CODEN [USA]: IAJPBB ISSN: 2349-7750

INDO AMERICAN JOURNAL OF
PHARMACEUTICALSCIENCES

http://doi.org/10.5281/zenodo.892396

Available online at: http://www.iajps.com Research Article

EVALUATING THE AWARENESS AND PERFORMANCE RATIO OF DENTAL ASSISTANTS WORKING IN DENTISTRY CENTERS OF THE CITY OF AHVAZ IN SOUTHWEST IRAN, ABOUT INFECTION CONTROL

Mohammad Shooriabi [1], Abdolreza Gilavand[2]*, Seyed Ali Emam[3]

[1] Associate Professor, Department of Oral Medicine, School of Dentistry, Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran.

[*2] Expert on Faculty Appointments, Department of Education Development Center, Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran.

[3] General Dentists, School of Dentistry, Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran

Abstract:

Background and Objective: *Infection control is among the most important priorities of dentistry profession that is related to the health of dentists, assistants, and patients. Thus, this study has been performed in order to evaluate the awareness and performance ratio of dental assistants working in the dentistry centers of the city of Ahvaz in southwest Iran, about infection control in 2015.*

Methods: *In this descriptive-analytical study, 217 dental assistants working in dentistry healthcare centers were selected in a stratified random way. The awareness and performance ratio of dental assistants about infection control was evaluated by research made questionnaire. The data was analyzed by SPSS 21 software.*

Results: *Among the total dental assistants participating in the study, 1.9% were male and 98.1% were female. In respect of workplace, 69% were working in private clinics, 29.6% in personal clinic, and 1.4% in public clinics. From the maximum 20 scores of awareness, 25.9% had the score 8 of awareness, and 24.5% had the score 10 of awareness. The mean score of assistants' awareness has also been 8.69±2.903. There was a positive and significant relationship between the awareness ratio and work experience, and by work experience increase, the awareness ratio increased too. The highest mean of awareness ratio of assistants was in the personal clinics and after it in the private clinics.*

Conclusion: *Considering the low level of dental assistants' awareness and performance about infection control, it is suggested to offer necessary trainings in a more effective way to them in this regard.*

Keywords: *Awareness, Performance, Dental Assistants, Infection Control, Iran.*

Corresponding Author:
Abdolreza Gilavand,
Expert on Faculty Appointments,
Department of Education Development Center,
Ahvaz Jundishapur University of Medical Sciences,
Ahvaz, Iran.
Email: gilavanda@gmail.com

QR code

Please cite this article in press as Abdolreza Gilavand et al, ***Evaluating the Awareness and Performance Ratio of Dental Assistants working in Dentistry Centers of The City of Ahvaz in Southwest Iran, about Infection Control****, Indo Am. J. P. Sci, 2017; 4(09).*

INTRODUCTION:

Cross infection means the transmission of infectious factors in the clinic between the patient and healthcare staff [1]. Those working in the dentistry profession are exposed to high risk of cross-infection by pathogens of blood-borne such as Hepatitis B and C, HIV, Mycobacterium tuberculosis, and other viruses and bacteria colonized in the upper respiratory tract and mouth [2 and 3]. This risk is intensified due to the accidental injuries occurring by dentistry devices while working with them. Such infections can be prevented by performing infection control guidelines and principles appropriately [4]. The prevalence ratio of Hepatitis B and C and HIV in Iran depending on the population under study has been reported differently; for instance prevalence ratio of HIV has been reported zero percent in public population, and 17 percent in injection addicts. The prevalence of Hepatitis B has been reported 0.00% among those working in the healthcare centers and 30.9% among the injection addicts. The prevalence ratio of Hepatitis C has been reported 19% among those working in the healthcare centers, and up to 51% among the injection addicts [5]. According to the medical history and clinical examination, some of these patients might seem healthy; hence, the risk management strategies or standard precautions should not be performed based on the patients' appearance. These infections might be transmitted through direct contact with the blood and secretions of the patient's body, or indirectly by contacting with contaminated devices and surfaces. There is also the transmission risk of some diseases by contacting with infectious aerosols in the clinic air [6]. These are reasons showing that the infection control program should be an inseparable component of dentistry centers in Iran [7]. Most dentists work with their assistants. The duties of dental assistant are extensive and include patient's admission, helping during treatment, and collecting, washing, packaging and sterilizing devices. With all the vastness of duties that the assistants are responsible for, unfortunately unlike other complementary fields of dentistry, such as dental hygienists and dental prosthetics technicians, working in this profession, who need to pass educational course in the university, there is not such a course for dental assistants, and everybody having any educational field and level can be employed in this job. They do not even need to pass preparatory course for this field. In a research in England from 254 dental assistants, 153 people [60 percent] lacked necessary competence and adequacy for this job [8]. In the study of Mutters in Germany, only 5 percent of dental assistants performed the washing hands accurately [9].

