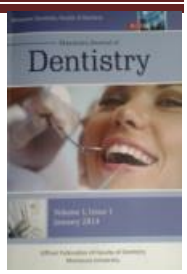
Evaluation of Knowledge, Attitude and Practice of Infection Control principles Among A Sample of Egyptian Dental Students.



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Abstract:

Background: Dental students are at great risk of cross-infection and accidental sharp injuries. Sharp injuries are the main risk for viral infections' transmission such as HBV, HCV, and HIV. The hazard of sharp injuries is generally reduced by following the proper safety measures in clinical training, and student vaccination particularly HBV vaccine.

Aim: this study was conducted to evaluate the knowledge about infectious diseases transmission, HBV vaccination status, attitude, and practice of treating patients with infectious diseases,history of occupational injuries, and post exposure management among 4th and 5th grades dental students in the Faculty of dentistry in both Mansoura and Delta universities.

Method: Atotal of 798 dental students in 4th and 5th grades in both universities were chosen randomly and participated in this cross sectional study. A self-administered questionnaire was designed to evaluate the knowledge, attitude, and practice of dental students toward infectious diseases that transmitted during dental procedures, post exposure management and their vaccination status. After data collection, they were analyzed using (SPSS) program.

Results: Mansoura University students had significantly higher correct knowledge about salivary diseases transmission. As well as, significantly higher percentage of Mansoura dental students (90.1%)were vaccinated against HBV Compared to (82.7%) of Delta dental students.On the other hand, both Mansoura and Delta students had correct knowledge about taking medical history and post exposure management without significant difference between them. Mansoura University students had significantly higher attitude towards treating patientswith infectious diseases (89.5%) in comparison to Delta university students (85.4%). But, they had lower practice.

Conclusion: Dental students in both Mansoura and Delta Universities had lower level of knowledge about salivary diseases transmission. But, the majority of them were vaccinated against HBV. In contrast, they had high knowledge and attitude toward treating patients with infectious diseases but moderate practice.

Key words: Dental students, HBV vaccination, infectious diseases.

Introduction

In dental operatory, dental staff are vulnerable to patient's contaminated saliva and blood during dental practice either by direct or indirect methods. So, this will increase the chances of transmitting countless diseases between dental staff and the patients. Such diseases as hepatitis (HBV and HCV), herpes simplex virus, HIV, mumps, Influenza, and rubella.[1]Also, some developing agents are merged and may be transmitted also during dental practice. These developing agents such as H1N1, H5N1, Ebola, Middle East Respiratory Syndrome-Corona virus (MERS-CoV), and others.[2]

HBV is a great hazard for dental stuff during their dental procedures. It can be transmitted through blood and saliva. Besides, it persists viable on instruments and surfaces for about 7 days if not decontaminated. So, adequate knowledge about HBV infection, its possible methods of transmission, vaccination, and safety precautions during dental practice may prevent the transmission of such infection.[3]

The majority of infections are hidden, and nearly 80% of HBV contagions are not diagnosed.[4] Because dental procedures include frequent use of sharp instruments and invasive techniques, dentists are at risk of accidental injuries.[5]Hence, The safety of dental staff turned into a must.[4]

Avoiding exposure to infections during dental procedures can be achieved by utilizing safety precautions and applying infection control strategies. The main lines of protection are vaccination and correct post-exposure management, as some exposure could not be prevented.[6]Vaccination and post-exposure prophylaxis play a major role in preventing such contagious diseases and HIV infections, correspondingly.[7]

Dental students are practiced at several dental branches during the 4th and 5th grades of their educational course. The concentrated practical training is in the 5th year; since they finish a large number of practical cases as requirements. Hence they are mostly at a high risk of accidental sharp injuries.[8]In addition, they do not have sufficient knowledge and experience like professionals.[2]

To enhance the application of infection control principles among dental students, strict infection control protocol with safety measures must be educated, reinforced, and trained among them.[9]The hazard of sharp injuries can be generally reduced by several measures such as student vaccination, proper safety measures in clinical training, distribution of safety guidelines, and lastly presentation of safer approaches.[8]besides, the correct use of sharp instruments and correct post exposure management.[10]

To our knowledge, there is no published data related to infection control principles among dental students in Egypt. In the light of this lack of data, this study was conducted to evaluate the knowledge about infectious diseases transmission, HBV vaccination, attitude, and practice of infection control measures while treating patients with infectious diseases, history of occupational injuries, and post exposure managementamong 4th and 5th grades dental students in the Faculty of dentistry in both Mansoura and Delta universities using a self-administered questionnaire.

