



Investigating the Impact of the Use of Mobile Educational Software in Increase of Learning of Dentistry Students

Abdolreza Gilavand¹ and Mohammad Shooriabi^{2*}

¹*Employed Expert on Faculty Appointments, Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran*

²*Assistant Professor, Department of Oral Medicine, School of Dentistry, Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran*

**Corresponding Email: dsshoriabii@yahoo.com*

ABSTRACT

After the growth of information technology, the traditional methods of teaching that are currently running do not alone meet the educational needs. Therefore, this research was conducted to investigate the effectiveness of using mobile educational software in increase of the amount of learning of dentistry students. In this semi-experimental study (pre-test and post-test), from between the last two years students of academic year 2015-16 of dentistry of Ahvaz Jundishapur University of Medical Sciences (AJUMS), 60 people were selected in a simple random way and divided randomly into two groups of intervention and control. Then the intervention group was given mobile educational software of the unit dental considerations on systemic patients; 30 days later, it was taken separate tests and their scores were compared with those of the control group who did not use software. The data were analyzed by SPSS V21 and regression test. The mean scores of awareness had increased in students of the intervention group before and after receiving the software and it was significant ($P < 0.05$). Furthermore, the difference of the mean scores of awareness after the intervention between control group and intervention one had been significant ($P < 0.05$). Based on the regression test, the age, gender, and semester had no impact on the score changes before and after the intervention. Although the use of smartphones was not included still in the formal curriculum of universities and educational institutions in line with the educational goals, but it allows students to use more various methods for learning.

Keywords: Educational Software, Mobile, Dentistry, Students, Learning

INTRODUCTION

After the growth of information technology, the traditional methods of teaching that are currently running do not alone meet the educational needs [1]. Teaching methods should be active and flexible and continuously for an environment in change and be updated constantly [2]. During the last few decades the information and communication technology (ICT) is a key component of teaching and learning in higher education. One especially important trend that has been appeared recently due to the use of information and communication technology is an increasing dependence on mobile devices not only in carrying out daily tasks, but also in educational and professional environments as well [3]. Using cell phone technology can increase significantly the combinatory learning [4].

At present, the method of lecture is the dominant method in teaching dentistry courses especially the unit *systemic diseases* [5]. This method is especially professor-oriented and does not pay sufficient attention to student learning. Usually, in a course there are some individuals who understand rapidly the contents, but some of the students need to have more time for reviewing and learning; in the traditional system both groups suffer a loss. Also, the traditional method is based mostly on remembering the contents of lesson and pay less attention to the true learning [6]. This causes the dental students and dentists do not get prepared at the time of coming into contact with systemic

patients. The various studies have shown that the amount of awareness and the performance of dentists in dealing with patients are undesirable [7-10]. An undesirable performance in dealing with systemic patients can endanger their status and cause some unfortunate consequences and future deplorable events. By observing necessary considerations by dentists about the systemic patients, we can prevent a lot of unfortunate events and their subsequent consequences. The topic of "learning anywhere and anytime" and "lifelong learning" according to the conditions of life and activity is an accepted and essential principle in today's world; the spread of information networks and new technologies, including the internet has provided a lot of opportunities in the field of learning one of which is the e-learning. Mobile learning is a new educational way and a subset of e-learning that focuses on teaching through numerous texts and the mobile tools [11].

One of the most personal digital devices is the smartphone that are widely used by the students and especially students of medical sciences universities. However, the tendency to use them in teaching is getting risen [12-14]. The software mostly used by medical students is the software related to the diagnosis and treatment of diseases and the drugs-related software [15-16]. Based on the results of international studies the students are demanding more educational software that guides them in taking a decision on the various clinical situations [17-18]. Evidences suggest the widespread use of smartphones in medical education. In a study in Canada it has been reported that 85 percent of medical faculty students use daily the smartphones and they have access to this technology for teaching and learning of the medical profession [19]. The results of a study in Australia suggest that dental students use smartphones and social media in line with the educational objectives and learning facilitation [20].

Ahvaz Jundishapur University of Medical Sciences (AJUMS) has: 650 faculty members, 7000 students studying at bachelors, masters and PhD levels, fellowship and higher degrees in 163 different fields and 15000 staff. The university is one of the most prestigious universities in Iran and is type one university based on the rating of the Ministry of Health and Medical Education. At the present, 484 students at professional PhD level, 98 students at specialized PhD level are studying in this university [21-23].