Valiollahi et al. performed a research entitled as "The correspondence ratio of public dentistry centers of Tehran with desired criteria of infection control and the factors impacting on it" in 2006. This study was performed on 74 public centers of the south and southwest of Tehran by a list of investigation including 10 axes and 141 indicators of infection control through direct observation, that 16.2 percent of centers were located under expectation limit, 81.1 percent at medium limit, and only 2.7 percent at desirable limit. In this research, having specialty of dentists, their membership in the board of the academic members of university, and the centers being stationed in the university hospitals had significantly role in the centers' trend towards desirability [10]. In the study of Hudson Davies et al. performed in England in 1995, only 12 percent of the employees of dentistry wards had participated in the infection control retraining courses [11].

The field of dentistry is among the most important fields with high applicant volunteers for entering the university in Iran [12-15]. An increase in the infectious and dangerous diseases all over the world has aroused the attention of the people of world, and has made observing special principles essential for all staff working in the healthcare service units. Since infection control is among the most important priorities of dentistry profession that is related with the health of dentists, assistants, and patients, and the awareness ratio of dental assistants with the infection control process has high impact on the promotion of current status towards the desired status, the previous studies about infection control in dentistry in Iran have focused more on evaluating the awareness and performance of dentists or dentistry students in this regard, and no study has been performed to target the assistants yet. The goal of this study is to evaluate the awareness, attitude, and performance ratio of these people about infection control [16-19]. Thus, this study has been performed in order to evaluate the awareness and performance ratio of dental assistants working in dentistry centers of the city of Ahvaz in southwest Iran, about infection control in 2015.

MATERIALS AND METHODS:

This study has been performed descriptively and analytically on 217 dental assistants working in public and private dentistry healthcare centers in the city of Ahvaz, in southwest Iran. The sample size has been performed based on the similar previous studies and the number of dentistry centers of the city of Ahvaz, and by using 95% confidence level, according to the following formulas:

$$n = \frac{z^2_{1-\alpha_{cc}} p_1 - pj}{d^2}$$

$$n = \frac{(1.95)^2 \times 0.5 \times 0.5}{(0.07)^2} = \frac{3.84 \times 0.25}{0.0049} = 193$$