Materials and Methods

Study Setting and sample

A cross sectional study by using a self-administered close ended questionnaire was designed to collect data.This study was carried out in the Faculty of Dentistry in both Mansoura and Delta universities. The study sample included 50% of dental students registered in each 4th and 5th grades in both universities. The dental students were chosen randomly in different dental clinics in the college.

Approvals and ethical consideration:

The approval from the committee of ethics in the Faculty of Dentistry, Mansoura Universitywas first obtainedunder the code (A 01091019). The questionnaire was anonymous to encourage participants to share information and to gain their trust and confidence. There was no need for signing a written consent just returning the filled questionnaire reflected the student's implied consent. After returning the filled questionnaire, data was securely preserved.

The validity and reliability and of the study questionnaire were evaluated through the random distribution of the questionnaire among 50 dental students in both universities to check the clarity and simplicity of the questions. Then, adjust them depending on the feedback prior to the beginning of the study.

The study was carried out at the beginning of the second term of 2019/ 2020 academic year and has been finished on 5th March 2020 just before the crisis of COVID-19. The questionnaires were distributed in person by the researcher. Then, the participants were asked to fill in the questionnaire in the clinics and lecture halls within 10-15 minutes. Intern dentists and dental students in the 1st, 2nd, and 3rd grades were excluded from the study.

Questionnaire:

A self-administered questionnaire based on a literature review [10-12] was designed to collect information about the knowledge of salivary diseases transmission, HBV vaccination status, and exposure to infectious diseasesamong 4th and 5th grades dental students in the Faculty of Dentistry, Mansoura and Delta universities. The questionnaires were written and distributed in the English language. The uncompleted questionnaires were excluded.

It was formed of 14 close-ended questions distributed into 3parts; the first part: Demographic data questions about student (gender, Academic year and university). The second part was about knowledge of salivary diseases transmission and vaccination status questions. The third part was about knowledge and attitude and practice of treating patients with infectious diseases, history of occupational injuries, and post exposure management.

Statistical analysis:

The data was analyzed and tabulated using the Statistical Package of Social Science (SPSS) program for Windows (Standard version 24). A one-sample Kolmogorov-Smirnov test was used first to check the normality of data.

Numbers and percentage were used to express qualitative data. Chi-square test of significance was used to investigate the association between categorical variables.Mean ± SD (standard deviation) were used to express the Continuous variables for normally distributed data.The student *t* test was used to compare the overall knowledge, attitude, and practice scores of the two groups. While Pearson correlation was used to correlate knowledge, attitude, and practice scores.

When ($p \leq 0.05$), the results were considered significant. The lesser the p-value obtained, the higher significant were the results.

Results

The total study sample was 798 participants selected randomly from 4th and 5th grades dental students. An overall number of 497 dental students were selected from Mansoura University and the rest 301 dental students were selected from Delta University. The study sample represented about 50% of the students registered in each 4th and 5th grades in each universities.

The data about gender and academic year distribution of the study groups was illustrated in table (1). Females showed elevated numbers in all the study participants. In both Mansoura and Delta Universities the uppermost numbers was related to both females and 4th grade students without any significant difference.

Table (1): Gender and academic year distribution of the studied groups

Socio-demographic data	Total (N=798) n (%)	MU (N=497) n (%)	DU (N=301) n (%)	Test of significance	P value
Gender					
Male	320 (40.1%)	188 (37.8%)	132 (43.9%)	χ^2=2.83	0.092
Female	478 (59.9%)	309 (62.2%)	169 (56.1%)		
Academic Year					
4th grade	402 (50.4%)	252 (50.7%)	150 (49.8%)	χ^2=0.057	0.812
5th grade	396 (49.6%)	245 (49.3%)	151 (50.2%)		

*MU: Mansoura University, DU: Delta University, N: total number of students, n: number of students, %:the percentage, χ^2 : Chi square test, *significant p ≤0.05*

Vaccination status:

a) knowledge

The correct knowledge aboutsalivary diseases transmission among Mansoura and Delta dental students was illustrated in Table (2). The highest reported correct knowledge among the total number of students was about Hepatitis B transmission (52.0%) followed by Tuberculosis (42.4%). Significantly higher percentage of Mansoura University students had correct knowledge about Tuberculosis transmission via saliva (47.1%) compared to (34.6%) of Delta University students (P=.001). There was no significant difference between them regarding Hepatitis B virus transmission via saliva.

