

ORIGINAL ARTICLE

A Comparison of Students Scores in Multiple-Choice and Essay Questions in Mother and Child Health Examination

Background: The method of evaluation in students' learning affects their studying mode. The aim of this study was to compare nursing students scores in essay and multiple-choice questions in Mother and Child Health examination in Shahrekord University of Medical Sciences.

Methods: In this study, the final scores of 121 of nursing students in a multiple-choice questionnaire consisting of 40 questions, during four semesters were compared with the scores obtained from an essay questionnaire composed of 40 questions. Difficulty and Discrimination Index of questions were similar in both kinds of questions. Data was analyzed employing paired t-test and Pearson correlation test and $P < 0.05$ was considered significant.

Results: Mean and standard deviation of students' scores were reported 14.72 ± 3.7 in essay questions and 16.53 ± 2.4 in multiple-choice questions and showed a significant difference ($P < 0.001$). A positive correlation was reported between the essay and multiple-choice questions ($r = 0.93$). Students' scores were higher in multiple-choice questionnaire compared to the essay one.

Using multiple-choice questionnaire on its own may lead to the success of those students who do not have the ability of perceive, resolve and apply.

Key Words: Essay Questionnaire, Multiple-Choice Questionnaire (MCQ), Students' Scores, Mother and Child Health

مقایسه نمرات طلاب التمریض فی اختبار الصحه عند الامربات و هدیثی الولاده فی اختبار ذو اربعه اجوبه و الاختبار التشریحی (LAQ & MCQ)

تسبیح و الهدف: إن اسلوب تقبیح التعلیم عند الطلاب له اثر فی اسلوب مطالعتهم، إن السرف من هذه الدراره هو مقارنه علامات درس الصحه عند الامربات و هدیثی الولاده عند طلاب کلبه التمریض فی سرفکرد للعلوم الطیبه فی السوبی LAQ & MCQ.

الأسلوب: تم مقارنه علامات ۴۰ سوال MCQ مع ۴۰ سوال LAQ فی درس الصحه عند الامربات و هدیثی الولاده فی اربعه فصول عند ۱۲۱ من طلبة التمریض و تم طرح سوال مشترك فی الاسلوبین فی جلسه امتحانیه واحده. تم تعیین مستوى الصعوبه (Difficulty Index) و ناخص التمايز (Discrimination Index) بشكل مشابه فی الاسلوبین تم تحلیل المطبیات عبر اختبار T المزدوج و ضربیب بیرسون و تم تعیین $P < 0.05$.

النتائج: المعدل و انحراف معیار کل علامات الطلاب فی MCQ (14.72 ± 3.7) و فی اختبار LAQ (16.53 ± 2.4) و كان التفاوت ملحوظ ($P < 0.001$). كان هناك ترابط و تیسو و ايجابية بین LAQ, MCQ ($r = 0.93$). **الاستنتاج:** كان هناك افضل فی الاداء فی اختبار MCQ مقارنه LAQ. إن استعمال اسلوب MCQ فقط فی الاختبارات من الممكن ان لا یكون مؤثر فی تقبیح الطلاب و یجب استعمال اكثر من اسلوب فی الاختبارات. **الكلمات الرئيسية:** الاختبار التشریحی LAQ، اختبار ذو اربعه اجوبه MCQ، اداء الطلاب، درس الصحه عند الامربات و هدیثی الولاده.

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مقایسه نمرات دانشجویان پرستاری در امتحان بهداشت مادران و نوزادان در دو آزمون تشریحی و چند گزینه ای

زمینه و هدف: شیوه ارزشیابی یادگیری دانشجویان در نحوه مطالعه آنان بازتاب دارد، هدف مطالعه حاضر "مقایسه نمرات درس بهداشت مادران و نوزادان دانشجویان پرستاری دانشگاه علوم پزشکی شهکرد در دو روش امتحان تشریحی و چند گزینه ای" بود.

