# COMPARISON OF EXTENDED MATCHING QUESTIONS (EMQ) WITH MULTIPLE CHOICE QUESTIONS (MCQ) IN UNDERGRADUATE DENTAL STUDIES

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## ABSTRACT

The aim of the study was to assess and compare the undergraduate dental students' performance and get their feedback on these tests. A cross-sectional study design was used to evaluate the performance of the dental students in extended matching questions (EMQ) and multiple-choice questions (MCQ). Dental students of the 2nd year professionals were the respondent of this study. The total number of 80 students participated. The students of 1st, 3rd and final years professionals were excluded. The test was taken from the topic "Decade Missing Filled Teeth (DMFT)" consisted of 5 MCQ and 5 EMQ. They were given 10mins to complete the test. After the test, feedback regarding the EMQ's and MCQ's were taken from the students in the form of questionnaire, including 5 items. The results showed that dental students' performance on EMQ's were better as compared to MCQ's. Based on simple and feasible to attempt, students were inclined towards the Multiple-Choice Questions whereas for effective learning, opted EMQ's. It is concluded that there should be more exposure towards EMQ that will help to get the depth of the knowledge and facilitate to learn in better way.

**Key Words:** Extended Matching Question, Multiple Choice Questions, competency, participant, Dentistry, Knowledge, learner.

## INTRODUCTION

Students' assessment is done through various types of methods including; global faculty ratings, structured oral examinations, standardized patient simulations, patient management problems, computer-based simulations, free-response questions (essay and short answer), and various forms of multiple-choice questions. Each method has inherent strengths and weaknesses associated with its reliability, suitability, reproducibility, validity and utility[1]. In cognitive domain of Bloom's Taxonomy, six levels[2]are identified, including knowledge, comprehension, application, analysis, synthesis and evaluation[3]. In medical education the assessment and teaching methodology, there have been substantial modifications in undergraduate medical curriculum in which the important components are the written tests. Currently, objectivity is gradually replacing subjective assessment that is, long essay type questions have been substituted by EMQs and MCQs[4]. Globally, in medical education, Multiple-choice questions (MCQs) are used as assumptive assessing tool that elevates two-dimensional learning road map. Logical rationale and comprehension of knowledge are the core ingredients of good MCQ's, and it provides dimension for assessing details with different topics[6]. Whereas, EMQs were developed in 1993[8]. They are same to MCQ and used for written assessments for improving competency and problem solving abilities[9]. An EMQ at the beginning has a list of 10 possible answers and student is given three short scenarios. The most suitable answer from the list for each scenario is selected by the student. The

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important outcome of these questions is on validity and reliability of the examination also the educative impact on the curriculum. More complex understanding can be assessed with EMQs where guessing answers is difficult with low 'recognition effect'. Research evidence shows that EMQs are also fair[10]. and can also be marked by the computer due to which the examiner bias is excluded[10]. The outcomes are measurable due to which the writing flaws can be reduced as they have good discriminatory power, can reduce cueing, are cost effective[11] and competency of clinical understanding can be assessed[4]. MCQs need special scrutiny and meticulous loom to have the capability to promote higher level of cognitive processing and assess applied knowledge, adversity index and differential measures by the effectiveness of the distractors to accurately distinguish between stronger and weaker performing learners. Multiple measures were explored to estimate the quality of EMQs as an assessment tool for the depth of knowledge in functional region. EMQs have competency of being challenging with high discriminatory control and greater option list than MCQs. The novelty of the EMQ appraisal on a weekly foundation may help the learners' to be prepared for examination and obtain competency in clinical areas as well[11].

## METHODOLOGY

This study was conducted in Sardar Begum Dental College and the approval for this study was taken from the Ethical Committee of Gandhara University. Total 80 dental students of 2nd year participated in this study. The purpose of the study was to assess their preferences and performance towards assessment tools; EMQs and MCQs. The questions were in the form of 5 MCQs and 5 EMQs taken from the "Textbook of Preventive and Community Dentistry, SS Hiremath (chapter 17)" on the topic of "*Decade Missing Filled Teeth (DMFT)*" and 10 minutes were given to them. After the tests, feedback was taken from the students about these objective tests. Chi-square test and frequencies were done to analyze the data in SPSS 22 version.