Table (2) Correct knowledge of Mansoura and Delta dental students regarding salivary diseases transmission

	Total (N=798) n (%)	MU (N=497) n (%)	DU (N=301) n (%)	χ^2	P value
Salivary diseases transmission					
Hepatitis B	415 (52.0%)	264 (53.1%)	151 (50.2%)	0.655	0.418
AIDS	170 (21.3%)	104 (20.9%)	66 (21.9%)	0.112	0.738
Tuberculosis	338 (42.4%)	234 (47.1%)	104 (34.6%)	12.06	**0.001***
Hepatitis C	123 (15.4%)	57 (11.5%)	66 (21.9%)	15.72	**≤0.001***
I don't know	111 (13.9%)	77 (15.5%)	34 (11.3%)	2.75	0.097

*MU: Mansoura University, DU: Delta University, N:total number of students, n : number of students, %:the percentage, χ^2 : Chi square test, *significant p ≤0.05.*

Hepatitis B vaccination status among dental students in Mansoura and Delta Universities was illustrated in table (3). A total of 697 students (87.3%) in both universities were vaccinated. Significantly higher percentage of Mansoura dental students (90.1%) were vaccinated and (79.7%) of them completed the 3 doses compared to (82.7% and 62.8%)of Delta dental students respectively, (P =.002 and ≤0.001).

Table (3) Hepatitis B vaccination among dental students in Mansoura and Delta Universities.

Hepatitis B vaccine	**Total (N=798) n (%)**	**MU (N=497) n (%)**	**DU (N=301) n (%)**	χ^2	**P value**
vaccinated students	697 (87.3%)	448 (90.1%)	249 (82.7%)	9.33	0.002*
No. of doses				27.45	≤0.001*
0	101 (12.6%)	49 (9.7%)	52 (17.6%)		
1	27 (3.4%)	12 (2.4%)	15 (5.0%)		
2	85 (10.7%)	41 (8.2%)	45 (14.6%)		
3	585 (73.3%)	395 (79.7%)	189 (62.8%)		

*MU: Mansoura University, DU: Delta University, N: total number of students, n: number of dental students, % the percentage, χ2 : Chi square test, *significant p ≤0.05.*

Knowledge, attitude, and practice of Mansoura and Delta dental students regarding exposure to infectious diseases was presented in table (4). The majority of dental students in both universities (94.7%) knew that medical history should be taken for all patients. However, a total of (78.3%) of Mansoura and Delta University students had correct knowledge about the steps of post exposure management.Delta University students showed significantly lower positive attitude toward evaluating patient general health before dental care (92.4%), and treating patients with infectious diseases (85.4%), in comparison to (98.4%, and 89.5%) ofMansoura University students respectively, (P ≤0.001, and=0.017). However, Delta University students significantly evaluated their patients' general healthbefore treatment and protecting their injuries by dressing (82.7%, 68.4%) compared to (72.6% and 57.5%) of Mansoura University students, respectively, (P=0.005, and ≤0.001).

Table (4)Knowledge, attitude, and practice of Mansoura and Delta dental students concerning exposure to infectious diseases.

Knowledge questions	Total (N=798)		MU (N=497)		DU (N=301)		P value
	Correct n (%)	Incorrect n (%)	Correct n (%)	Incorrect n (%)	Correct n (%)	Incorrect n (%)	
Infectious diseases							
Taking medical history	756 (94.7%)	42 (5.3%)	470 (94.6%)	27 (5.4%)	286 (95.0%)	15 (5.0%)	0.783
Post exposure management	625 (78.3%)	173 (21.7%)	389 (78.3%)	108 (21.7%)	236 (78.4%)	65 (21.6%)	0.964

