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RESEARCH ARTICLE

Dental Health Care Workers at Cairo Dental Research Center: Do They Need Further Training on Infection Control Strategy to Prevent Viral Hepatitis Transmission

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Abstract

Background: Viral hepatitis is a major global public health problem in Egypt. The national organizations have issued a number of guidelines on proper infection control procedures in dental clinics. The study purpose was to determine the need for further educations and training on infection control guidelines by surveying the practices in infection control among dental health care workers at Cairo Dental Research Center.

Methods: A self-administered questionnaire concerning various aspects of infection control knowledge, attitude, and practices was distributed to twelve dental staff, twenty interns, fifteen dental nurses, and six cleaning staff. The total number was fifty-three participants who are working at Cairo Dental Research Center.

Results: Responses came from fifty-three participants. All tested groups reported 100% routine wearing of gloves. Dental staff (83.3%) and interns (100%) reported a statistically higher frequency of routine mask use. Cleaning staff reported a statistically higher frequency of never washing hands before or after gloving, routine, watches and jewelry wearing (100%). Interns were less prone to percutaneous dental injuries. All dental staff received hepatitis B immunization in comparison with 85% of the interns, 66.7% of the dental nurses and the cleaning staff.

Conclusion: The compliance with international precautions for infection control among dental professionals at Cairo Dental Research Center was a good, while it was a poor among nurses and cleaning staff. There is a necessity for raising awareness, providing periodical training in infection prevention, and further education of dental community especially nurses and cleaning staff to improve their compliance with infection control practices.

INTRODUCTION

A viral hepatitis is a major global public health problem; it is an important cause of morbidity and mortality from its sequelae which include chronic hepatitis, cirrhosis and primary liver cancer (Gunson et al., 2003). The viral Hepatitis B (HBV) and hepatitis C (HCV) are endemic worldwide, with prevalence varying geographically. North

Africa and Middle East are estimated to have high prevalence of hepatitis C viral infection (Lavanchy 2008; Mohd Hanafiah et al., 2013). In Egypt, over 90% of the hepatitis have been reported to be HCV (Ruane et al., 2015; Wantuck et al., 2014). While for hepatitis B virus, Egypt is also considered as a destination which has an intermediate risk for hepatitis B (van Genderen et al., 2012; Guerra et al., 2012). The spread of hepatitis infection in Egypt occurs through iatrogenic sources as blood transfusions, injections, and dental care (Frank et al., 2000; Darwish et al., 2001).

The studies were identified viral hepatitis as an occupational hazard for health care personals when there are unsafe medical practices and a breaking in infection control protocol (Lavanchy 2008; Michelin, and Henderson 2010). The contaminated dental equipment, instruments and environmental surfaces can transmit the disease; the meticulous compliance with dental infection control recommendations is crucial (Radcliffe et al., 2013). The national organizations and regulatory agencies have issued a number of guidelines on proper infection control procedures in the dental clinics. So the aim of the study was to monitor the infection control strategies among dental health care personals at Cairo Dental Research Center to determine if there is need for further educations and training on infection control guidelines.

METHODS:

Between the beginning of January and the end of March 2015, a self-administered, confidential questionnaire concerning various aspects of infection control knowledge and practices was distributed to twelve dental staff, twenty interns, fifteen dental nurses and six cleaning staff who are working at Cairo Dental Research Center. The criterion for the selection of this institution was the easiness of access and gathering data. A participation in this study was voluntary for all participants. Questionnaires with less than 70% of completed answers were excluded. Questionnaires were handed out to the selected professionals with no prior contact between the researcher and professionals. A pilot test was conducted with 10 professionals to assess the validity of the research instrument, followed by obtaining signed consent from study participants. The research project was approved by the Committee for Ethical Research of Faculty of Medicine for Girls, Al Azhar University.

The information gathered in the questionnaires were dealt with the following areas: I) general information of participants: sex, age, period since graduation, specialty in dentistry if present, and years in practice ranged; II) infection control in dental clinics characterized by: a) use of surface protective barriers, b) hand hygiene: washing before and after gloving, washing between patients, and use of hand and fingers jewelry, III) percutaneous injuries; III) vaccination status, post-vaccination testing regarding hepatitis B virus and postural dose.