This cross-sectional study was performed in a six months period from October 2015 to March 2016. The list of dentistry centers was inquired from Ahvaz Medical Council, and was considered as a framework for sampling. This evaluation was performed through designing a researcher made questionnaire. The questions of questionnaire had been arranged in three categories. The first part is related to the personal characteristics such as age, gender, work experience years in this job [five questions], the second part is related to the awareness including questions such as using protective devices like gloves, using disinfecting devices, types of the methods of disposing materials and infectious and contaminated devices, and also questions about sterilization of devices [10 questions]. The third part is related to the performance in which questions like vaccination against diseases, referring to the physician after the occurrence of events, the way of washing hands, methods of maintaining and storing devices and other cases that the assistants should implement the answer of these questions in a practical and applied way in their work [10 questions]. The answers to the questions of one to five were given shortly, and the questions 6 to 25 were in multiple-choice form, that for each correct answer one positive score, and for each wrong answer a zero score was considered. If the respondent's score is from zero to five, it was located in the weak group, if it is from six to fifteen, it was located in the medium group, and if it is from sixteen to twenty-five, it was located in the good group. The validity of this questionnaire was confirmed by using the viewpoint of experts such as dentistry specialists and the infectious disease specialists of Ahvaz Jundishapur University of Medical Sciences, and its reliability was proved with 95% Cronbach's alpha coefficient. Awareness means the ratio of theoretical knowledge and information of assistants about infectious diseases transmission and the way of controlling them. Performance means implementing awareness in doing the work. The questionnaires were given to the assistants through attending at public and private healthcare centers and personal clinics of dentists and by coordinating with the managers of these centers to answer the questions lonely in certain time period specified in the answer sheet [25 minutes]. Having collected the responded questionnaires, the data was analyzed by using SPSS software version 21. Moreover, the required ethical considerations such as attracting the satisfaction of those questioned and ensuring them that the confidentiality of their viewpoints in this research has been observed, were given.

RESULTS:

Among the total dental assistants participating in the study, 1.9% were male and 98.1% were female. In respect of workplace, 69% were working in the private clinics, 29.6% in the personal clinics, and 1.4% in the public clinics. The mean of the employment experience of assistants has been 4.235± 2.692 years. The maximum score of awareness was considered 20, that 25.9% had the awareness score of 8, and 24.5% had the score awareness of 10. The mean of the awareness score of dental assistants has also been 8.69±2.903 from total 20 awareness score. About using gloves for washing devices before sterilization 73.1% responded "always", 16.7% responded "sometimes", 6.9% responded "rarely", and 3.2% responded "never". About using mask for washing devices before sterilization 17.1% responded "always", 16.6% responded "often", 70 people [32.4%] responded "rarely", and 33.8% responded "never". About using gowns for washing devices before sterilization 78.7% responded "always", 8.3% responded "often", 5.1% responded "rarely", and 7.8% responded "never". About using eyeglasses for washing devices before sterilization 13.0% responded "always", 8.8% responded "often", 22.7% responded "rarely", and 55.6% responded "never". About performing every three stages of vaccination against Hepatitis B, 120 people [55.6%] responded "no" and 96 people [44.4%] responded "yes". About referring to the physician after being injured by contaminated devices of dentistry, 85.6% responded "no", and 14.4% responded "yes". Among the total dental assistants participating in the study about washing contaminated gowns, 52.3% responded "at home and separated from other clothes", 25.3% responded "in the clinic", 18.5% responded "giving to laundry", and 3.7% responded "at home and along with other clothes". About participating in training program of infection control, 91.7% responded "no", and 7.9% responded "yes". About vaccination against Hepatitis B, 107 people [49.5%] responded "yes", and 104 people [48.1%] responded "no". There was a positive and significant relationship between the awareness ratio and working experience, and by work experience increase, the awareness ratio increased too. The highest mean of awareness ratio of assistants has been in the personal clinics and after it in the private clinics.

Table 1: Demographic Information of Dental assistants under Study

		Frequency	Percent	Reliable Percent
Reliability	Male	4	1.8	1.9
	Female	212	97.7	98.1
	Total	216	99.5	100.0
Missed Data	System	1	0.5	
Total		217	100.0	
Reliability	Single	143	65.9	66.5
	Married	72	33.2	33.5
	Total	215	99.1	100.0
Missed Data	System	2	0.9	
Total		217	100.0	
Reliability	Private clinic	149	68.7	69.0
	Public clinic	3	1.4	1.4
	Personal clinic	64	29.5	29.6
	Total	99.5	100.0	
Missed Data	System	1	0.5	
Total		217	100.0	

Table 2: Determining the Frequency Ratio of Assistants' Awareness about Infection Control

	Awareness Score	Frequency	Percent	Reliable Percent
Reliability	0	2	0.5	0.5
	2	3	1.4	1.4
	4	25	11.5	11.6
	6	27	12.4	12.5
	8	56	25.8	25.9
	10	53	24.4	24.5
	12	42	19.4	19.4
	14	8	3.7	3.7
	16	1	0.5	0.5
	Total	216	99.5	100.0
Missed Data	System	1	0.5	
Total		217	100.0	

responded "no" and 17 people [7.9%] responded "yes" about attending at training program of infection control [3].