روش: در این مطالعه نمرات ۴۰ سؤال امتحانی چند گزینه ای با ۴۰ سؤال تشریحی در درس بهداشت مادران و نوزادان در مدت ۴ نیمسال تحصیلی در ۱۲۱ دانشجوی پرستاری مورد مقایسه قرار گرفته و یک نکته علمی به دو روش تشریحی و چند گزینه ای در یک جلسه امتحانی از دانشجویان سؤال شد. سطح دشواری (Difficulty Index) و شاخص تمایز (Discrimination Index) سوالات در دو روش مشابه بود. تجزیه و تحلیل داده ها با آزمون تی زوج و ضربیب همبستگی پیرسون انجام و میزان $P < 0.05$ معنی دار در نظر گرفته شد.

یافته ها: میانگین و انحراف معیار کل نمرات دانشجویان در آزمون تشریحی 14.72 ± 3.7 و در آزمون چند گزینه ای 16.53 ± 2.4 بود و تفاوت معنی دار بود ($P < 0.001$). همبستگی قوی و مثبتی بین سوالات تشریحی و چند گزینه ای وجود داشت ($r = 0.93$).

نتیجه گیری: عملکرد دانشجویان در آزمون چند گزینه ای قویتر از آزمون تشریحی بود. استفاده صرف از سوالات چند گزینه ای در امتحانات، ممکن است سبب موفقیت دانشجویانی که قدرت درک، تجزیه و تحلیل، تفکر و کاربرد ندارند گردد، بنابراین استفاده از روشهای مختلف ارزشیابی در امتحانات، پیشنهاد می گردد.

واژه های کلیدی: آزمون تشریحی، آزمون چند گزینه ای، عملکرد دانشجویان، واحد بهداشت مادران و نوزادان

زچم و بچم کی حفظان صحت کے تفصیلی اور آبیچیکٹو امتحانوں میں نرسنگ طلباء کے نمبروں کا موازنہ

بیک گراؤنڈ: طلباء کے تعلیمی عمل کا جائزہ لینے سے ان کی پڑھائی پر مثبت اثرات مرتب ہوتے ہیں۔ اس تحقیق کا هدف زچم و بچم کی حفظان صحت کے تفصیلی اور آبیچیکٹو امتحانوں میں نرسنگ طلباء کے نمبروں کا موازنہ کرنا ہے۔

روش: اس تحقیق میں چالیس آبیچیکٹو سوالوں اور چالیس تفصیلی جوابات کے سوالات بنائے گئے تھے جو زچم اور بچم کی حفظان صحت کے تعلق سے تھے۔ ان کے جوابات کا موازنہ کیا گیا۔ ڈیفیکلٹی انڈکس اور ڈسکری می نیشن انڈکس کو ملتی جلتی روشوں سے پیش کیا گیا تھا۔ ڈاتا کا تجزیہ پیرسن اور ٹی ٹسٹ سے انجام دیا گیا۔

نتیجے: تفصیلی جوابات اور آبیچیکٹو جوابوں سے معلوم ہوتا ہے اوسط نمبروں میں کافی فاصلہ ہے۔

سفارشات: طلباء کی کارکردگی آبیچیکٹو سوالوں میں بہتر تھی، اس روش سے ان طلباء کو زیادہ فائدہ پہنچ سکتا ہے جو بہتر ادراک اور تجزیہ و تحلیل نیز فکر کرنے کی صلاحیت نہیں رکھتے۔ لہذا یہ سفارشات کی جاتی ہے کہ امتحانوں میں آبیچیکٹو سوالات پوچھے جائیں۔