Data was analyzed by Microsoft Office XP (excel) and Statistical Package for Social Science (SPSS for Windows, SPSS Inc, Chicago, IL) version 10. The parametric data was expressed as mean ± SD, and non parametric data was expressed as number and percentage of the total. Determining the extent that a single observed series of proportions differs from a theoretical or expected distribution was done using the Chi Square test. A probability value of $< .05$ was considered statistically significant.

RESULTS:

The participants' number was fifty-three which is the total number of the dental personals who work at Cairo Dental Research Center. All the members completed the questionnaires (100%). Response for the distributed questionnaire came from twelve (22.7%) dental staff members, twenty (37.7%) interns, fifteen (28.3%) dental nurses and six (11.3%) cleaning staff. Of the twelve dental staff participants, five (41.7%) were males and seven (58.3%) were females; of the interns, twelve (60%) were females; all the dental nurses and the cleaning staff were females (100%). The differences in the ages and genders were statistically significant (Table I).

Table II summarizes the infection control strategies of the hand care and glove-wearing practices among the groups. All the tested groups reported routine gloves wearing except two of the cleaning staff (33.3%) who reported sometimes wearing gloves. The compliance with washing before and after gloving differed among the groups. The dental staff reported a statistically higher frequency of routinely washing hands before and after gloving 58.3% and 41.7% respectively. However, the compliance with changing the gloves between the patients and the routine disposing of contaminated gloves before handling nonclinical items were reported 100% among all the participants. The cleaning staff (100%) wore jewelry on a more regular basis followed by the dental nurses (66.7%), the interns (45%) then the dental staff (33.3); the dental staff reported a statistically higher frequency of always mask use (83.3%) than the dental nurses (66.7%). 33.3% of the dental nurses sometimes wore protective eyewear in comparison with 66.7% of the dental staff and 30% of the interns. Regard to hand watches, rings, and jewelry there was high incidence of wearing them in all the tested groups.

Table III shows the incidence of percutaneous injuries (needle-stick and non needle-stick) occurred in the previous six months to the survey. The dental staff and cleaning staff were more significantly subjected to such injuries than the dental nurses and interns, with ($p < .01$). The incidence of blood splashes to eyes, nose, or mouth during the last six months was incurred more among the dental staff than the interns. Data related to hepatitis B immunization and post-immunization testing are presented in the Table IV. All the dental staff, 85% of the interns, 66,7% of the dental nurses, and 66,7% of the cleaning staff received hepatitis B immunization with significant difference ($p <.01$). The post-immunization testing was higher among the dental staff (58.3%), with only 20% of the interns and 0% of the nurses and the cleaning staff ($p <.01$). The results also revealed that all participants did not received hepatitis B immunization postural dose.

Table I: Demographic data of the participants

Points	Dental Staff	Interns	Dental Nurses	Cleaning Staff	Total	P- value
Number	12(22.7%)	20(37.7%)	15(28.3%)	6(11.3%)	53	
Sex						
Females	7(58.3%)	12(60%)	15(100%)	6(100%)	40(75.5%)	
Males	5(41.7%)	8(40%)	0	0	13(24.5%)	
Age:						
Mean	42.17±10.1035.	22.78±0.72	38.27± 4.54	43.33±10.41	36.64±10.56	< 0.01
Confidence interval	7-48.5	22.4-23.1	35.7-40.7	17.4-29.1	30.7-36.7	
Years in practice:						
Mean	22.42± 9.75	3.00±0.00	20.73±4.08	29.33±7.77	18.87±11.1	< 0.01
Confidence interval	16.2-28.6	3.0-3.0	18.4-22.9	10.3-22.6	11.4-17.7	

Table II: Infection control strategies:

Points	**Dental Staff (n=12)**	**Interns (n=20)**	**Dental Nurses (n=15)**	**Cleaning Staff (n=6)**	***P-value***
Routine use of gloves:					
Always	12(100%)	20(100%)	15(100%)	4(66.7%)	
Never	0%	0%	0%	0%	*< 0.01*
Sometimes	0%	0%	0%	2(33.3%)	
Routine hand washing before gloving :					
Always	7(58.3%)	9 (45%)	2(13.3%)	0	*< 0.01*
Never	3(25%)	3 (15%)	10(66.7%)	6(100%)	
Sometimes	2 (16.7%)	8 (40%)	3(20%)	0	
Routine hand washing after removing gloves :					
Always	5(41.7%)	7(35%)	2(13.3%)	0	*< 0.01*
Never	3 (25%)	10(50%)	7(46.7%)	6(100%)	
Sometimes	4(33.3%)	3(15%)	6(40%)	0	
Changing gloves between patients:					
Always	12(100%)	20(100%)	15(100%)	6(100%)	*< 0.01*
Never	0	0	0	0	
Sometimes	0	0	0	0	
Routine of disposing contaminated gloves before handling nonclinical items:					*< 0.01*
Always	12(100%)	20(100%)	15(100%)	6(100%)	
Never	0	0	0	0	
Sometimes	0	0	0	0	
Routine hand, wrist, and finger jewelry wearing:					
Always	4(33.3%)	9(45%)	10(66.7%)	6(100%)	*< 0.01*
Never	6(50%)	5(25%)	2(13.3%)	0	
Sometimes	2(16.7%)	6(30%)	3(20%)	0	