Attitude	Total			MU			DU			P value
	Agree n (%)	Uncertain n (%)	Disagree n (%)	Agree n (%)	Uncertain n (%)	Disagree n (%)	Agree n (%)	Uncertain n (%)	Disagree n (%)	
Infectious diseases										
Evaluating patient's general health	767 (96.1%)	28 (3.5%)	3 (0.4%)	489 (98.4%)	8 (1.6%)	0(0%)	278 (92.4%)	20 (6.6%)	3 (1.0%)	≤0.001*
Treating patients with infectious diseases	702 (88.0%)	77 (9.6%)	19 (2.4%)	445 (89.5%)	46 (9.3%)	6 (1.2%)	257 (85.4%)	31 (10.3%)	13 (4.3%)	0.017*

Practice	Total			MU			DU			P value
	Always n (%)	Sometimes n (%)	Never n (%)	Always n (%)	Sometimes n (%)	Never n (%)	Always n (%)	Sometimes n (%)	Never n(%)	
Infectious diseases										
Evaluating patient general health	611 (76.5%)	171 (21.4%)	16 (2.0%)	361 (72.6%)	126 (25.4%)	9 (1.8%)	249 (82.7%)	45 (15.0%)	7 (2.3%)	0.005*
Protecting injuries by dressing	49.4(62%)	230 (28.8%)	74 (9.3%)	286 (57.5%)	175 (35.2%)	35 (7.0%)	206 (68.4%)	55 (18.3%)	39 (13.0%)	≤0.001*

		Yes	No		Yes	No		Yes	No	P value
Treating patients with infectious diseases	Total	637 (79.8%)	161 (20.2%)	MU	387 (77.8%)	110 (22.1%)	DU	250 (83.0%)	51 (16.9%)	0.076
Having history of sharp injury		252 (31.5%)	546 (68.5%)		154 (30.9%)	343 (69.0%)		98 (32.3%)	203 (67.7%)	0.691

MU: Mansoura University, DU: Delta University, N: total number of students, n: number of students, %:percentage, *significant p≤0.05. Data was analyzed by using X2 test of significance.

Discussion:-

This study was performed to evaluate the knowledge about infectious diseases transmission, HBV vaccination, attitude, and practice of treating patients with infectious diseases, history of occupational injuries and post exposure managementamong 4th and 5th grades dental students in the Faculty of dentistry in both Mansoura and Delta Universities, Egypt. As, Dental students will become dentists. They will work in dental clinics and offering dental services to their patients in the future. They will apply what they have learned in infection control during their educational course in dentistry.[13]

Dental students are prone to hepatitis B Viral infection from their occupation. Hence, It is mandatory for them to have adequate knowledge about its methods of transmission.[14]

In the current study, about half of the students in Mansoura and Delta Universities recognized that Hepatitis B infection has the highest rate of transmission by saliva.

This is a reflection of inadequate knowledge about diseases transmitted by saliva among dental students in both Universities. This may be due to the deficiency of priodic health educational programs for dental students in order to be up to date with the diseases that could be transmitted during their dental work.[15]

The results of current study are lesser than those found by Alavian et al (2011)[3] in Iran and Madiba et al (2018)[16] in South Africa where about (81.7% and 72%) of dental students, respectively stated that HBV can be transmitted by saliva. However, another study conducted among dental students in Saudi Arabia by Al-Shamiri et al (2018)[17] revealed that only (42.5%) knew that saliva can transmit HBV which is slightly lower than the current findings.

Dental students are at higher risk of infections particularly the serious HBV infection which transmitted through blood and body fluids including saliva.[18]Most participants in the current study received HBV vaccination as well as, but not all of them have completed the full vaccination course. Significantly higher percentage of Mansoura University students was vaccinated compared to Delta University students.

The high percentage of HBV vaccination in the study may be because some Universities provide an immunization plan for dental students as a part of the infection control programs. As, they believe that vaccinations are an important part for prevention of occupational infections.[18]

Some Universities suggest that dental students should be fully vaccinated for hepatitis B during their clinical training in the school of dentistry.[14] Particularly in Egypt where HBV infection is considered moderate endemic disease and infects about 4% of the total population.[19]

These results are much higher than those reported by Bansal et al (2013)[20] in which only half (52.5 %) of undergraduate dental students in Haryana were vaccinated against the hepatitis B virus. However, the present finding is similar to a study performed in Nepal by Battarai et al (2014)[21] in which (86.5%) of dental students were vaccinated against Hepatitis B and (83.7%) had completed the three doses. In addition, a study conducted among dental students in Saudi Arabia where most participants (91.4%) had received HBV vaccine.[17]

In the current study, although a high ratio of dental students knew that medical history should be taken for all patients and had a positive attitude toward patient' general health evaluation. A lower ratio of dental students in Mansoura and Delta Universities actually evaluated their patient general health before dental care. This gap between their knowledge, attitude, and practice among dental students might be because of the limited time of training sections and they work on patients without any assistance. So, they focused on patient treatment rather than taking medical history.

