

Frequent Announced Pharmacology Quizzes have No Impact on Academic Performance: An Exploratory Study

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Abstract

Context: The impact of frequent announced quizzes on the students' level of understanding and learning has had inconsistent results. **Objectives:** This study aimed to investigate the possible benefits of frequent announced quizzes in pharmacology on the performance of a representative sample of Libyan pharmacy students. **Subjects and Methods:** Eleven pharmacy students were studied during the "pharmacokinetics and pharmacodynamics" course. The initial six sessions were delivered using the conventional lectures with interactive questions and answers. In the following six sessions, at the beginning of each session, students were informed that they will have a quiz at the end of each session. At the end of the semester, the corresponding total scores of quizzes in the two periods were compared. **Results:** The mean final scores of the pharmacokinetics lesson were not significantly different from that of the pharmacodynamics (75.8 ± 11.1 vs. 68.6 ± 17.5 on the scale of 100, respectively, $P = 0.13$). There was no significant difference in the mean score of the six quizzes compared with the mean final term score of pharmacokinetics. **Conclusions:** Frequent announced quizzes were not beneficial on enhancing the students' performance and learning.

Keywords: Academic performance, frequent quizzes, learning, pharmacy students

INTRODUCTION

Interest toward improving students learning and teaching quality cannot be ignored in recent scientific advances.^[1] Problem-based learning has been recognized by some researchers as most important development in education over the past five decades.^[2] Attention to efficient factors in learning and progress of students is a characteristic of a successful university education system.^[3] As the educational success of students is very significant, it must be understood that educational and psychological factors have a major influence on the students' academic achievement. Thus, finding an approach to encourage students to more influencing learning can be helpful to the betterment of students' level of understanding and learning.^[4] It is generally recognized that the assessment of students' performance by the lecturer is one of the most difficult and essential of all tasks. It is assumed that quizzes are beneficial tools to promote learning and support what has been taught.^[5] The implication of a series of lecture quizzes is usually used to assess the degree of achievement of the learning goals, particularly if the quizzes

are an important part of the students' final score in the class, and subsequently to improve the learning process.^[6] Quizzes and assignments, as teaching aid equipment, have been shown to have a positive impact on attendance, reading, and student confidence. In addition, the feedback from regular quizzes permits students to distinguish areas on which to focus for examinations.^[7]

In this study, we evaluated the possible benefit of frequent announced quizzes in a pharmacology subject for pharmacy course at "University of Tripoli Alahlia (UTA)." This course is offered in the 5th year program to get bachelor in pharmacy (B. Pharm.). The hypothesis was that regular quizzes would improve student performance on both regular examinations as well as on summative final examination.

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Access this article online

Quick Response Code:



Website:
www.ijmbs.org

DOI:
10.4103/ijmbs.ijmbs_44_17

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How to cite this article: Atia A, Ashour A, Abired A. Frequent announced pharmacology quizzes have no impact on academic performance: An exploratory study. *Ibnosina J Med Biomed Sci* 2018;10:18-20.

SUBJECTS AND METHODS

This study was conducted in 2017 at the Department of Pharmacy, UTA, Janzur, Tripoli, Libya. The Department of Pharmacy in UTA includes undergraduate students in five levels who are distributed in ten semesters. Students enrolled in the study were all the 11th semester medical students taking the pharmacology module. The course consisted of theory classes in two topics of pharmacokinetics and pharmacodynamics, in which the basic information were provided about the study of the movement of drugs in the body and effects of drugs on living organisms. In accordance with the course syllabus, it was offers in various sessions during the fifth semester of the pharmacy education. Initially, in the teaching of pharmacokinetics, six routine topics were handled with lectures and reactive questions and answers. Then, at the next of the other six pharmacodynamics sessions, the students were informed that they will have a quiz at the end of each session. The quiz consisted of two simple essay questions about the subjects taught in the lecture, and the score was included in the students' final score. According to the series of discussions and number of the lectures, six quizzes were taken from the pharmacodynamic topics. Quiz papers were marked, and the scores were preserved until the end of the academic semester. In the summative final examination, two series of questions about the topics of pharmacokinetics and pharmacodynamics were prepared and implemented. The structure and pattern of these questions were similar. Questions consisted of true-false questions, multiple-choice questions, and short essays. The names of students were coded during data collection for confidentiality purposes. The analysis was done using statistical software (SPSS version 22.0, Inc., Chicago, IL, USA). Comparisons of two groups were done using *t*-test. The statistical significance level was set at $P < 0.05$.

