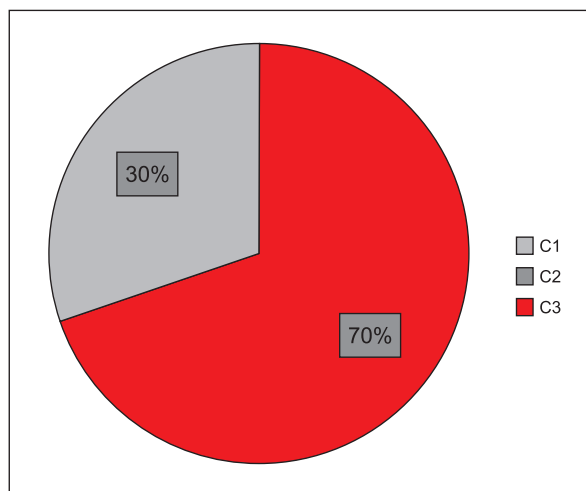


Fig 1: Percentages of MCQs according to C1, C2 and C3.

Table 1:

Question No.	Blooms Taxonomy
	Level I: Knowledge (recall of information including direct questions asking to check the factual recall, containing words like enumerate list etc.)
	Level II: Comprehension and application (ability to interpret data; questions including lab data or containing words like analyze)
	Level III: Problem – solving (Use of knowledge and understanding in new circumstances, including scenario based questions which contain case description and lab data asking students to initially make a diagnosis and then to suggest next appropriate investigation; management modalities; counseling etc.)

DISCUSSION

The present study shows that most % of the MCQs were at the C1 level, 70%. MCQs in C2 were 30%. There were no MCQs at C3 level in the final exams. The same results and issues have also been pointed out by Baig ³ and ¹⁶ in their findings. They have stressed the need for more efforts in producing higher levels of MCQs in Basic Sciences ^{8, 9, 10}. Their results were 76% items in the C1 level, 24% in the C2 level, and no MCQ at the C3 level.

These findings contrast with some of the previous studies²⁰, which shows that these studies utilized MCQs from clinical subjects. It is easy to create MCQs at the percentage of MCQs at C2 and C3 level¹. One of the reasons for this contrast is the high level of cognition in clinical subjects, while it is difficult for Basic Medical Sciences^{13,14,15}. The MCQs in the present studies were only from the subject of Pharmacology, which is a Basic Medical Science. An integrated curriculum using cluster MCQs can help achieve histudentser level higher-levelc medical sciences. basicThere subjects need to be integrated with clinical sciences.

Another interesting finding of this study was that most of the MCQs at the C2 level had poor DI. This means that the item loses its validity when the cognition level increases. The reason is that the students need to be trained at a higher cognitive level of critical thinking, analysis, and problem-solving. The defect is due to the use of didactic lectures as the only source of learning methodology. For this purpose, innovative instructional strategies like problem-based learning, small group discussions, and tutorials are needed.

The students were asked to mark the level of cognition for the MCQs. They marked all the MCQs at the C1 level. They were approaching the C2 level MCQs at the level of recall. Hence, they have not developed the habit of critical thinking. The absence of Test Blue Prints is also a reason for low cognitive level items.

These findings suggest considerable room for improvement in the quality of MCQs. Innovative Instructional Methodologies like Problem-based learning, Small group discussions, and tutorials should be introduced to prepare the students for assessment in higher levels of cognition. The curriculum should be integrated, which will help test the student at a higher level of cognition. For this purpose, the faculty should receive vigorous training.

CONCLUSION

Good quality of MCQ is of utmost importance if it replaces essay questions completely. MCQ must be made according to higher (and C3) cognitive levels and reassessed by full-time committed departmental/ university examination section staff. It is more difficult in basic sciences to produce such MCQs. It also requires quality teaching to students. One good

suggestion will be to introduce a higher (C2 C3) level of MCQ in small numbers and then gradually increase its proportion.

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