During recent years, the curriculum and educational books have been paid more attention [24-29], but this important principle, that is, new technologies such as the capabilities of smartphones and their effect on students' spirituality and performance has been not investigated, so that few researches have been conducted in this field. Doing such researches on the students of dentistry that according to the conducted studies is the most attractive field in terms of candidates of entering the University [30-32], is a necessity. Therefore, since the combinatory learning, including the benefit of smart phones and the software installed on them may provide opportunities to enhance teaching and learning, this research has been conducted to investigate the impact of the use of mobile educational software on the increase of dentistry students learning.

MATERIALS AND METHODS

This research has been conducted in a semi-experimental way (with pre-test and post-test). The research tool is a researcher-constructed questionnaire whose validity and reliability confirmed. The statistical population includes all of the last two years professional doctorate students of dentistry of Ahvaz (in Southwest Iran). From between the final two years dentistry students of academic year 2015-16 of Ahvaz (in Southwest Iran) 60 students as the statistical sample were chosen by simple random method and randomly divided into two groups of intervention and control. Then the intervention group was provided with the educational software of mobile of the unit *dental considerations of systemic patients* and 30 days later, it was taken separately tests and their score was compared with students of control group who did not use software. The data were analyzed by SPSS V21 and regression test.

At the beginning of the first semester of year 2014-15 all professional doctorate dental students of Ahvaz Jundishapur University of Medical Sciences (AJUMS), where they are in final two years of their training course were invited for participation in the study. In this academic semester the unit *dental considerations on systemic patients* is not provided for these students. All participants were given the necessary explanations about the purpose of study, implementation and usage manner of software, being optional of participation in study and that the test results have not any impact on evaluating student. The inclusion criterion for participation in the study was the consent of students and having a smart phone with the Android environment; 30 students had inclusion conditions. The necessary moral considerations including the confidentiality of students' views and taking the needed authorization from the research deputy of Ahvaz Jundishapur University of Medical Sciences (AJUMS) has been observed in this research.

With respect to the spread of the use of Android smartphones among students, the DMOTMCP software was designed to run in this environment. The executable file of software is downloadable via the Internet (the Web page) and Bluetooth and other applications of sending wireless data such as Zapia and Sherit etc. after downloading the

software the process of its installation is very comfortable and is done through a click on the program file. The program information is also available to students as off-line. After running the program, the start page of program contains 4 links (directory, more about theme, about book and exit). The user via a click on the link of list can have access to *dental considerations* and more than 81 situations and systemic disease. For faster access of user to the desired content, the possibility of search has been considered on this page. The user by clicking on the name of any disease enters to a page in which the potential problems of that disease in dental treatments, oral symptoms and manifestations of the disease, working procedure of preventing the incidence of systemic problems during dental treatment and necessary changes that should be considered in the provision of dental treatment plan have been inserted separately. The user can change as he/she likes the font, size and color of the letters that have been set up by default based on the standards of mobile applications. The contents and the topics of the program have been provided from the reference books *Dental management of the Medical compromised patient*[33] and *Burket's Oral Medicine*[34].

Awareness and information of participants about *the dental considerations on systemic diseases* were measured before and after offering software based on test score. For leveling two tests before and after the presentation of software, initially 40 questions with four answers were prepared. Their validity was approved with opinion of 13 specialists of dentistry, medicine and medical education. Reliability of the questionnaire was also confirmed using the Cronbach's Alfa of 0.88. Then the questions were divided randomly into two 20-question parts. For the first test, other than 20 questions of test some questions were included about age, gender, years of entering university and academic semester (demographic characteristics). In order to do a second test, alongside the next twenty questions of test some questions were added about the extent of the satisfaction of software and its efficiency and its effect on the amount of students' consciousness.

The first test was happened at the beginning of the implementation of the plan and before providing software. The time that students have to respond to questions was 20 minutes. After collecting questionnaires, the software was send by design executive through Bluetooth and wireless data as well as other programs such as Zapia and Sherit etc. to participants' cell phone and they were asked to install software on their phones. The probable problems in implementation and installation of software were removed by design executive and if participants have questions in the field of software, they were answered. About the date of second test the students were not explained. After 30 days and at the end of the academic semester the students were invited again to participate in the second test and annex questions. The time students have to respond to questions was 20 minutes. Simultaneously 30 other students who have no used software (the control group) were tested similarly in terms of the demographic characteristics. After collection the data were analyzed statistically by SPSS, v. 21 and regression test.

