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KEYWORDS: Item difficulty index, item discriminating power, item analysis, medical education.

CORRELATION OF DIFFICULTY INDEX AND DISCRIMINATING INDEX IN MEDICAL STUDENT'S ASSESSMENT.

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ABSTRACT:

Multiple choice questions are nowadays used in competitive examination and formative assessment 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. Goal of the study was to identify the relationship between the item difficulty index and item discriminating index in medical student's assessment. 400 final year medical students from various medical colleges responded 200 items constructed for the study. The responses were assessed and analysed for item difficulty index and item discriminating power. Item difficulty index an item discriminating power were analysed by statical methods to identify correlation. The discriminating power of the items with difficulty index in 40%-50% was the highest.

SUMMARY AND CONCLUSION: Items with good difficulty index in range of 30%-70% are good discriminator.

INTRODUCTION

Multiple choice questions (MCQs) are used in competitive exams as well for the formative assessment for certification as well to determine the eligibility of examinees. [1-4] Single best answer multiple choice question consists of stem- the question and the distracters- more than one choice from which the examinees are supposed to choose the correct option. [5,6] Item analysis is the process of collecting, summarizing and using information from students' responses to assess the quality of test items. [5,7] 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 than 30% are considered difficult and more than 70% are considered as easy items. [7,8] Ability of items to distinguish between high scorer and low scorer is known as discriminating index or point biserial index. [6,7] Discriminating index ranges from -1.00 to +1.00; discriminating index ≥ 0.35 is considered excellent and ≤ 0.20 is considered as poor. [7,8]

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, Orhtpaedics, 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 was counted as item,

Difficulty index was calculated by the following formula. Difficulty index= (Total true responses X 100)/ Total responses Where total responses= (True responses + wrong Responses + no responses)

Discriminating index: Total score of each student was calculated and arranged in descending order from the highest score to lowest score. Highest one third and lowest one third students were identified as higher group (H) and Lower group (L) respectively. Item discriminating index was calculated by following formula.

Discriminating Index= (HT-LT / T) X 2 where HT= number of correct responses in upper group, LT= number of correct responses in lower Group and T= total number of responses in both groups.

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

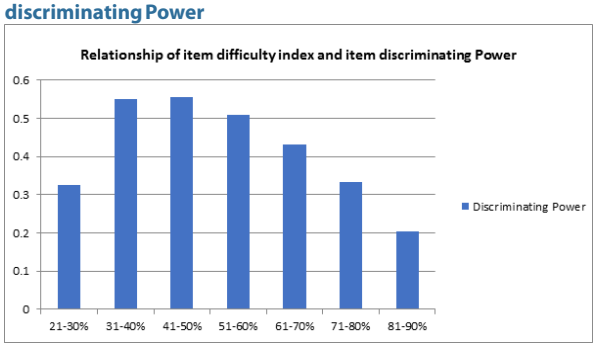
Difficulty index	Number (n=200)	Percentage
<30	37	18.5%
30-70	141	70.5%
≥70	22	11%

Table 2: Frequency distribution of distracter effectiveness

Difficulty index	Number (n=200)	Percentage
<0.2	10	5%
0.2-0.35	36	18%
>0.35	154	77%

The discriminating index was found highest (0.5563 ± 0.02, p< 0.05) for the items with difficulty index in range from 41% 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. [9-11] 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.

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