According to table 4 there is a positive and significant relationship between awareness ratio and working experience, and by work experience increase, the awareness ratio will increase too.

According to table 2, the best result in the performance section is related to wearing gowns that about 78 percent [170 people] of participants always used gowns when washing devices, while unfortunately only about 12 percent of participants always used eyeglasses when washing devices.

According to table 3 among the total assistants participating in this study, 199 people [91.7%]

Table 3: Attendance Frequency Distribution of Assistants in Training Program of Infection Control

	Type of Answer	Frequency	Percent	Reliable Percent
Reliability	Yes	17	7.8	7.9
	No	199	91.7	92.1
	Total	216	99.5	100.0
Missed Data	System	1	0.5	
Total		217	100.0	

Table 4: Determining the Relationship Ratio of Dental Assistants' Awareness and Their Working Experience

		Work Experience
Awareness Ratio	Pearson's Correlation Coefficient	0.279
	P Value	0.000
	Number	216

Table 5: Descriptive Statistics of Awareness Ratio of Participating Assistants in Term of Workplace

Awareness Ratio	Number	Mean	Standard Deviation	Minimum	Maximum
Private Clinic	149	4.22	1.375	1	8
Public Clinic	3	3.33	2.887	0	5
Personal Clinic	64	4.69	1.511	1	7
Total	216	4.35	1.451	0	8

Table 6: Comparing the Mean of Awareness Ratio of Participating Assistants in Term of Workplace

Awareness Ratio	Total Squares	Degree of Freedom	Mean of Squares	F Statistics	P Value
	12.850	2	6.425	3.110	0.047

According to table 5 the mean of the awareness ratio of assistants in terms of workplace had significant difference [P=0.047], and the highest mean of awareness ratio of assistants has been in the personal clinic, and after it in the private clinic. By using Toki test, it was specified that there is a significant difference between private clinic and personal clinic in respect of the mean of awareness ratio. [P=0.031].

DISCUSSION:

Observing infection control principles in the dentistry causes preservation of patient and dentist against dangerous infectious diseases such as Aids and Hepatitis. Thus, workers in these centers should have proper awareness and performance in this regard.

In some countries, observing infection control principles is not adequate, and employees in the healthcare centers do not have perfect awareness of these principles [17]. It has been reported that the ratio of observing infection control guideline by Asian dentists is low [20]. In Iran, one of the concerns of practitioners and decision makers about oral health policies and issues related to it is to prevent disease transmission, whether from patients to healthcare staff and treatment surrounding, or from healthcare staff or treatment surrounding to the patients. This study helped to make the awareness and performance ratio of dental assistants working in dentistry centers of the city of Ahvaz clear. The mean of the awareness score of dental assistants in this research from total 20 scores of awareness has been 8.69± 2.903. These results show that the awareness ratio of dental assistants working in Ahvaz is low that are similar to the results of previous studies in Iran and correspond with the studies of Ehsanie t al. [16] , Askarian et al. [21] and Ghasemi et al. [23]. In the present study, there was a positive and significant relationship between the awareness ratio, and age and working experience, and by age and working experience increase, the awareness ratio about infection control have increased too, that corresponds with the studies of Valiollahi et al. [9], Razavi et al. [27], Mustafa et al. [15], Hudson Davies et al. [10] Shooriabi et al.[28], and Ebrahimi et al. [17]. It seems that this awareness increase is through learning by trial and error and is transferred through teacher and student method, meaning that the assistants while working during the years of employment asked and learned various issues created for them from the dentists or their colleagues who have experience in this field. It is obvious that this process is not an appropriate way for learning infection control principles by dental assistants.