RESULTS

The mean age of the students in the intervention group was 26.07 ± 3.60 year including 5 men and 25 women and in control group 26.64 ± 3.20 year including 10 men and 20 women. In the intervention group 13 students of semester 9 and 17 students of semester 11 were present. Also 10 students of semester 9 and 20 students of semester 11 were in control group. T-test statistical analysis showed that between two groups there is no significant difference in terms of mean age ($P = 0.118$). Chi-square test results also indicated that two groups were similar in terms of gender ($P = 0.233$) and academic semester ($P = 0.60$).

In table 1, the mean scores of the first test (before the intervention) and secondary (after the intervention) and the changes mean score in intervention group plus the mean score of the second test (without intervention) in the control group have been shown (Table 2). Statistical analysis showed that the difference of the mean scores before and after the test has been significant in the intervention group, ($p < 0.001$) (Table 3). The analysis showed also that the difference of the mean scores in second test has been significant between intervention and control group ($P = 0.002$) (Table 4).

The samples were also classified in terms of score earned in three groups into: *low*, *moderate* and *good*. In the intervention group the number of people who have low and moderate awareness has been decreased, and people with good awareness have been increased. In the control group also most of samples had moderate awareness ($P < 0.05$).

Mean scores have been estimated in accordance with gender and semester in both intervention and control groups in table 5. Based on the regression test, the age, gender and semester did not have any impact on the score changes before and after intervention ($P > 0.05$).

Table 1. The Mean scores of the first test (before the intervention) and secondary (after the intervention) and the changes mean score in intervention group

Groups	Tests	Minimum	Maximum	Mean scores	Std. Deviation
	First test	5.00	18.00	9.9667	3.06800
Intervention group	Second test	7.00	17.00	12.4333	2.17641
	Changes Mean scores in intervention group	-6.00	8.00	2.4667	3.22419
Control group	Second test	8.00	14.00	10.7333	1.81817

Table 2. Mean scores in Control group

	N	Minimum	Maximum	Mean	Std. Deviation
Postscore	30	8.00	14.00	10.7333	1.81817

Table 3. Difference of the Mean scores before and after the test in the intervention group

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
						Lower	Upper		
Pair 1	prescore - postscore	-2.46667	3.22419	0.58865	-3.67060	-1.26273	-4.190	29	0.000

Table 4. Mean e scores in second test between intervention and control group

		Levene's Test for Equality of Variances		t-test for Equality of Means							
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference		
										Lower	Upper
postscore	Equal variances assumed	0.365	0.548	3.283	58	0.002	1.70000	0.51777	0.66357	2.73643	
	Equal variances not assumed			3.283	56.220	0.002	1.70000	0.51777	0.66287	2.73713	

Table 5. Mean scores have been estimated in accordance with gender and semester in both intervention and control groups

change Mean scores		Second test		First test					
Std. Deviation	Mean scores	Std. Deviation	Mean scores	Std. Deviation	Mean scores				
2.00	3.00	1.10	12.20	1.10	9.20	Male	Sex	Intervention group	
3.44	2.36	2.35	12.48	3.32	10.12	Female			
2.75	2.62	1.53	13.00	2.63	10.38	9	Semester		
3.62	2.35	2.52	12.00	3.41	9.65	11			
.	.	1.79	10.90	.	.	Male	Sex	Control group	
.	.	1.87	10.65	.	.	Female			
.	.	1.89	10.30	.	.	9	Semester		
.	.	1.79	10.95	.	.	11			

DISCUSSIONAND CONCLUSION

According to the results obtained from this research, the designed mobile software, on the whole, had been able to make improvements of students' awareness regarding the unit *dental considerations on patients with systemic difficulties*. Therefore, the smartphones can be used in line with educational purposes, although this technology has been not included in the official curriculum yet, but it represents an opportunity for every educational system to design the suitable methods, activities and educational materials for smartphones, so that it allows students to use this technology and provide the varied methods of learning in students.

Rung et al in a study that was done among the Australian dental students have emphasized on the positive role of smartphones in teaching and learning; it is consistent with present research [20]. Khatoon et al [17], Sagheb et al [18], Payne et al [35], Mosa et al [36] in various studies showed the much use of smartphones by medical and dental students and their eagerness for e-learning products; this is also consistent with our research. In their study Mosa et al showed that medical students use mostly the applications with the subject of the management of diseases and guidelines on their smartphones and with regular study use them in order to learn the contents; this is in accordance with our research, too [36].

