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Original Article

Effects of Frequent Announced Parasitology Quizzes on the Academic Achievement

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Abstract

Background: The effect of frequent examinations on the students' learning has had inconsistent results. This study aimed to assess the effectiveness of frequent announced quizzes on the learning of a representative sample of Iranian medical students.

Methods: This experimental study was conducted among 37 fifth semester medical students who had taken the course in Protozoology and Helminthology, in which the same basic information were provided about different types of protozoa and worms. Initially, in the teaching of helminthology, ten routine sessions were handled with lectures and interactive questions and answers. Then at the beginning of the protozoology topic in the beginning of all of the next 9 sessions, the students were informed that they will have a quiz at the end of each session. At the end of the semester, the total scores of quizzes were compared with the mean final scores of protozoology and helminthology using paired *t* and repeated measure tests.

Results: The mean final scores of the protozoology lesson were not significantly different from that of the helminthology (10.45 ± 2.75 vs.11.25 ± 2.56 on the scale of 20, respectively, *P*=0.13). There was no significant difference in the mean score of the five quizzes compared with the mean final term score of protozoology. The overall mean scores in the helminthology lesson (11.25±2.56), protozoology lesson (10.45±2.75), and the quizzes (9.16 ± 3.55) were significantly different (*P* <0.0001).

Conclusion: Frequent announced quizzes were not effective on increasing the medical students' motivation and learning.

Introduction

The role of teaching quality cannot be ignored in recent brilliant scientific advances (1). One of the major challenges of teaching is finding an approach to increase students' level of understanding and learning (2). Various teaching techniques have resulted in different outcomes. From more than half a century, professionals have studied the effective teaching methods in higher education. Teaching behavior reflects the beliefs and values of the teacher in teaching and learning activities (3).

It is documented that students preserve about 20% of items taught during a 45-minute lecture, but active participation of students in the learning process would increase the level of students' understanding. As an example, using a cooperative-learning technique is found to be significantly effective in increasing the students' level of understanding and learning (4). The effects of frequent examinations and quizzes on science teaching and learning have been surveyed at different educational levels from elementary schools to universities. This method can have favorable effects in the earlier detection of the students' errors and in raising and maintaining high standards of learning attainment (5). Quizzes and assignments, as teaching aid equipment, can provide appropriate feedback and error correction for students during educational courses (6). The quiz is a tool for encouraging and monitoring the progress of students, especially when they are taken frequently. It may also have desirable effects such as improving academic achievement, reducing anxiety, augmenting the student-professor communication, and decreasing the study time for the final exam (7). Conversely, in some cases it can increase the students' anxiety, and in other cases may have poor or negative effects on the learner's performance (6,8,9).

Similar to the other areas of higher education, the learners in the field of medical sciences are considered as the core. Through active participation in the educational processes, they would acquire the desired education, and by attaining knowledge, attitudes and necessary expertise, they achieve certain professional skills to serve the community (10).

Owing to the importance of the aforementioned points in taking frequent examinations and quizzes for improving the students' performance, and on the other hand considering the controversial effects of this technique on the final grades of students, as well as the difficulty of taking and correcting frequent quizzes for the instructors, we aimed to assess its effectiveness in a representative sample of Iranian medical students.

Materials and Methods

This experimental study was conducted in 2009 to perform research in the field of education in the Kurdistan University of Medical Sciences, Iran. The study comprised all the 42 fifth-semester medical students taking the parasitology module; 5 of them were excluded because of their recurrent absences or their previous failure in this course. The course consisted of two topics of helminthology and protozoology, in which the basic information were provided about different types of protozoa and worms. In accordance with the course syllabus, it was presented in numerous sessions during the fifth semester of the basic medical science education. Initially, in the teaching of helminthology, ten routine sessions were handled with lectures and interactive questions and answers. Then at the beginning of the protozoology topic in the beginning of all of the next 9 sessions, the students were informed that they will have a quiz at the end of each session. The quiz consisted of one or two essay questions about the subjects taught in the session, and the score was applied to the students' final grades.

According to the sequence of discussions and number of the sessions, five quizzes were

taken from the protozoology topics. Quiz sheets were corrected and the scores were kept until the end of the academic semester. In the final exam, two series of questions about the topics of helminthology and protozoology were designed and implemented. The score and style of these questions were similar. Questions consisted of multiple-choice questions, short essays, and false-true questions.

Statistical analysis

Data analysis was conducted by SPSS software, version 14.0 (SPSS Inc., Chicago, Illinois, USA). The significance level was set at $P<0.05$. The final results obtained from the two topics of helminthology and protozoology, and also the results and scores from the quizzes were compared using paired *t* and repeated measure tests.

Results

As presented in Table1, the mean final scores in the topics of protozoology, taken with the frequent quizzes during the semester, was not significantly different from that of the helminthology topics (10.45 ± 2.75 vs.11.25 ± 2.56 on the scale of 20, respectively, $P=0.13$). Likewise, there was no significant difference in the mean score of the five quizzes (9.16±3.55) compared with the mean final examination score of protozoology (10.45±2.75)($P=0.1$) (Table 2).