RESULTS

The mean final scores in the sessions of pharmacodynamic, taken with the frequent announced quizzes during the semester, was not significantly different from that of the pharmacokinetic topics (75.8 ± 11.1 vs. 68.6 ± 17.5 on the scale of 100, respectively, $P = 0.13$) [Table 1]. Similarly, there was no significant difference in the mean score of the six quizzes (69.1 ± 12.7) compared with the mean final examination score of pharmacodynamics (71.3 ± 10.8) ($P = 0.38$) [Table 2].

DISCUSSION

The impact of assessment methods in promoting students' performance in terms of knowledge earning and retention is well established.^[8] The main purpose of this study was to determine if the use of frequent announced quizzes would improve student performance on subsequent summative examinations. Our results showed that taking frequent quizzes was not significantly associated with higher scores in final examination than the regular teaching technique. This finding is comparable to that reported for the students from Iran^[9] and

Table 1: Characteristics of the final scores of pharmacy students after implementing of the two educational methods

Final examination score*	n	Mean±SD	P
Pharmacokinetics (without announced quizzes)	11	68.63±17.5	0.13
Pharmacodynamics (with announced quizzes)	11	75.81±11.11	

*Scores were based on 0-100 scale. SD: Standard deviation

Table 2: Comparison of mean scores of pharmacy students from quizzes and from the final examination of pharmacodynamics

Final examination score*	n	Mean±SD	P
Quizzes	11	69.09±12.68	0.38
Final examination	11	71.27±10.81	

*Scores were based on 0–100 scale. SD: Standard deviation

India.^[10] However, is not consistent with other studies that observed effects on the students' performance in many different countries.^[11,12] Therefore, our hypothesis that weekly quizzes would result in increased student performance and score in the final examination was rejected.

The effects of frequent quizzing and improved student score and performance have been studied before in various studies on different levels of education.^[12-15] A study from the US demonstrated that the score of medical students significantly raised by taking frequent oral quizzes after group discussion at the end of each class.^[16] Another study reported that weekly quizzes significantly increased student score compared with no quiz indicating that weekly quizzes enhance students' performance.^[17] Similarly, Poljicanin *et al.*^[12] have found in their study an improvement of student performance in written, practical, and oral examination after implementing frequent announced quizzes. Compared with our findings, the higher number of questions and the larger sample size might have been the reason for the effectiveness of this method in that studies. However, similar to our results, no significant impact has been reported between the weekly quiz group and no quiz group students' score and achievements in the class.^[18] Furthermore, the mean final scores of topics with frequent weekly quizzes of the protozoology lesson were not significantly different from no quiz group of the helminthology. In the same study, the mean score of the quizzes was also not significantly differed compared with the mean final term score of protozoology. The authors concluded that frequent announced quizzes were not influential on enhancing the motivation and learning of the students.^[9] Azorlosa and Renner conducted study in the US revealed that frequent quizzes did not increase student's score in psychology final examination, although it promotes the attendance of the students in the classroom and their better preparation for the examination.^[19] In this study, we also could not find any significant difference between weekly quiz groups compared with nonquiz groups; however, the students'

viewpoints were not examined. Intuitively, it appears that the quizzed group should do better compared to the nonquizzed group. One of the reasons could be that given the stress of the quiz the students might not have grasped the teaching sessions well. One of the ways to tackle this problem in future would be to give a surprise quiz to the students. Moreover, the lack of usefulness 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 pharmacodynamic, so they consumed most of their time to study the pharmacokinetics lessons, and consequently got good scores in the final examination. It can also be suggested that students had less desirability and attention to the pharmacodynamic topics than to the pharmacokinetic topics. Another potential reason may be the easier learning of the subjects of pharmacokinetic than the pharmacodynamic classes.

Although by grading written quizzes we learned which students could understand the question being asked and synthesize complex information into a short answer, quizzes were very time consuming to grade even for a small class. An effort was made to write deductive comments on each student's quiz paper, so it took me few times to mark a single quiz paper. Furthermore, despite we had taken into account the complexity of the lectures and teaching methods for the students' concentration toward the lesson, as well as in the design and scoring of the questions in the final examination, the inefficiency of our teaching method could be due to some limitations including the small sample size, the small number of quizzes, and the different types of questions in the quizzes and the final examination. Further investigations with larger sample size are planned for future work by our research group.

CONCLUSIONS

Weekly announced quizzes had no significant impact on enhancing the pharmacy students' motivation and learning. This may be due to that this type of motivation did not increase the attractiveness of students, their learning, and enhancement of their final scores just in this course. Further studies in this field investigating the effects of the quizzes on the same and exactly equal topic but in the different groups of students would be worth.

Acknowledgment

We are grateful for all students who participated in the study.

Author's contribution

All authors contributed adequately to qualify for authorship. They have all drafted and approved the final version of the article.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

Compliance with ethical principles

This study was approved by the UTA Research Committee.

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