Points	**Dental Staff (n=12)**	**Interns (n=20)**	**Dental Nurses (n=15)**	**Cleaning Staff (n=6)**	***P-value***
Routine watch wearing:					
Always	10(83.3%)	9(45%)	10(66.7%)	6(100%)	
Never	2(16.7%)	5(25%)	2(13.3%)	0	*< 0.01*
Sometimes	0	6(30%)	3(20%)	0	
Routine wearing of a mask:					
Always	10(83.3%)	20(100%)	10(66.7%)	0	
Never	0	0	5(33.3%)	6(100%)	*< 0.01*
Sometimes	2(16.7%)	0	0	0	
Routine wearing of a protective eyewear:					
Always	4(33.3%)	14(70%)	0	0	
Never	0	0	10(66.7%)	6(100%)	*< 0.01*
Sometimes	8(66.7%)	6(30%)	5(33.3%)	0	

Table III: Incidence of percutaneous injuries and blood splashes among

No. of incidence: **Once or more**	**Dental Staff (n=12)**	**Interns (n=20)**	**Dental Nurses (n=15)**	**Cleaning Staff (n=6)**	**P- value**
Needle-stick injuries	7(58.3%)	7(35%)	4(26.7%)	4(66.6%)	< 0.01
Non-needle-stick injuries	3(25%)	4(20%)	8(53.3%)	2(33.3%)	< 0.01
No percutaneous injuries	2(16.7%)	9(45%)	3(20%)	0	< 0.01
Blood/saliva splashes to eyes, nose, or mouth	9(75%)	3(15%)	2(13.33%)	0	< 0.01

Table IV: Hepatitis B immunization, post-immunization testing status and postural dose

Points	**Dental Staff (n=12)**	**Interns (n=20)**	**Dental Nurses (n=15)**	**Cleaning Staff (n=6)**	***P-value***
Hepatitis B immunization	12(100%)	17(85%)	10(66.7%)	4(66.7%)	< 0.01
Hepatitis B post-immunization testing	7(58.3%)	4(20%)	0	0	< 0.01
Hepatitis B immunization postural dose	0	0	0	0	

DISCUSSION:

Viral hepatitis is arguably the most significant public health problem facing Egypt today; 14.7% of Egyptian has HCV and 2-8% has HBV (Okasha et al., 2015; EL-Shabrawi et al., 2013). Dental health care personals are in close proximity to their patients, and their field is awash in saliva, which is usually contaminated with blood. Many dental procedures also produce aerosolized droplet nuclei, which may remain for a long time in the atmosphere and makes disease transmission is an inherent part of dental practice. The dental care can be provided with a high degree of safety, provided that the tenets of infection control are adhered. This is in agreement of many studies (Kalil et al., 2010; Barakat and El-Bashir 2011; Saleh et al 2008; Dahiya et al., 2015; Thomas et al., 2008).

The National Control Strategy seeks to provide guidance to various government ministries, agencies, and to non-governmental partners to reduce the possibility of cross-infection (Doss et al., 2008). Hand hygiene is one of the simplest and the most important infection control measures (Myers et al., 2008). The results of our study revealed that the compliance with hand washing before wearing gloves is poor among groups although, it is high among the dental staff. This is consigned with findings from previous studies that found that the dentists washed their hands before gloving, and no assistant was found to do that (Myers et al., 2008; Qudeimat, et al., 2006). Routine hand washing after removing gloves was also reported higher in the dental staff. The poor compliance with hand washing in this survey was in agreement with findings of earlier studies (Van de Mortel et al.,2001; Harris et al., 2000).