کلیدی الفاظ: تفصیلی امتحان، آبیچیکٹو سوالات۔ زچم بچم۔

INTRODUCTION

Assessment is one of the most important components of each educational program, and if accomplished well, can improve students' motivation for learning and provide educators with useful feedback [1]. Learning assessment is often one of the most difficult and time-consuming aspects of education, greatly affecting students' studying mode [2]. Conventionally, different types of questions such as essay, short answer, structural, and objective have been employed for assessment of students' knowledge. Essay questions, despite their greater credibility compared to other types of questions, were applied less due to being time-consuming in terms of scoring. This question format allows students to be flexible while writing answers and individually reflecting on their skills [3]. Essay questions also provide specific feedback to direct future learning [2]. A study reported that essay questions had higher sensitivity in comparison with objective questions in predicting the students' performance [4]. The objective questions, making students find correct answers, require comparably shorter time to score, and are employed in assessment of medical students in different courses. These questions are capable of covering most of the content and are highly reliable. Multiple-choice, true-false, and matching types, are classified as objective questions (5,6). Designing multiple-choice questions (MCQs) to be used repeatedly in final examinations is difficult and time consuming, even for professional educators; besides, with elimination of negative scores, association of examination score with learners' knowledge seems poor [7]. In designing these questions, it should be noted that these questions must include the cognitive educational purposes, which are mentioned in the lesson plan [8,9]. MCQs have high reliability, but their validity, particularly at the level of knowledge and considering the construct design principles, have been noticeable issues in educational studies. Clearly, if an examination is not well-designed in terms of questions' taxonomy choice and/or structural rules, it will not yield an acceptable level of content validity or construct. Therefore, not only the main role of examination as a complementary and vital component of educational cycle will be lost, but also it will negatively affect learners' motivation and threatens the efforts of teachers and educational system [1]. In comparing essay with MCQs regarding their predictive capability, various studies have reported different findings. According to one, MCQs have a lower sensitivity to predicting students' performance than essays [10]. However, as reported by another study, essay questions have higher validity than the MCQs, but can't measure the qualification aspects of students more profoundly in contrast to MCQs [2]. Importantly, students' awareness of conventional structure of questions has replaced question-reading with thinking during the learning process; and also the approach to question-reading has frantically reduced welcoming class sessions which is an environment for communicating thoughts, analyzing data, and even teaching research [11]. One study reported that an important section of one's preparation for examination is indeed his or her assessment of its method [12]. In Mother and Child

Health course in Shahrekord University of Medical Sciences, the assessment of students' performance is made with multiple-choice questions. It seems that graduated nursing students, working in hospitals and health centers, have little knowledge about the mother and child health subject. The objective of the present study was to compare the scores obtained by the nursing students while answering essay and multiple choice questions about mother and child health subject.

METHODS

In Shahrekord University of Medical Sciences, thirty or thirty-one students in nursing course are accepted each year who study the Mother and Child Health subject in the 3rd semester. To help generate the findings of this study, we studied the students of 4th semesters; i.e. 121 nursing students between 2010 and 2012 who had taken the Mother and Child Health subject. In this course, the final evaluation is conventionally carried out through MCQs. In the current study, we compared the essay with MCQs. Data collection was performed by Personal Information Form and the questions of Mother and Child Health examination. For this study, to examine mother and child health, first, the essay, consisting 40 questions, was given to the students to answer during the 40-minute allotted time. At the end of this section and after the students had delivered their essay papers, a multiple-choice questionnaire composed of 40 questions that covered a similar content, was given to students to answer within 40 minutes. In essay and multiple choice questionnaires, 50% of questions were designed in taxonomy I (recalling information and memorizations) and 50% in taxonomy II (interpreting information). None of the questions in either exam had a negative score; this issue was inscribed on their papers. The value of essay questions and MCQs were equivalent; besides, each semester the questions were replaced with those of similar content. After the examination, the papers were scored by the teachers and controlled by other two colleagues. In analyzing questions, difficulty index, discrimination index of questions was detected and compared between the two exams. To consider the research ethics, only the scores of MCQ examination was noted for final evaluation as the real score of student based on 20 and was delivered to Education Deputy of Faculty. Analysis of the data was performed by using paired t-test and Pearson correlation coefficient and $P < 0.05$ was considered statistically significant.

RESULTS

The mean age of all participants was 21.31 ± 1.4 . Sixty-Eight percent of them were female and Thirty-Two percent were male. There was not a significant difference with regards to difficulty and discrimination indices between the two kinds of questions for all the four semesters of study. The comparison of students' mean scores in two types of evaluation is presented in table 1 that indicates higher scores of MCQs compared to essay questions in all four years in a significant manner ($P < 0.001$). The minimum score obtained in essay questionnaire was 11.50 and the maximum was 16.50. In MCQs questions, these scores were 14.00 and 18.00. A positive correlation was observed between the scores in the two types of questions [$n = 121$, $r = 0.93$, $p < 0.001$ (figure 1)].