Table 3 shows that the overall mean scores in the topics of helminthology (11.25±2.56), protozoology (10.45±2.75), and the quizzes (9.16±3.55) had significant differences ($P<0.001$).

Table1: Characteristics of the final scores of medical students after the performing the two educational methods

Final exam score***	n	Amplitude	Min.	Max.	Mean	SD	*P*	T
Protozoology*	37	11.3	5.65	16.95	10.45	2.75	0.13	-1.527
Helminthology**	37	11.08	4.46	15.54	11.25	2.56		

*: Usual teaching method with frequent announced quizzes
**: Usual teaching method
***The scores are on the scale of 20

Table 2: Comparison of mean scores of medical students from quizzes and from the final examination of protozoology

Final exam score*	n	Amplitude	Min.	Max.	Mean	SD	*P*	T
Quizzes	37	6.7	8	14.70	9.16	3.55	0.10	1.64
Final term	37	11.3	5.65	16.95	10.45	2.75		

*The scores are on the scale of 20

Table 3: Repeated measure analysis of the mean scores on three tests of the protozoology, helminthology, and the quizzes

Scores	N	Mean	SD	mean square	F	*P*
Quizzes	37	9.16	3.55	11745.9	1450.4	0.000
Helminthology*	37	11.25	2.56			
Protozoology**	37	10.45	2.75			

*: Usual teaching method / **: Usual teaching method with frequent announced quizzes

Discussion

In this study, taking frequent quizzes was not associated with higher final scores than the regular training technique. This finding is not consistent with some previous studies (3-7,11),which showed positive effects on the students' learning.

A study on Iranian dentistry students with four methods of the problem-based learning, film screening, lectures, and frequent quizzes showed that the final score was higher in the group with frequent quizzes compared with the group taught by the lecture method (5). In another study conducted among nursing students in Iran, repeated oral quizzes were more effective than the lecture method in increasing the scores, and in enhancing the students' satisfaction from the learning contents; though it increased the students' anxiety (3).

A study in the US showed that the performance of medical students increased significantly by taking oral quizzes after group discussion at the end of the class (4). The effect of group discussion on the favorable results of this study should be taken into account; we did not use this method in the current study. In a study among medical students in Croatia, obtaining daily quizzes, consisting of 10 questions, increased the final scores and the success rate of passing the course (11). Compared with our findings, the higher number of quizzes and questions might have been the reason for the effectiveness of this method in that study. Our findings are consistent with some previous studies showing limited or no effect of taking frequent quizzes. In the study conducted among 227 introductory psychology students in the US the feedback provided through the pre-test did not show any effect on increasing the general knowledge of the students (4). In this study, the quizzes were conducted as pre-tests, but in our study they were taken immediately at the end of the teaching sessions.

In a project, for getting a professional doctoral degree in education, three methods of conventional education, quiz with prior notification (announced quizzes), and quiz without prior notification were implemented for high school students of economy. It showed that obtaining the quizzes had no effects on improving the students' economy scores (9). The participants in the survey were high school students, with different levels of mental maturity and motivation compared with the university students in our study.

In a study among undergraduates in the US, conducting announced quizzes did not improve the final exam scores of the students in the psychology course, although it increased the presence of the students in the classroom and their better preparation for the exam (8). In our study, the students' viewpoints were not investigated.

A study on 287 college men, which used different measures of baseball performance for predicting the overall performance of professional baseball players, showed that confidence in judgment increased with practice and efforts (12).

The problem of judgment bias should be also taken into account; it is documented that poor performance of students on a test can be because they may be more overconfident regarding their answers to hard questions, particularly those they answer wrongly, than are students who achieve better (7).

Study limitations and strengths

The lack of effectiveness of frequent quizzes in our study may be because the students believed that by taking the quizzes, they were more ready for the topic of protozoology, so they spent most of their time to study the helminthology lessons, and therefore got better scores in the final exam. It can also be suggested that students had less attraction and attention to the protozoology topics than to the helminthology topics. Another possible reason may be the easier learning of the subjects of helminthology than the protozoology discussions.

Although from our points of view, we had considered the resemblance in course contents, in complexity of the lessons and teaching methods for the students' attraction toward the lesson, as well as in the design and scoring of the questions in the final exam; and taking all these similarities into account is our study strength. However, the non-effectiveness of our teaching method could be due to limitations such as the contents of the discussions, the small number of quizzes, the small sample size, as well as the different types of questions in the quizzes and the final exam, i.e. essay versus a variety of multiple choice questions.

Conclusion

Frequent announced quizzes had no significant effects on increasing the medical students' motivation and learning. It is possible that this method did not increase the attractiveness of students, their learning, and improvement of their final scores just in this course. Given the dissimilarities of our findings with some other studies, we recommend to conduct further investigations in this field by studying the effects of the quizzes on the same and exactly equal topic but in the different groups of students.

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