Hepatitis B is the main cause of acute and chronic liver disease, cirrhosis and Hepatocellular carcinoma in the world, and has been known as an occupational hazard for those working in dentistry centers [25]. The studies in Iran have estimated that the prevalence ratio in some specific populations such as injection addicts reaches 3.2 percent as well. Depending on age, the prevalence ratio changes, and considering the necessity of vaccination of children during the recent years in Iran, the prevalence ratio of Hepatitis B is more in adults [26]. The vaccination of healthcare staff before exposing to the risk is the most effective method of prevention. Although it is strongly recommended by the healthcare organizations in Iran to perform vaccination against Hepatitis B for those working in dentistry environments, this point has not been made mandatory yet legally, and considering that most dental assistants have not

been trained in this regard, this point might be regarded as low importance and fail to perform it. The results of this study showed that only 49 percent of dental assistants have vaccinated against Hepatitis B, while in the study of Qudeimat et al. in Jordan about 87 percent of dental assistants have vaccinated against Hepatitis B [29]. Among the reasons of this difference is the population under study, that in the study of Qudeimat the sample size was very lower [about 25 people] than the present study, and secondly they have performed their study on the assistants working in a faculty of dentistry, that is a limited and scientific environment, and increases the possibility of their participation in the training classes about infection control, and exchanging experiences with each other, while the present study has been performed on those who work in the clinics of the city. In the study of Kakoie [30] in Iran, more than 90 percent of dentists under study have performed vaccination against Hepatitis B. Considering that the Iranian dentists, unlike their assistants are trained under correct methods of infection control while studying, this difference in the two studies is justifiable. Failure to do vaccination against Hepatitis B by more than 50 percent of dental assistants has serious concern, because it means that many of them are vulnerable to HBV infection. Although it is essential that those who work in the healthcare centers have information about their serum status [25], there is disagreement about doing test to investigate antibody against Hepatitis B surface antigen [anti-HBs]. It has been said that the high ratio of seroconversion in a high percent of vaccinated people and the decline in occupational HBV exposure make the necessity of doing this test unessential. A research has also shown that post-exposure testing; Hepatitis B immunoglobulin prescribing in negative responders compared with post-immunization testing, has higher Cost-Benefit [31]. In a study in Canada 72 percent of dentists had information about their serum status after immunization [32], while in a study in Jordan about 57 percent of dentists and 4 percent of dental nurses have performed anti-HBs test, and 48 percent of those who were working in the dentistry centers of Saudi Arabia have not checked their antibody titer against Hepatitis B either [29]. In the study of Kakoie 57 percent of dentists did not evaluate their antibody titer against Hepatitis B, and in the present study 14 percent of dental nurses had not performed antibody titer test [anti-HBs] [30]. The cause of difference in the studies is describable by this fact that in some developing countries, before beginning the work in the dentistry healthcare centers, doing the test is obligatory, while in the developed countries this is not the case; moreover the populations under study in these researches are different from each other. It has also been shown that a high percent of healthcare workers are unaware of the necessity of doing anti-HBs test [18, 25, and 33]. Hence, the required information about the necessity of doing antibody titer test against HBs should be given to people when vaccination. Dental Health Care Personnel [DHCP] should wear gloves when touching devices that are potentially infectious to prevent hands contamination. Although in this study the ratio of using gloves when washing contaminated devices of patients was high [91 percent], and was similar to several resembling studies [3, 4, 18, 34, and 35], the frequency of using mask [34 percent] was low that might be due to the low ratio of awareness of dental assistants about communicability of infectious diseases through aerosols and blood splashes. These results were in line with the research of Qudeimat et al. in Jordan, that in their study about 30 to 40 percent of dental assistants have used mask [29], and also like the study of Alavian [18] on the dentistry students of Tehran, Iran that using gloves had higher frequency than mask. Of course the result of present research in this regard was contrary to the research of Duffy et al. on the Romanian dentists, because the frequency of using mask and eyeglasses is more than using gloves by the Romanian dentists. Only 24 percent of Romanian dentists wear gloves for each patient, and 70 percent of them have used gloves when doing surgical treatments of patients [36]. Numerous infectious factors can contaminate people through air particles in the dentistry centers. It has been stated in the infection control guideline of American Dental Association that the dental assistants should always use mask. Therefore, the dental assistants should be trained about the necessity of using mask in respect of minimizing the airborne infections transmission chance. The use of eyeglasses by dental assistants [22 percent in this study] compared with some studies that had mentioned 59 percent [37], 93 percent [34], 84 percent [4] was completely low, but was similar to the study of Rahman [3], Ebrahimi [17], and Mary [38]. Among the reasons of low use of eyeglasses, in addition to the low awareness, the unavailability of eyeglasses and its cost can be mentioned. American Dental Association has recommended that workers in the dentistry use eyeglasses and shield. Thus, the dental assistants should be encouraged to use eyeglasses while working. The studies have shown that the aerosol and splatter that are the content of infectious pathogens can contaminate the wearing of people working in the healthcare centers [39 and 40] and remain alive for several days. Like the study of Raman et al. [3] and the study of Halboub et al. [33], most of the dental assistants participating in this research [96 percent] were also using gowns when washing contaminated devices. Among the total assistants participating in this study 91.7% responded “no” and 7.9% responded “yes” about attending at training

