A Comparison Between Students' Performance In Multiple Choice and Modified Essay Questions in the MBBS Pediatrics Examination at the College of Medicine, King Khalid University, KSA

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Abstract

Objectives: To investigate the relation between the students' scores in MCQs and MEQs of the summative assessment in pediatrics at the College of medicine KKU.

Introduction: Student assessment is the most difficult task in medicine since it is ultimately related to human life and safety. Assessment can take different types of formats with advantages and disadvantages and there is no single prescribed method of choice.

Research Methods: This is a quantitative, observational retrospective study enrolling 50 students who completed the final MBBS examination in pediatrics in 2015.The medical students' scores in MCQs and MEQs in the final MBBS pediatrics examination were collected and SPSS used for analysis.

Results: 52% of the students scored A and B, 46% scored C and 2% scored D and nobody scored F. The mean percentage scores in MCQs, MEQs and the combined are75.03%, 79.99% and 76.68% respectively. The standard deviation (SD) for MCQs, MEQs and combined are 0.0753, 0.0763 and 0.0559 respectively.There are no significant differences in means and SD. The correlation (CR) between MCQs and MEQs is -1.73%. The CR between MCQs and MEQs for those who scored A and B is 7.38% which could indicate a weak but significant +ve CR (p value 0.017), (table3). For those who scored C inverse CR (-74.38%) was observed between MCQs and MEQs.

Discussion: The main finding of this study was the weakly negative CR between students' performance on MCQs and MEQs. Good performance in MCQs is not necessary correlated with good performance in LEQs. This is not in agreement with Oyebola et al. and Moqattash et al findings, who reported positive CR in the performance of their students. The discrepancy observed in performance between MCQs and MEQs could be explained by the subjectivity and the difficulty in avoiding bias in setting and marking essay questions.

Key Words: multiple choice questions, Modified long essay questions, correlation.

1. Literature review

Student assessment is the most difficult task in medicine since it is related to human life and safety [1]. Assessment is an active, continuous process and is the corner stone in medical education. It could determine students' approaches and perception towards their learning and study [2-7]. The significance of MCQs as a tool for assessment is well recognized due to its validity, reliability, ability to be used for large numbers of students and easy marking using a scanner or a computer. Moreover, MCQs can assess knowledge, cognition and can cover large topics in the curriculum. However, MCQs also have some disadvantages which include, need of experts to construct them, encouragement of superficial reading by students and the misleading of some clever students who might go in more than the needed depth for answering [8, 9]. In contrast to MCQs, essay questions allow students to go in depth and reflect themselves well [10]. Moreover, short essay questions are sensitive and can allow a student to prove his skill in high cognitive level but consume more time and might open doors for bias should it not be well constructed [11]. MCQs ability to anticipate the aggregate performance is considered low compared to essay questions [12]. In contradistinction, Day et al considered the essay questions to be of low sensitivity in measuring performance compared to MCQs [13]. Despite this debate the ideal way is to use multiple methods when conducting assessment [1]. This is essential for medical schools to be accountable to their stakeholders.

The department of pediatrics in the College of Medicine KKU uses MCQs and MEQs for long time. The department is interested in comparing the performance in these two methods especially in the absence of such study in a similar context. Thus, the objective of the current study was to investigate the relation between the students' scores in MCQs and MEQs of the summative assessment in pediatrics.

Theory and hypotheses

- Null hypothesis: there is no relation between student performance (scoring) in MCQs and MEQs in pediatrics, college of medicine, KKU.

- Alternative hypothesis: there is a relation between student performance (scoring) in MCQs and LEQs in pediatrics, college of medicine, KKU.

2. Research methods

This is a quantitative, observational retrospective study enrolling 50 students who completed the final MBBS examination in pediatrics in June 2015.The medical students' scores in MCQs and MEQs in the final MBBS pediatrics examination were collected. These scores are kept in the department coordinator computer which is secured and protected by a pass word only known to the coordinator. The data used includes only the scores without any personal identification information of any student.

KKU College of medicine was established in 1980. The MBBS program of the college can still be described as discipline-based. The pediatrics course is taught in the 5th and 6th years with final examination in pediatrics as pre-requisite for graduation. The total mark is 45 (For this component MCQs carrying 30 marks, MEQs carrying 15 marks) and the grading system adopts letter grading as follows: A for score above 40 marks, B from 35-39,C 30-34, D 25-29 and F which is failure below 25.