## RESULTS

## DISCUSSION

This study analyzed the popularity of the test tool amongst the 2nd year BDS participants that is Extended matching questions (EMQs) or multiple-choice questions (MCQs). Our study revealed that student's performance on EMQ's (38.8%) were better than on MCQ's (21.2%) as shown in table 1. Faculty are trained in their medical institutes to create MCQs which ensure assessment for the intelligence of the undergraduates and postgraduates[12]. Studies showed that MCQs were used for comprehension, application and analysis and had the potential to assess dominant critical knowledge[13]. In MCQ there is nothing essential that could prevent assessment of advanced intelligence thinking[14]. There is spotlight on general perception regarding knowledge recall; Level I of Bloom's Taxonomy that is revised and is capable of testing higher ordered reasoning[15]. In MCQs, there is possibility with some question types for the students to answer intentionally, for the assessment to be less than an acceptable measure of competency, subjects that more easily fit certain types of questions, topics may be neglected by the examiners[16]. Whereas, in EMQs the scoring is easier with enough reliability[17]. when it comes to assessing the students' applied knowledge, EMQs are far more superior to traditional MCQs[18]. The EMQ format is being used in high-stakes licensing and certification examinations nationally and internationally[19]. In EMQs, cueing is reduced. It does not only lead students to the correct option, called positive cueing, can also lead students to the wrong option, called negative cueing[10]. Researches showed, a properly functioning distractor that can be skillful by establishing quality and plausible distractors

TABLE 1: PERFORMANCE OF THE DENTAL STUDENTS IN EMQ'S & MCQ'S

| Variable | Performance | | Total | Chi-square test | P-value |
|---|---|---|---|---|---|
| | Good Performance | Bad Performance | | | |
| EMQ | 31(38.8%) | 49(61.2%) | 80(100%) | 20.2 (79) | <0.01 |
| MCQ | 17(21.2%) | 63(78.8%) | 80(100%) | 21.5 (79) | <0.01 |

TABLE 2: FEEDBACK OF THE STUDENTS ON MCQ'S AND EMQ'S

| | Feedback | Yes | No |
|---|---|---|---|
| 1 | EMQ are easier to comprehend than MCQ | 19(23.8) | 61(76.3) |
| 2 | EMQ requires more practice to improve retention than MCQ | 5(6.3) | 75(93.8) |
| 3 | EMQ needs more self-directed learning than MCQ | 73(91.3) | 7(8.8) |
| 4 | EMQ takes less time to solve the test than MCQ | 17(21.3) | 63(78.8) |
| 5 | EMQ are more effective in learning than MCQ | 54(67.5) | 26(32.5) |

that would recognize the weaker student. The EMQs selected-response question form is an alternative to the MCQ that can reliably assess the smeared information and evades the trouble in developing MCQs. Regarding examination acceptability, questionable face validity was found with medical school learners who were first introduced to the EMQ format[17]. It has been suggested that, with a little practice, learners will become accustomed to the EMQ format and prepare accordingly[16]. A study[12] learners found their attitudes toward the use of EMQs as positive and felt it was an appropriate tool to assess clinical reasoning and could relate the scenarios asked to experience in their clinical rotations. It appears poor face validity with EMQ assessment is due to the unfamiliarity of their format and should decline with experience[17]. In our study (table 2), students' feedback provides a theme that EMQ have a more vote than MCQ's. A study[19] with medical school learners found that, with most questions, the EMQs were able to discriminate between strong and poor performers. Consequently, from these results, the EMQs are more appropriate for assessing the application of knowledge than MCQs. It was suggested that in final year professional exams or tests, EMQ's should be preferred as it requires high level of cognitive processing[7]. Learners from the EMQ group had the highest average scores on all interim examinations (consisting of MCQs), but the difference was not statistically significant due to a small group size. In other words, learners will engage in the weekly chunks of material, knowing the assessment will demand an in-depth understanding. When comparing EMQs with other written examination formats, there is a consistent demonstration of higher psychometric measures with less difficulty in their creation and a more valid measure of applied knowledge. It was determined that the EMQs were easier to construct than MCQs, and the use of EMQs as a means of monitoring the learners' progress was recommended[19].

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## CONTRIBUTIONS BY AUTHORS

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| 2 | **Samir Khan Kabir:** | Critical Revision; Supervision; Final Approval. |
| 3 | **Zainab Waheed:** | Drafting Manuscript; Data Acquisition; Data Analysis/Interpretation. |
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