Table 1. MCQs and essay scores for nursing students in Mother and Child Health examination

study semester		Essay scores	MCQs scores	P Value
	n	X±SD	X±SD	
1st semester of 2009-2010	30	14.79±2.4	16.42±1.5	P<0.001
2 nd semester of 2009-2010	31	14.88±3.1	16.17±2.3	P<0.001
1 st semester of 2010-2011	30	13.27±5.3	16.33±4.3	P<0.001
2 nd semester of 2010-2011	30	13.91±4.3	17.21±3.5	P<0.001
Total	121	14.72±3.7	16.53±2.4	P<0.001

Values are means (SD); n, numbers of students.

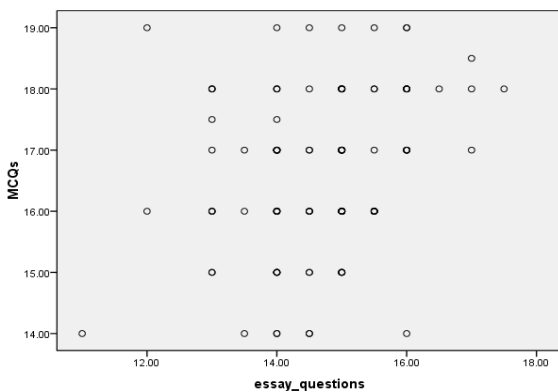


Fig. 1. Scatterplot of students' scores in Mother and Child Health Essay and MCQ examinations.

The findings of present study showed a significant difference between the scores obtained by nursing students in essay and multiple-choice examination and the MCQs' scores were higher than the essay ones in all four semesters. Moqattash et al., reported similar findings and stated that the students with recalling ability may get a better score in MCQs while those with analysis, interpretation, organization of knowledge, and reporting skills obtain higher scores in essays [14]. On the other hand, the consistently lower scores in long essay questions may be attributed to the bias or more subjective marking schemes of different lecturers compared with the more quantitative nature of MCQs. A similar observation of higher scores in MCQs and short essay questions compared with structured, integrated long essay questions was reported by Moqattash et al. [14], who claimed that one of the reasons for higher scores was the elimination of examiners' bias. However, we believe that long essay-type assessment is a sensitive test requiring students not only to recall facts but also to use higher-order cognitive skills, such as analytical, interpretive, and application skills.

In the present study, considering the fact that in designing essays we attempted each part of question to have a clear

point for scoring, it seems the examiner's bias could be minimized. Pepple et al., also reported that the essay questions with long answers not only make the students recall the facts, but also express their cognitive skills in higher areas such as analysis and applications [2]. One study compared medical students' performance in essays with short answers and MCQs questions. It was reported in physiology that an insufficient knowledge of physiology and students' inability to establish a logical sequence among the learnt information is the main reason for their poor performance in essay questions compared to MCQs [15]. Another finding of the present study was the significant association between the scores of essay and MCQs questions. This relationship reveals that students with a good performance in essay questions will typically have an acceptable performance in MCQs. Similar findings were noted by Oyebok et al., [15] and Mogattash et al., [14]. The analysis of multiple-choice questions in different studies indicate that the majority of MCQs have been designed to recall information and memorization [16, -17].

Anyway, it is worthy considering that in MCQs examinations, the emphasis of test developers is on memorization rather than deep understanding and application of concepts, because this approach leads to memorizing subjects which in medical courses, it would not be satisfactorily borne in mind and is far from developing students' ability [16,18]. Of course, the limitations of MCQs that were indicated by other studies should be noticed [19, 20], It is necessary for teachers to take advantage of other standard questions for assessing students' knowledge. In brief, this study indicates that there was a strong correlation between students' scores in MCQs and essay questions in general. The overall higher MCQ scores depict that without the essay examination format, some of the failing students are likely to pass the final examination in maternal and child Health subject. Conducting the study on just one subject of nursing lessons was the limitation of this study. The studies with more comprehensive samples and in other courses might help generalize the results and achieve a comprehensive analysis.

CONCLUSION

The findings of the present study indicted a significant difference in students' MCQ and essay scores; that is the scores of students in MCQs was higher than the essay

questions. It reveals that if only MCQs are used, some students will pass the exams without cognition, analysis, thinking, and knowledge application abilities. Therefore, different methods of assessments are highly recommended.

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