Dhuvad et al (2015) and Senthooor et al (2014) showed that smart phones software, such as whats app, can lead to reduce errors and improve the performance of technical assistants in oral and maxillofacial surgery field by facilitating the process of consultation and the surgeons connection with together [37-38]. In their study Baheti et al also came to conclusion that smart phones software related to orthodontics has satisfied the orthodontists and has been able to improve the treatment design and treatment results which are consistent with this research [39].

This research showed that the effect of the software on the promotion of awareness and learning makes no difference between men and women. That's the same with the results of the study of Economides et al. In the mentioned study, no difference was observed between women and men among the Greek students on the use and application of mobile [40]. The reason of similarity in the results can be similarity in learning them. However, this interpretation should be considered carefully, because the people under study have not been asked directly about the amount of using the software during research period.

Based on the results, 70% of the students have estimated the performance of software *much* and *verymuch*. Also Waldmann et al indicated that the medical students have evaluated using mobile software positive for learning DEGAM-guidelines which are related to first aid; from this respect it is consistent with present research [41]. The students' positive evaluation of the software can be one strong argument for using these kinds of software in the learning program of dentistry students.

Given that, after completing a degree in dentistry, the dentist practices in his/her office independently and is responsible for the consequences of the treatment and no teacher monitor his/her work, the software performance will be higher. 70% of the students evaluated the application of this software for employed dentists *much* and *verymuch*. It is recommended that in this respect another research is conducted with direct questions from dentists employed in this matter. For more precise evaluation of changing the level of participants' awareness and learning in this research, it was not sufficed to their personal view about changing the extent of their awareness about the dental considerations of systemic patients; rather, it was proved by the test that the students who had this application in their mobile phone, have gained better results in the final test and in comparison with when they did not have the application. Also the statistical analysis showed that difference in mean scores before and after test in the intervention group was significant. This analysis indicated also that the difference of mean scores in the second test have been significant between control group and intervention one. Also in intervention group, the number of persons with little or medium awareness and learning was decreased and the number of persons with good awareness and learning was increased. From this regard, the results are similar to the researches of De Sena et al [42] and Glickman et al [43]. With any method of training, the material should be repeated continuously to be kept in memory. By the method of offering educational contents through mobile software, the content repetition is possible because of the availability of cell phones everywhere and every time [44-45]. The studies have shown that general dentistry graduates are unable to perform some dentistry sophisticated jobs [46]. However, installing the different courses software or the updated software the students can always have access to their textbooks sources and needed information.

According to the results of this study, it appears that the expansion of the learning activities including using smartphones is possible and practical. Designing learning materials that allow access not only through the computer but also through smartphones is recommended. It is recommended to perform this research in different educational groups which have different experiences and awareness of dental considerations of systemic patients and compare the results, so that more precise conclusion about the impact of this software on improving students' awareness and learning is possible. One of the limitations of the present study is that was conducted just on students

REFERENCES

- [1] Gilavand A, Hosseinpour M. Investigating Employees' Satisfaction with E-learning Inservice Training Courses at Ahvaz Jundishapur University of Medical Sciences and Health Services in 2014, Educational Development of Jundishapur. 2015; 6(3): 253-260.
- [2] Mattheos N, Schoonheim-Klein M, Walmsley AD, Chapple IL. Innovative educational methods and technologies applicable to continuing professional development in periodontology. Eur J Dent Educ 2010;14Suppl 1:43-52.
- [3] Koszalka TA, Ntloedibe-Kuswani G. Literature on the safe and disruptive learning potential of mobile technologies. Distance Education 2010;31(2):139-157.
- [4] Echeverría A, Nussbaum M, Calderón JF, Bravo C, Infante C, Vásquez A. Face-to-face collaborative learning supported by mobile phones. Interactive Learning Environments 2011;19(4):351-363.
- [5] Zarshenas L, Momeni Danaei S, Oshagh M, Salehi P. Problem based learning: An experience of a new educational method in dentistry. Iranian Journal of Medical Education. 2010;10(2):171-9.