Old researches reported that a greater number of bacteria has been isolated from rings and watches of oral surgeons (Waterman et al., 2006; Yildirim et al., 2008); a greater reduction in their number are achieved after hand washing without rings Girard (2015). In this study 50% of the dental staff and 25% of the interns never wore jewelry during work; this percent was much lower than that of the dental nurses and the cleaning staff 13.3% and 0% respectively. This is in agreement with studies that found that 66% of dental practitioners remove jewelry before washing their hands which is much higher than that of dental assistants (Field et al., 1996).

The high rate (100%) of routine use of gloves among the study groups indicates a high degree of basic infection control practices at Cairo Dental Research Center. Compliance with routine glove wearing compares favorably with other studies (Qudeimat, et al., 2006). It has been found previously that dental cleaning staff were much less likely to wear gloves routinely than the dental assistants (Qudeimat, et al., 2006). This may explain the results of this study. The compliance with changing gloves between patients was 100%. This is because of the dental staff are responsible for supervising the interns, the nurses, and cleaning staff.

As suggested in the infection control guidelines, dentists and dental assistants should always wear masks and eyeglasses with lateral protective shields (Kohn et al., 2004). There was a very poor compliance to wear the protective eye glasses and face masks between the nurses and the cleaning staff. The interns showed 100% for compliance with wearing face masks and 70% for routine wearing of a protective eyewear. This may be because the rules restrictions are more applied on the interns and they must follow rules. The dental staff reported 83.3% and 33.3% of always wearing of the face masks and protective eyewear, respectively. This is comparable with previous reports of regular wear of masks among dentists (20%-60%) and it is higher than those reported among dental assistants (10%-17%) (Qudeimat, et al., 2006). It was surprising that all the cleaning staff are not using face masks and eye glasses despite they are responsible for cleaning the clinics and collect the wastes. This could explain why there was high incidence of blood or saliva to eyes, nose or mouth.

Needle-stick injuries or other sharp instruments are common in dental practice and can be avoided by using safe work practices and following infection control guidelines (Kuru et al., 2014). A statistically significant difference among the tested groups in the percutaneous injuries was present ($p < .01$). In contrast to 66.6% of the cleaning staff, only 35% of the interns, 26.7%of the nurses 58.3% of the dental staff experienced needle stick injuries within the past 6months. This is lower than the 56% incidence of needle stick injuries reported among 600 general dental practitioners in another study (Qudeimat, et al., 2006). Similarly, the incidence of non-needle percutaneous injuries to dental nurses in the current investigation was statistically significantly higher than that among other groups ($p < .01$). A possible explanation for the dental nurses being more prone to non-needle stick injuries because their duties is cleaning and sterilizing the instruments while the dental staff and the interns are more liable to needle stick injuries because they are more exposed to dental patients.

Immunization remains the most efficient method in health care settings (Qudeimat, et al., 2006). In Egypt, there is no legislation requiring HBV vaccination by medical staff; however, such vaccination is strongly recommended; the most of dental teaching centers provides immunization schedules for Dental health care personals. In the current study, 100% of the dental staff members, 85% of the interns, 66.7% of the dental nurses, and 66.7% of the cleaning staff received HBV vaccination. This is in agreement with previous study which concluded the dentists formed the majority of the vaccinated group, and there was ignorance and less awareness regarding the vaccination among dental nurses and cleaning staff (Reddy et al., 2014). In this survey, the dental staff (58.3%) and 20% of the interns reported knowing their sero-status after immunization while no one of the nurses or cleaning staff know that. This is owing to cost-effectiveness of the post-immunization test where most of dental centers only provide funding for HBV vaccination, and there is no funding or legislation which requires performing this test. This also could be the cause that explain why there is no any one of the participants took postural dose.

CONCLUSION:

In general, the compliance with international precautions for infection control among the dental professionals at Cairo Dental Research Center was a good, while it was a poor among the nurses and the cleaning staff. Routine use of gloves was 100% among tested groups. Hepatitis B immunization was reported by100%of the dental staff, 85% of the interns, and 66.7% of the dental nurses and the cleaning staff. Percutaneous injuries were more frequent among dental nurses, and routine wearing of masks and protective eyewear was poor for all groups. This reveals a necessity to raise awareness and to provide periodical training in infection prevention and further education of the dental community especially the nurses and the cleaning staff to improve their compliance, and efficacy of infection control practices.

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