Both MCQs and MEQs were designed to cover the pediatrics syllabus in the curriculum with well-planned blueprint to ensure validity and well distribution of the questions according to the weight and importance of the topics in the curriculum. The MCQs component of the final examination consisted of 60 questions in form of the best of four options. The time allowed for the examination was 1.5 hours for the 60 MCQs (1.5 minutes for each MCQ).The MEQs contained three open-ended questions including two clinical cases (case1 and case 2) and one topic from the common pediatrics problems. Especial emphasis was made on interpretation; layout of differential diagnoses, case summary and organization of the information.

SPSS was used for data analysis. Pearson's correlation coefficient (r) was used to compare students' performance (scoring) in MCQs and MEQs. T-test was used to test the significance of differences in performance in MCQs and MEQs. The level of significance was set at $P < 0.05$. The analysis was done with the help of the statistician of the department of medical education in the college.

3. Results

52% of the student scored A and B, 46% scored C and 2% scored D and nobody scored F (Table 1, Fig. 1). The mean of the percentage score in MCQs, MEQs and the combined score are75.03%, 79.99**%** and 76.68% respectively with no significant difference. The standard deviation (SD) for MCQs, MEQs and the combined scores are 0.0753, 0.0763 and 0.0559 respectively (Table 2). The CR between MCQs and MEQs is -1.73 where there is weak negative correlation. This indicated that good achievement in MCQs would not necessarily be associated with good achievement in MEQs and vice versa. Not only that, but it further indicated that high performance in one is associated with low performance in the other. This finding made it necessary to investigate the relationship between both MCQs and MEQs across the different grades. This showed that the CR between MCQs and MEQs for those who scored A and B is 7.38% indicating weak +ve but significant CR (p value 0.017), (Table3). For those who scored C inverse correlation was observed between MCQs and MEQs (CR of -74.38). For F, and D grades there were no enough scores.

Table 1: Grade distribution

Grades	freq.	%
A&B	26	52
C	23	46
D	1	2
F	0	0
Total	50	100

Table 2: Descriptive statistics

Exam component	Mean (in %)	S.D
MCQs (out of 30)	75.03%	0.0753
LEQs (out of 15)	79.99%	0.0763
Combined (out of 45)	76.68%	0.0559
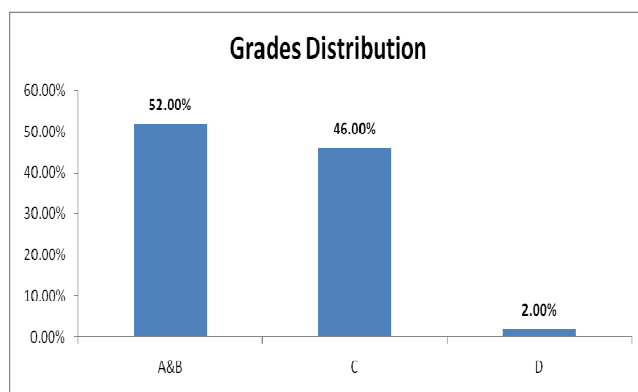
Figure 1: Grades distribution

Table 3: Comparison between MCQs & MEQs

Statistics	A&B grades	C grade	Combined
Correlation	7.25	-74.37	-1.73
p-values (by t test)	0.017	0.0144	0.001

4. Discussion

To the best of our knowledge, this study is the first one to be performed in a Saudi medical school context. The study aim was to investigate the relation between the students' scores in MCQs and MEQs of the summative assessment in pediatrics at the College of Medicine KKU.The main finding of this study was the weakly negative correlation between students' performance in MCQs and MEQs. The good performance in MCQs was not necessarily correlated with good performance in MEQs. This negative correlation between the performance in MCQs and MEQs does not agree with the findings of Oyebola et al. [14] and Moqattash et al. [15] who reported positive correlation in the performance of their students. This difference and disagreement could be explained by the difficulties in avoiding bias and subjectivity in setting and marking essay questions. The positive correlation in performance between MEQs and MCQs for those who achieved A and B could be easily explained since the good performers logically perform well in any examination format as suggested by Anbar [9]. The higher scoring in MCQs could be explained by the possibility of guessing and the presence of recall questions, while bias and subjectivity in marking of MEQs could lead to low scoring in MEQs. This might explain the negative correlation observed in C and D grades. But, the observation itself is not constant in all previous similar studies[16]. One of the factors that might affect genaralizability of these results might be the low number of the enrolled students and the unequal distribution of marks between MCQs and LEQs.

5. Conclusion

There was weak negative correlation between the students' performance in MCQs and MEQs. This correlation was not the same among the different grades.

6. Recommendation

Review of the MCQs and MEQs items used in this summative assessment is essential for improvement. Use of other methods of assessment should be considered.

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