program of infection control, indicating the lack of appropriate training course about infection control or the lack of adequate awareness about the importance and necessity of infection control in dentistry by the assistants. In the study of Geramipanah et al [2003], 80% of assistants did not pass the oral health course work [41]. In the study of Hudson Davies et al. performed in England in 1995, only 12 percent of employees had participated in the infection control retraining courses [11]. In the study of Valiollahi et al. [2009] the corresponding ratio of employees' training and the patients of centers under study with desirable criteria was 27.1 percent. Also in their research, having specialty of dentists, their membership in the board of the academic members of university, and the centers being stationed in the university hospitals had significantly role in the centers' trend towards desirability [10] that correspond with this research. In the study of Mustafa et al. [2015], 70% of assistants had participated in the training course [24] that does not correspond with this research.

CONCLUSION:

Regarding the low level of awareness and performance of dental assistants about infection control, it is suggested to offer necessary trainings formally and informally more effectively to them in this respect, that in this regard it is necessary that the public centers insert infection control training course in the in-service training courses of employees who are working as dental assistants, and having the certificate in the infection control field should be the condition of employment and using dental assistants in the public and private sections and personal clinics. More attention should also be paid to the people's educational document and profession in employing dental assistants and their vaccination against Hepatitis B, and their continuous evaluation should become obligatory before beginning the work as dental assistant by the universities of medical sciences affiliated to the Ministry of Health and Medical Education, and continuous theoretical and practical training programs should be considered for dental assistants.

Limitations

Among the limitations of this study was to obtain results based on the self-assessment and the viewpoints of participants themselves in the research, while more exact information might be obtained provided that the researcher have referred to the dentistry centers and observed their behavior and actions when working. Therefore, the responses might not be reflecting the real awareness and performance level of assistants, and might be less than the real limit. This ratio of questions cannot show the real awareness and performance of the respondents. Of course it was tried to design questions as minimum as possible, so that the ratio of people's participation in the study increases, that this point seems to have been effective.

Financial support

Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran.

Conflict of interest

The authors declare no conflict of interest.

Acknowledgement

This research was adopted from a thesis written by Seyed Ali Emam, MD student of Dentistry in Ahvaz Jundishapur University of Medical Sciences.

REFERENCES:

1. Yüzbasioglu E, Saraç D, Canbaz S, Saraç YS, Cengiz S. A survey of cross-infection control procedures: Knowledge and attitudes of Turkish dentists. J Appl Oral Sci. 2009; 17 [6]:565–9..
2. Milward MR, Cooper PR. Competency assessment for infection control in the undergraduate dental curriculum. Eur J Dent Educ. 2007; 11 [3]:148–54.
3. Rahman B, Abraham SB, Alsalami AM, Alkhaja FE, Najem SI. Attitudes and practices of infection control among senior dental students at college of dentistry, university of Sharjah in the United Arab Emirates. Eur J Dent. 2013; 7 [Suppl 1]:S15–9
4. de Souza RA, Namen FM, Galan J, Jr, Vieira C, Sedano HO. Infection control measures among senior dental students in Rio de Janeiro State, Brazil. J Public Health Dent. 2006; 66 [4]:282–45.
5. Amiri FB, Mostafavi E, Mirzazadeh A. HIV, HBV and HCV Coinfection Prevalence in Iran-A Systematic Review and Meta-Analysis. PloS one. 2016; 11[3]:e0151946.
6. Singh A, Purohit BM, Bhambal A, Saxena S, Singh A, Gupta A. Knowledge, attitudes, and practice regarding infection control measures among dental students in Central India. Journal of dental education. 2011;75 [3]:421-7.
7. Alshiddi IF. Attitude and Awareness of Dental Students and Interns toward Infection Control Measures in Prosthodontic Clinics. Journal of International Oral Health. 2015;7 [12]:10.
8. John J, Thomas D, Richards D, Evans C. Regulating dental nursing in the UK. British dental journal. 2002; 193 [4]:207-9.
9. Mutters NT, Hägele U, Hagenfeld D, Hellwig E, Frank U. Compliance with infection control practices in an university hospital dental clinic. GMS Hygiene & Infection Control. 2014; 9 [3].
10.Valiollahi S, Anissian A, Dabiran S, Razavi SM. Assessing the compatibility rates of govermentaldentistry centres of Tehran with desireable infection control criteria and the factors involved, 2014. JQUMS. 2009;13 [3]:95-101.

