ABSTRACT

Multiple choice questions are nowadays used in competitive examinations and formative assessments to assess the student's eligibility and certification. Item analysis is the process of collecting, summarizing, and using information from students' responses to assess the quality of test items. The goal of the study was to identify the relationship between the item difficulty index and item discriminating index in medical students' assessment. This study was conducted in December 2019, in the test 200 items were constructed confidentially by experienced professors. Three hours were given to participating students. The test paper was constructed confidentially by experienced professors. Three hours were given to participating students. The test paper consists of 200 items constructed for the study. The responses were assessed and analysed for item difficulty index and item discriminating power. Item difficulty index and item discriminating power were analysed by statistical methods to identify correlation. The discriminating power of the items with difficulty index in 40%-50% was the highest.

INTRODUCTION

Multiple choice questions (MCQs) are used in competitive exams as well as for the formative assessment for certification as well to determine the eligibility of examinees. Single best answer multiple choice questions refer to a question and the distracters- more than one option from which the examinees are supposed to choose the correct option. Item analysis is the process of collecting, summarizing, and using information from students' responses to assess the quality of test items. Difficulty index also known as ease index describes percentage of students who correctly answers questions. Recommended difficulty index is 30-70%, items with difficulty index below 30% are considered difficult and more than 70% are considered easy items. Ability of items to distinguish between high scorer and low scorer is known as discriminating index or point biserial index. Discriminating index ranges from -1.00 to +1.00; discriminating index ≥ 0.35 is considered excellent and ≤ 0.20 is considered poor.

AIMS AND OBJECTIVES

This study was conducted to find relationship between Difficulty index and discriminating index in single best answer stem type multiple choice question in medical student's assessment.

MATERIAL AND METHODS

This study was conducted in Gujarat, 400 final year medical students from different medical colleges of Gujarat participated in the test. The test paper consists of 200 items from final year medical subject that included medicine, surgery, Gynaecology, Orthopaedics, paediatrics, and skin. The test paper was constructed confidentially by experienced professors. Three hours were given to participating students to complete the whole assessment, the test was held at computer laboratory set in Ahmedabad on December 2019. There was no negative marking or penalty for any wrong response.

Item analysis:

Stem type multiple choice questions with single best correct option were counted as item,

DIFFICULTY INDEX

Difficulty index was calculated by the following formula.

\[ \text{Difficulty index} = \left( \frac{\text{Total true responses} \times 100}{\text{Total responses}} \right) \]

Discriminating index:

The discriminating index was found highest (0.5563 ± 0.02, p<0.05) for the items with difficulty index in range of 40%-50% which is considered as ideal.

The data was compiled and analysed by Microsoft excel 2020 and Epi-info 7.2.4 software. For statistical significance confidence interval was considered >95% (p-value 0.05).

OBSERVATION AND RESULT

This study was conducted in December 2019, in the test 200 items responded by 400 final year medical students were analyzed for the objectives of the study. Difficulty index in this study was 54.93% (p<0.05) which is considered as ideal.

Table 1: Frequency distribution of difficult index

<table>
<thead>
<tr>
<th>Difficulty index</th>
<th>Number (n=200)</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;30</td>
<td>37</td>
<td>18.5%</td>
</tr>
<tr>
<td>30-70</td>
<td>141</td>
<td>70.8%</td>
</tr>
<tr>
<td>≥70</td>
<td>22</td>
<td>11%</td>
</tr>
</tbody>
</table>

Table 2: Frequency distribution of distracter effectiveness

<table>
<thead>
<tr>
<th>Difficulty index</th>
<th>Number (n=200)</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;0.2</td>
<td>10</td>
<td>5%</td>
</tr>
<tr>
<td>0.2-0.35</td>
<td>36</td>
<td>18%</td>
</tr>
<tr>
<td>&gt;0.35</td>
<td>154</td>
<td>77%</td>
</tr>
</tbody>
</table>

The discriminating index was found highest (0.5563 ± 0.02, p<0.05) for the items with difficulty index in range from 40% to 50%.
to 50%, while discriminating index (0.205 ± 0.02, p<0.05) was the lowest for the items with difficulty index in range of 81 to 90%. [Chart 1]

Chart 1: Relationship of item difficulty index and item discriminating Power

DISCUSSION

The mean item difficulty index (54.93%) in this study was in ideal range for a test paper; 70.5% of items were in ideal range of difficulty index. The study found that the items with ideal difficulty index were excellent discriminator, that supports data reported by previous studies. In the study, Items with low or high difficulty index have poor discriminating power.

CONCLUSION:

Question paper analyzed in the study had items capable to discriminate the high and low score examinees. Items with difficulty index between 30-70% are good discriminators. Post examination item analysis of Multiple-choice question test should be a practice to improve the assessment method.

REFERENCES: