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ITEM ANALYSIS OF USED MCQS IN UNDERGRADUATE ANATOMY EXAMINATION

Anatomy

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ABSTRACT

Context and rationale: Formulating good quality of multiple choice questions (MCQs) is a demanding task. Difficulty index (DIF) and discrimination index (DI) are use to determine the quality of the MCQs.

Aim of the study: To assess the quality of the MCQs used in Anatomy examination.

Methods: Study was conducted on ninety (90) 1st year MBBS students of Enam medical College, Savar, Dhaka, who appeared in second term Anatomy examination, September 2017. It comprised of twenty (20) Anatomy multiple "true/false response" type MCQs with no negative marking. Difficulty index (DIF I) and discrimination index (DI) of each item was analyzed.

Results and conclusions: Maximum 11(55%) item have the DIF within the acceptable range (P =30–70%), and only one (5%) item was too difficult (P < 30%). Whereas DI of majority 11 (55%) items was excellent (d > 0.35) and one third (25%) of the items was poor (d < 0.20). Item analysis is an important tool to discriminate good and bad test items. It helps to increase the need of skills in constructions of items and identifies the specific area which need more focus to discard or clarity.

KEYWORDS

Multiple choice questions, item analysis, difficulty index, discrimination index.

INTRODUCTION

The assessment is an integral component of overall educational activities (Tabish, 2008). A wide range written assessment tool is used now a days, short answer question (SAQ), Modified essay question (MEQ), essay question (EQ), problem based question (PBQ), structured essay question (SEQ), multiple choice question (MCQ). MCQ is an assessment tool that requires examinees to identify the one correct answer to a question and it consists of a stem that directly or indirectly poses a question and a set of distracters from which the answer is selected (Wojtczak, 2002). Typically students select the correct answers by circling the associated number or letter, or filling in the associated circle on the machine-readable response sheet (University of Waterloo, 2017). To maintain the objectivity and consistency, MCQ is a good assessment tool, and it can cover a large amount of knowledge from the area of course contents to be tested. Student who practiced the past questions become adopt at choosing the correct option from a list without the in-depth understanding the topic was one of the disadvantage of MCQ claimed by Sam et at al. (2016). Hence, MCQs to be used must be of quality and they need to be tested for the standard or quality. According to Mehta (2014) item analysis is the process of collecting, summarizing and using information from students' response to assess the quality of test items.

Though MCQ is used as a important assessment tool in various medical examinations and entrance tests, this study was done to assess the quality of MCQs/items currently in used in Anatomy.

Methods and analyses of Data

The present research was a set of observational study. The data were collected from the second term final Anatomy MCQ examination held in September 2017, where ninety (90) 1st year MBBS students were appeared. It comprised of 20 multiple true/false responses a MCQs. Total 20 mark was allotted for twenty (20) MCQs. Each MCQ have a single stem with five (5) responses/options. Total twenty (20) MCQs/ items were analysed. A correct response was awarded 0.2 marks, and zero (0) marks for each incorrect response. The range of the score is being 0-1. There was no negative marking and the passed marks were 12 (60%). After evaluation of the examination, marks obtained by the students were arranged in descending order and entered in Statistical package for social science (SPSS) version-20. The upper one-third students (30) were considered as high achievers (H) and lower one-third (30) as low achievers (L). For computation purpose, marks obtained by middle one-third were discarded. Discriminatory index and difficulty index were analysed for each item.

Difficulty index (DIF I): It is the percentage of students in high and low achievers group who answered the item correctly and ranges between 0% and 100% (Mehta, 2014). The following formula was used to calculate the dif : DIF I = H + L × 100/N, here, H = number of students answering the item correctly in the high achieving group, L = number of students answering the item correctly in the low achieving group, N = total number of students in the two groups (including non responders) Start in another para DI is the ability of an item to differentiate between students of higher and lower abilities and ranges between 0 and 1(Mehta, 2014). It was calculated by using the formula: DI = 2 × (H–L)/N (symbols H, L, and N represents same meaning used in the above equation).