11. Hudson-Davies SC, Jones JH, Sarll DW. Cross-infection control in general dental practice: dentists' behavior compared with their knowledge and opinions.Br Dent J. 1995;178 [10]:365-369.
12. Gilavand A. The Comparison of Iranian and Foreign Students' Motivations to Choose Dentistry Field of Study. *Int J Pediatr*. 2016; 4[6]: 1993-2010.
13. Gilavand A, A Study of Ahvaz Jundishapur University of Medical Sciences Dental Students' Interest to Pursuing a Specialty according to their Demographic Information. Indo Am. J. P. Sci, 2017; 4[06] 1593-1598. doi.org/10.5281/zenodo.819543.
14. Shooriabi M, Gilavand A. Investigating the Use of Smartphones for Learning Purposes by Iranian Dental Students. World Family Medicine. 2017; 15[7]: 48-53. doi: 10.5742/MEWFM.2017.93024
15. 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.
16. Ehsani M, Tabarsi T, Abesi F, Mesgarani Ab, Mohammadi M. Knowledge and attitude of dental students towards infection control in Babol dental school. Journal of Dentomaxillofacial. 2014;2 [3]:21-5.
17. Ebrahimi M, Ajami B, Rezaeian A. Longer years of practice and higher education levels promote infection control in Iranian dental practitioners. Iranian Red Crescent Medical Journal. 2012; 2012 [7, Jul]:422-9.
18. Alavian SM, Mahboobi N, Mahboobi N, Savadrudbari MM, Azar PS, Daneshvar S. Iranian dental students' knowledge of hepatitis B virus infection and its control practices. Journal of dental education. 2011; 75 [12]:1627-34.
19. Askarian m, Assadian o. Infection Control Practices among Dental Professionals in Shiraz Dentistry School, Iran. Arch Iranian Med 2009; 12 [1]: 48 – 51
20. Puttaiah R, Shulman JD,Youngblood D, Bedi R, Tse E,Shetty S, Almas K, Kim BO, Du M.Sample infection control needs assessment survey data from eight countries. Int Dent J 2009;59: 271-6.
21. Askarian M, Mirzaei K, Honarvar B, Etminan M, Araujo MW. Knowledge, attitude and practice towards droplet and airborne isolation precautions among dental health care professionals.in Shiraz, Iran. *J Public Health Dent* 2005; 65: 43-7. [157514 94] [doi.org/10.1111/j.1752-7325.
22. Askarian M, Mirzaei K, McLaws ML. Attitudes, beliefs, and infection control practices of Iranian dentists associated with HIV-positive patients. Am J Infect Control 2006; 34: 530-3.
23- Ghasemi H, Bayat F, Hooshmand B, Maleki Z. Determinants of Iranian dentists' behaviour regarding infection control. Int Dent J 2011;61:85-9.
24. Mustafa EA, Humam AK, Al-Mosuli TA. Evaluation Of Dental Assistant Awareness Concerning Infection Control Policy Of Blood Borne Diseases. Journal of International Dental and Medical Research. 2015; 8 [1]: 21-4.
25. Paul T, Maktabi A, Almas K, Saeed S. Hepatitis B awareness and attitudes amongst dental health care workers in Riyadh, Saudi Arabia. Tropical Dental Journal. 1999:9-12.
26. Poorolajal J, Majdzadeh R. Prevalence of chronic hepatitis B infection in Iran: a review article. Journal of Research in Medical Sciences. 2009; 14 [4]:249-58.
27.Razavi SM, Motaghi A, Sajadi SM, Jahanbakhsh M Evaluation of Infection Control in Dental clinics in Isfahan. Journal of Isfahan Dental School. 2006; 2 [4]: 16-22
28. 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.
29. Qudeimat MA, Farrah RY, Owais AI. Infection control knowledge and practices among dentists and dental nurses at a Jordanian university teaching center. American journal of infection control. 2006; 34 [4]:218-22.
30-Kakoei S, Sheibani G, Mohammadalizadeh S. Awareness and practice of Kerman dentists about B – hepatitis, 2004. J Dent Sch 2007 25[1]: 10
31.Alimonos K, Nafziger AN, Murray J, Bertino JS Jr. Prediction of response to hepatitis B vaccine in health care workers: whose titers of antibody to hepatitis B surface antigen should be determined after a three dose series, and what are the implications in terms of costeffectiveness? Clin Infect Dis 1998; 26: 566-71
32. John M. Hepatitis B immunization and postimmunization serology. JOURNAL-CANADIAN DENTAL ASSOCIATION. 2000; 66[10]:551-3.
33. Halboub ES, Al-Maweri SA, Al-Jamaei AA, Tarakji B, Al-Soneidar WA. Knowledge, attitudes, and practice of infection control among Dental Students at Sana'a University, Yemen. Journal of international oral health: JIOH. 2015;7 [5]:15.
34. McCarthy GM, Britton JE. A survey of final-year dental, medical and nursing students: Occupational injuries and infection control. J Can Dent Assoc. 2000; 66 [10]:561. [PubMed]
35. Ogden GR, Bahrami M, Sivarajasingam V, Phillips G. Dental students' knowledge and compliance in cross infection control procedures at a UK dental hospital. Oral Dis. 1997; 3 [1]:25–30
36-Duffy RE, Cleveland JL, Hutin YJ, Cardo D. Evaluating infection control practices among

dentists in Valcea, Romania, in 1998. Infect Control Hosp Epidemiol 2004; 25[7]:570–5
37.Freire DN, Pordeus IA, Paixão HH. Observing the behavior of senior dental students in relation to infection control practices. J Dent Educ. 2000;64 :352–6
38-Mary NE, Adriane K, Chia S. Infection control knowledge attitudes and practices of dental practitioners in Kampala. African Journal of Dentistry. 2013; 1 [1]: 001-005,
39. Bentley CD, Burkhart NW, Crawford JJ. Evaluating spatter and aerosol contamination during dental procedures. J Am Dent Assoc. 1994; 125 [5]:579–84. [PubMed]
40. Qureshi UM, Siddiqui S, Macfarlane TV. Cross infection: How do dentists change into a clean set of clinical clothing? Health Educ J. 2005; 64:101–109
41. Geramipanah F, Monzavi A. Investigate infection control in dental offices and clinics in the city of Varamin. Journal of Islamic Dental Association of Iran. 2003; 15 [3]: 79-68.