The present findings are lower than that reported in a study carried out among dental students in India by Malhotra et al (2017)[22] in which (100%) of dental students asked their patients about medical history.Also, another study conducted at Riyadh, Saudi Arabia by Binalrimal et al (2019)[4]where (99%) of males and (98%) of female students were evaluating their patients' general health by taking medical history.

On the other hand, mostdental students in the two Universities had a positive attitude toward treating patients with infectious diseases. This may be attributed as they considered it humanitarian and they may have an academic and practical background in the personal protection while treating such patients.[23]

These outcomes are in agreement with studies performed by De Souza et al (2006)[24] and Wu et al (2016)[25] in which (87.8% and 86%) of dental students, respectively were willing to treat patients with infectious diseases and felt it morally. A study conducted by saquip et al (2019)[26] showed a slightly higher percentage (91.7%) of dental students had an ethical responsibility to treat patients with HBV infections.

However, these findings were in disagreement with other studies carried out by Al-Maweri et al (2015)[23] in Saudi Arabia and Halboub et al (2015) [27] in Yemen who reported that (55.7% and 45.1%) of dental students respectively showed positive attitude toward treating patients with infectious diseases which was much lower than the current findings.

Dental students are vulnerable to accidental exposure to manyinfectious diseases during their work despite using of safety precautions.[28] About one third of Mansoura and Delta students in the present study had a history of sharp injuries. This is may be attributed to insufficient skill and experience and lack of time[28] Moreover, dental students are working in a limited operational field with different types of sharp instruments.[27] Those sharp injuries may be due to deficient knowledge about handling such sharps besides absence of injection safety facilities.

These findings are in line with a study investigated the infection control measures among dental students in Brazil which found (31.1%) of the participants had a history of needle stick injuries.[24] Other similar studies performed by Mungure et al (2010)[29] and Al-Maweri et al (2015)[23] revealed that (29% and 33.5%) of dental students, respectively had suffered from occupational injuries.

On the contrary, other studies by McCarthy and Britton (2000)[30] in Canada, Myers et al (2012)[28] in Columbia, and Halboub et al (2015)[27] in Yemen reported that (82%, 68.3%, and 62.8%) of dental students respectively had accidental percutaneous injuries while treating their patients which is far away from the present finding.

The proper post exposure management after (NSIs) starts from the immediate and correct care of the unsterile wound.[30] Elevated percentage of dental students in Mansoura and Delta Universities knew the correct post exposure management by washing the wound with detergent and water. This result indicates the students' awareness about the danger of (NSIs) and diseases that could be transmitted through it. But, they need more reinforcement by educational approaches for the risk of occupational injuries during their clinical practice and the hadzards of blood borne infection transmission. Besides, the incorporation of management programs after exposure to occupational injures.[24]

This is consistent with a study conducted by Machado et al (2007)[31] in which (74.9%) of undergraduate dental students in Brazil washed their wound by soap and water immediately after occupational exposure.But it is rejected by another study conducted by Sofola et al (2007)[32] among Nigerian dental students that showed that over (90%) of the students were not aware of the correct post exposure procedures, and (46%) of students washing their wounds with water only. However, a study by Myers et al (2012)[28]evaluated the knowledge and attitude of dental students toward occupational exposure in Columbia reported that only (44.2%) of dental students washing their wound with soap and water.

the current study collected valuable information concerning the awareness, beliefs, and practices of treating patients with infectious diseases, post exposure management, and vaccination status among Egyptian dental students.

Conclusion:-

Dental students in both Mansoura and Delta Universities had lower level of knowledge about salivary diseases transmission. But, the majority of them were vaccinated against HBV. In contrast, they had high knowledge and attitude toward treating patients with infectious diseases but moderate practice.

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