- [6] Nourian A, Nourian A, Ebnahmadi A, AkbarzadehBaghban A, Khoshnevisan MH. Comparison of E-learning and Traditional Classroom Instruction of Dental Public Health for Dental Students of ShahidBeheshti Dental School during 2010-2011. *J Dent Sch.* 2012;30(3):174-183.
- [7] Hill KB, Hainsworth JM, Burke FJ, Fairbrother KJ. Evaluation of dentists' perceived needs regarding treatment of the anxious patient. *Br Dent J.* 2008;204(8):E13; discussion 442-3.
- [8] Murphy J, Twohig E, McWilliams SR. Dentists' approach to patients on anti-platelet agents and warfarin: a survey of practice. *J Ir Dent Assoc.* 2010;56(1):28-31.
- [9] Ahmadi-Motamayel F, Vaziri S, Roshanaei G. Knowledge of General Dentists and Senior Dental Students in Iran about Prevention of Infective Endocarditis. *Chonnam Med J.* 2012;48(1):15-20.
- [10] Robati R, Farokhi M. Evaluation the dentists' awareness of inherited bleeding disorders and anticoagulants in Shiraz. *Iran J PedHematolOncol.* 2013;3(4):159-63.
- [11] Bork A. Learning with the world wide web. *The Internet and Higher Education.* 1999;2(2):81-5.
- [12] Luanrattana R, Win KT, Fulcher J, editors. Use of personal digital assistants (PDAs) in medical education. *Computer-Based Medical Systems, 2007. CBMS'07. Twentieth IEEE International Symposium on; 2007: IEEE.*
- [13] Chatterley T, Chojecki D. Personal digital assistant usage among undergraduate medical students: exploring trends, barriers, and the advent of smartphones. *Journal of the Medical Library Association : JMLA.* 2010;98(2):157-60.
- [14] Patel PD, Greenberg RB, Miller KH, Carter MB, Ziegler CH. Assessing medical students', residents' and the public's perception of the use of personal digital assistants. *Med Educ Online.* 2008; 13:9-<http://www.med-ed-online.org>.
- [15] Duncan V, Vokey S, Gordon S, Helwig M, Chatterley T. Mobile Device Use in Pharmacy: A Multi-Institutional Study. 2015. 2015;36(3).
- [16] Boruff JT, Storie D. Mobile devices in medicine: a survey of how medical students, residents, and faculty use smartphones and other mobile devices to find information. *Journal of the Medical Library Association: JMLA.* 2014;102(1):22-30.
- [17] Khatoon B, Hill KB, Walmsley AD. Dental students' uptake of mobile technologies. *Br Dent J.* 2014;216(12):669-73.
- [18] Sagheb K, Schulz P, Bensch A, Al-Nawas B. Improving interactive learning in dental education. Poster. *J Dent Oral Med.* 2010;12(3):Poster 503.
- [19] Wallace S, Clark M, White J. 'It's on my iPhone': attitudes to the use of mobile computing devices in medical education, a mixed-methods study. *BMJ Open* 2012;2(4):e001099
- [20] Rung A, Warnke F, Mattheos N. Investigating the Use of Smartphones for Learning Purposes by Australian Dental Students. *JMIR mHealthuHealth.* 2014; 2(2): 1-8.
- [21] Gilavand A. A Study of the Growth and Flourish of Ahvaz Jundishapur University of Medical Sciences; A Cultural History. *Int J Med Res Health Sci.* 2016; 5(11): 83-86.
- [22] Gilavand A. Ahvaz Jundishapur University of Medical Sciences over Years; the History of AJUMS. *Jentashapir Journal of Health Research.* 7(5): e42677.
- [23] Gilavand A. Pathology of Faculty Members' rank Promotion in Universities and Higher Education Institutions Affiliated to the Ministry of Health and Medical Education of the Islamic Republic of Iran. *Int J Med Res Health Sci,* 2016, 5(9S):25-30.
- [24] Gilavand A, Hosseinpour M. Investigating the Impact of Educational Spaces Painted on Learning and Educational Achievement of Elementary Students in Ahvaz, Southwest of Iran..*Int J Pediatr* 2016; 4(2): 1387-96.
- [25] Gilavand A, Jamshidnezhad A. The Effect of Noise in Educational Institutions on Learning and Academic Achievement of Elementary Students in Ahvaz, South West of Iran. *Int J Pediatr* 2016; 4(3): 1453-63.
- [26] Gilavand A, Espidkar F, Gilavand M. Investigating the Impact of Schools' Open Space on Learning and Educational Achievement of Elementary Students in Ahvaz, Southwest of Iran. *Int J Pediatr* 2016; 4(4): 1663-1670.
- [27] Gilavand A, Gilavand M, Gilavand S. Investigating the Impact of Lighting Educational Spaces on Learning and Academic Achievement of Elementary Students. *Int J Pediatr* 2016; 4(5): 1819-28.
- [28] Gilavand A. The Impact of Educational Furniture of Schools on Learning and Academic Achievement of Students at Elementary Level. *Int J Med Res Health Sci.* 2016; 5(7S): 343-348.
- [29] Gilavand A. Investigating the Impact of Environmental Factors on Learning and Academic Achievement of Elementary Students: Review. *Int J Med Res Health Sci.* 2016; 5(7S) 360-369.
- [30] Gilavand A. The Comparison of Iranian and Foreign Students' Motivations to Choose Dentistry Field of Study. *Int J Pediatr* 2016; 4(6): 1993-2010.
- [31] Gilavand A, Shooriabi M. Investigating the Relationship between Mental Health and Academic Achievement of Dental Students of Ahvaz Jundishapur University of Medical Sciences. *Int J Med Res Health Sci.* 2016; 5(7S): 328-333.
- [32] Gilavand A. Comparison of Interest Rates of Pursuing a specialty among Autonomous Campus with Dentistry Students of Ahvaz Jundishapur University of Medical Sciences. *JundishapurSci Med J* 2016;15(3):347354

