

Original Research

The Beneficial Effects of Applied Physiology Study Guides on Dentistry Students' Learning

Rana Keyhanmanesh¹, Fariba Mirzaei Bavi², Morteza Ghojzadeh³, Hadi Ebrahimi², Hossein Mazouchian^{1,4*},
Mohammad Ali Ebrahimi Saadatlou⁵

¹Medical Education Research Center, Tabriz University of Medical Sciences, Tabriz, Iran

²Physiology Department, Tabriz University of Medical Sciences, Tabriz, Iran

³Research Development and Coordination Center, Tabriz University of Medical Sciences, Tabriz, Iran

⁴Student Research Committee, Tabriz University of Medical Sciences, Tabriz, Iran

⁵Department of Basic Sciences, College of Veterinary Medicine, Tabriz branch, Islamic Azad University, Tabriz, Iran

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Abstract

Introduction: Previous studies have shown that study guides are effective tools that recognize students' educational needs and help teachers to attain satisfactory results. Unfortunately, this effective learning tool has not been used in the coursework and teaching of basic sciences in Tabriz University of Medical Sciences. Therefore, this study was proposed to evaluate the effects of a study guide in an applied physiology course on the overall learning quality of dental students.

Methods: In this semi-quasi experimental study, 45 dental and 63 medical students in an Applied Physiology course were included. A study guide was given to the dental students at the beginning of the course. At the end of the course, a final examination was held for both groups separately using the OSCE method. The medical and dental students' final scores were compared using a T-test with SPSS v.16 software. A 34-question Likert-scaled questionnaire was prepared by researchers to evaluate the experimental group's opinion about the effects of the study guide on their learning.

Results: The final exam score of the dental students was 18.01 ± 1.57 , and it was 17.94 ± 1.42 for the medical students. The final score of both groups was not different significantly ($p=0.804$). Based upon the questionnaire, the dental students believed that study guide significantly improved their knowledge and skills in applied physiology (Mean= 61.12 ± 13.7).

Conclusion: Use of a study guide improves both the attitude and knowledge of dental students in the applied physiology course.

Introduction

In the traditional Tabriz University of Medical Sciences curriculum, physiology is taught by lecture along with the other basic sciences during the first five semesters (2.5 years) of medical and dental school. The applied physiology course mainly consists of methods of basic physical examinations (neurological, cardiovascular and respiratory examinations) and laboratory tests, and is held for both medical and dental students.

Some studies showed that just 2.4% of teachers presented the goals and expectations of the session at the beginning of the class.¹ In the other studies, it was also reported that there were not enough connections between the study goals and actual teaching content.^{2,3,4} Harden and his colleagues

demonstrated that a study guide, as an effective learning tool, could recognize students' educational needs and help teachers to attain satisfactory results.⁵ This tool also has been compared to a permanent teacher who reveals key points to students.⁶ Standard study guides should include the learning goals and schedule, teaching content, and a self-evaluation for students.⁷ Unfortunately, this effective learning tool has not been used in basic science teaching in Tabriz University of Medical Sciences. As a result, this study was proposed to evaluate the effects of a study guide in an applied physiology course on the learning quality of dental students.

*Corresponding authors: Hossein Mazouchian, Email: Hosseinm1388@yahoo.com

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Materials and Methods

This semi-quasi experimental static group comparison design study was performed in Tabriz University of Medical Sciences during the 2009-2010 academic year. In a static group comparison design study, subjects non-randomly were divided into experimental and control groups. The study population was the entire class of second-year medical and dental students of Tabriz University of Medical Sciences who attended the applied physiology course. A total of 45 dental and 63 medical students were selected by the convenience sampling method. Students were those from the class of 2008 who had passed all prerequisite classes included in the study. Guest students were excluded from the study. Students in both groups were matched based on their pre-University average. The study guide included the details of the class, goals and expectations, learning schedule, assessment methods, a self-assessment portion and details about teachers and their specialty. The study guide was given to the dental students (the experimental group) at the beginning of the course and completely explained to them in a one-hour session. Then, the traditional method of teaching was performed to both groups during sessions. At the end of the course, a final examination was held for both groups separately using the OSCE method. Medical and dental students were then given a final score, which was compared using Student's T test with SPSS v.16 software. Their final score also compared with those who had passed applied physiology in a previous semester. For our purposes, $p < 0.05$ was considered significant. For a detailed evaluation of the experimental group's opinion about the effect of the study guide on their learning quality, a Likert-scaled researcher-made questionnaire was prepared. This questionnaire included 34 questions; five questions about the impact of the study guide on their knowledge, six questions asking professors' teaching quality, four questions their interest in dentistry and 15 questions asking their study patterns. Four yes-no questions were designed to evaluate their study patterns, too. The validity of the questionnaire was approved by expert opinion method. Its reliability was also confirmed by the test, re-test method and alpha Correnbach coefficient was calculated at 0.87.