RESULTS

Study was done with the ninety (90) 1st year MBBS students who had appeared in second term MCQs examination in Anatomy, in September 2107. Total twenty (20) MCQs were analysed where each question contain highest value one (1) and lowest value zero (0). After statistical analysis, it was found out that Mean score was 14.39 ± 1.75. Difficulty index of maximum 11 (55%) items was in the acceptable range (p= 30-70%), only 1 (5%) item was too difficult. Interpretation of the results of DIF was shown in Table-I.

Table-I Difficulty index (DIF I)found in MCQs of anatomy

Cutoff point (%)	Number (% frequency of the items*)	Interpretation	Action
<30	1 (5%)	Too difficult	Revised/discard
30-70	11 (55%)	Good/acceptable	Store
>70	8 (45%)	Too easy	Revised/discard

*n= 20 MCQs were analysed
Mean ± SD= 14.39 ± 1.75.

Discrimination index of majority 11 (55%) of the items was excellent, and one-fourth (20%) of the items was poor (<0.20), and the percentage was not ignorable shown in table-II.

Table-II Discrimination index (DI) found in MCQs of anatomy

Cutoff point (%)	Number (% frequency of the items*)	Interpretation	Action
<0.20	4 (20%)	Poor	Revised/Discard
0.2-0.34	5 (25%)	Good	Store
≥0.35	11 (55%)	Excellent	Store

***n=20 MCQs were analysed**

DISCUSSION:

Ease and reliability of scoring is regarded as the strengths of the MCQs by Wojtczak (2002) and its conciseness by Schuwirth & Vleuten (2003). The most commonly administered multiple choice exams are scored by the machine and the statistical information like the test items' difficulty index and item test correlation can also be provided and for this reason MCQ is the choice of many teachers offering the advantage of allowing different kind of questions at various level of difficulty with a very short period of time the author (Wojtczak, 2002) has added. But to construct a good MCQ is difficult and time consuming. Though MCQ can examine broader component of the curriculum often it focus on the finer detail in the text book rather than cognitive skills (Vuma & Sa, 2003). The author also stated that in MCQ, students choose an answer from the provided options which may encourage them to answer by recognising. Considine stated the item analysis is a simple procedure that provides information regarding the reliability and validity of a test. Some researcher also proposed that the quality of items will be greatly improves if there is a viable question bank for subsequent use and it might help both students and teachers by providing feedback to the teacher to improve their method of teaching and encourage the learners to learn more effectively. A study conducted by Patel and Patel (2015) on 100 MBBS students of medicine with 100 MCQs, mean DIF I 48.90 ± 13.72 was reported. In our study, the P value of majority (55%) items was in the acceptable range (30–70%) and only one (5%) item was too difficult (P < 30%). Item analysis done by Mehta and Mokhasi on 100 MBBS students for MCQs test comprising 50 questions in anatomy was reported mean DIF I 63.06 ± 18.95, DIF I of more than half (62%) of the items in the acceptable range (P = 30–70%), and about one tenth (6%) items were too difficult (P < 30%). Items with high DIF I (>70%) should be placed either at the start of the test as "warm-up" questions to boost the confidence of students or discarded, similarly items with low DIF I (<30%) should be either revised or removed altogether Kaur et al (2013). To discriminate between skilled and unskilled examinees DI is another important parameter of item analysis. A study by Singh et al. (2012) on item analysis of 20 MCQs reported more than one third (30%) of the items with DI < 0.2, and half 10 (50%) of the test items with DI > 0.35, results a bit similar to our present study. It is also to be noted that the difficulty index not only reflects the attribute of a question, but also reflects the ability of the group responding to the question. Study on item analysis of 50 items, 9 items had DI < 0.2, 21 items had DI ≥ 0.20, and ≤ 0.35 and 20 items had DI > 0.35 was found by Patel & Mahajan (2013) The reason for poor discrimination index would include, these questions had too easy or too difficult or not pertaining to the syllabus, and might need to further revision.

Sample size of the present study was small. However, further research can be done with a larger sample size. It is concluded from the present study that majority of the test items were within the recommended values. Construction of good MCQs is not a simple task. However, some test items did not meet the requirement of well-designed question items. Hence, these items can be revised or discarded, and a viable question bank can be prepared. Paper-setters and question moderators needs to be more care to achieve the objective of the assessment through MCQs.

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