- [33] Little J, Falace D, Miller C, Rhodus N. Dental management of the Medical compromised patient. 6th ed. Florida Mosby Co; 2012:398.
- [34] Greenberg MS, Glick M. *Burket's Oral Medicine*, 12th Ed. USA: People's Medical Publishing House; 2012; 732.
- [35] Payne KB, Wharrad H, Watts K. Smartphone and medical related App use among medical students and junior doctors in the United Kingdom (UK): a regional survey. *BMC Med Inform DecisMak.* 2012;12:121.
- [36] Mosa AS, Yoo I, Sheets L. A systematic review of healthcare applications for smartphones. *BMC Med Inform DecisMak.* 2012;12:67.
- [37] Dhuvad JM, Dhuvad MM, Kshirsagar RA. Have Smartphones Contributed in the Clinical Progress of Oral and Maxillofacial Surgery? *J ClinDiagn Res.* 2015;9(9):ZC22-4.
- [38] Senthooor Pandian S, Srinivasan P, Mohan S. The maxillofacial surgeon's march towards a smarter future-smartphones. *J Maxillofac Oral Surg.* 2014;13(4):355-8.
- [39] Baheti MJ, Toshniwal N. Orthodontic apps at fingertips. *ProgOrthod.* 2014;15(1):36.
- [40] Economides AA, Grousopoulou A. Use of mobile phones by male and female Greek students. *International Journal of Mobile Communications.* 2008;6(6):729-49.
- [41] Waldmann UM, Weckbecker K. Smartphone application of primary care guidelines used in education of medical students. *GMS Z Med Ausbild.* 2013;30(1):Doc6.
- [42] deSena DP, Fabricio DD, Lopes MH, da Silva VD. Computer-assisted teaching of skin flap surgery: validation of a mobile platform software for medical students. *PLoS ONE.* 2013;8(7):e65833.
- [43] Glicksman JT, Brandt MG, Moukarbel RV, Rotenberg B, Fung K. Computer-assisted teaching of epistaxis management: a Randomized Controlled Trial. *Laryngoscope.* 2009;119(3):466-72.
- [44] Moulton CA, Dubrowski A, Macrae H, Graham B, Grober E, Reznick R. Teaching surgical skills: what kind of practice makes perfect?: a randomized, controlled trial. *Ann Surg.* 2006;244(3):400-9.
- [45] Tefanidis D, Scerbo MW, Montero PN, Acker CE, Smith WD. Simulator training to automaticity leads to improved skill transfer compared with traditional proficiency-based training: a randomized controlled trial. *Ann Surg.* 2012;255(1):30-7.
- [46] Shooriabi M, Gilavand A, Yazan M. Studying the Necessity for Presenting the Science of Determining the Tooth shade Course in Educational Curriculum in Dentistry Faculties Based on the Evaluation of the Amount of Knowledge and Performance of General Dentists. *Der Pharmacia Lettre.* 2016; 8(13):298-304.