Results

There were 45 people in dental students group; 25 of them were female (55.6%) and 20 were male (44.4%). The mean age of this group was 19.72 ± 0.88 years old, ranging from 18 to 22. In the medical student group, 36 were female (57.1%) and 27 were male (42.9%). The mean age was 18.93 ± 1.23 years old in this group, ranging from 18 to 24. The final score of the dental students was 18.01 ± 1.57 , and was 17.94 ± 1.42 for medical students. The final score of both groups was not different significantly ($p = 0.804$). The experimental group's final score was significantly higher than the dental students who were passing applied physiology in the previous semester (Mean final score = 16.91 ± 1.77 , $p = 0.004$). Students in the experimental group were highly interested

in dentistry (Mean = 72.17 ± 17.58). They also believed that the study guide highly improved their knowledge and skill about applied physiology (Mean = 61.12 ± 13.7). Their satisfaction about the teaching characteristics of teachers was very high (Mean = 81.91 ± 12.62).

In the questions about their study pattern, 28 (82.4%) students told that they reviewed the chapter before starting studying, and six students didn't (17.6%). On study habits, 20 students claimed that they studied orderly (60.6%), but 13 students studied disorderly (39.4%). A total of 20 students read the guide in the beginning of books before starting studying (69%) but nine students don't (31%). Of the subjects, 19 students had specific study pattern (70.4%) but 19 didn't (29.6%). Students' answers about other questions of their learning style were mentioned on Table 1.

Discussion

Most of the students found the study guide instructive and well-constructed. Dental students, those who read the study guide, mentioned that this educational tool highly improved their knowledge and skills in applied physiology. The teaching characteristics of teachers also satisfied students. The general view of students indicated that both teachers and the implementation of the study guide met their expectations. Our findings replicated the reports of Isman *et al.* in 2002, which examined students' view about using the hypertension module as a learning tool in physiology. In their study, students were positive about this learning tool and defined the module as a "dynamic, comfortable and interactive process".⁸

Though students had a positive attitude toward the study guide, their cognitive scores showed different results. Our findings indicated that the cognitive score of students in the experimental group was good and similar to control group. Moreover, the mean final score in the experimental group was significantly higher than in those dental students who passed this course in the previous semester, but this is not reliable enough to evaluate the efficacy of the study guide. Roshangar and her colleagues defined a study guide as a motivator for nursing students of Tabriz University of Medical Sciences. They also reported that this learning tool increased nursery students' cognitive and psychomotor scores in the intensive care and cardiac care units (ICU and CCU).⁹

In addition, other studies showed that a study guide was a helpful learning tool that improved the overall educational quality and ameliorated students' practical skills.¹⁰⁻¹⁴

The absence of significant difference between the cognitive scores of the experimental and control group in our study could be due to limitations of method in this study; first, the sampling was done from students with two different majors because it was not possible to completely separate two groups if the students of single major had been chosen. Second, although the dental and medical students passed similar courses in the traditional curriculum's basic medical sciences of Tabriz University of Medical Sciences; their different attitude toward applied physiology possibly

Table 1. Learning style of dental students

Learning style questions	Mean± Standard Deviation	Agreement
1 I spend lots of time for learning something	48.75±17.86	Average
2 I study intensively in the days before the exam	59.76±28.44	Average
3 Social activities prevent me to study	54.27±22.98	Average
4 When I study, the radio and TV is turned on	19.51±27.11	Very low
5 I distract while studying for long time	40.85±26.07	Average
6 I am confused and sleepy while studying	23.17±25.85	Low
7 I don't understand my class notes	13.12±16.97	Very low
8 I'm too confused while taking notes in the class	25.64±18.57	Low
9 My class notes are incomplete	18.12±21.17	Very low
10 After studying, I cannot remember the main subjects	31.25±20.22	Low
11 I cannot recognize the important contents	28.12±22.78	Low
12 I cannot commensurate my reading speed with the difficulty of contents	32.05±23.61	Low
13 I distract while taking exam	40.00±24.55	Average
14 Although I read well, I can't remember anything in the exam	33.14±26.79	Low
15 I don't make a plan to study for exam	28.75±28.05	Low

affected our results.

In the other part of our study, students answered some questions about their problems while studying. Results showed that most of students encountered few learning problems, study in an orderly manner, and have a specific study pattern. Most of students mentioned they read the guide in the beginning of the book before starting to study.

Competing Interests

The authors declare no conflict of interest.

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