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The Assessment of Infection Control Measures in Dental Clinics Primary Health Care , Bilqas, Dakahlia

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ABSTRACT

Background: The emergence of life-threatening infectious diseases demands the implementation of efficient infection control practices in health care facilities. Failure to adhere to such infection control measures may lead to the spread of pathogens and microorganisms which damage the health of both the healthcare personnel and the community in general.

Objectives: This study aimed to assess the practices of infection control procedures among dental staff through the application of a health education program.

Subjects and methods: It was an intervention study conducted at a dental clinic at Bilqas District in Dakahlia Governorate to assess the knowledge and attitude of staff concerning infection control practice. The study included the doctors and nurses (20 dentists and five nurses) working in the clinic.

Results: The results of the study revealed that there was a highly significant increase in infection control measures score and the total score; also, there was a significant increase in occupational safety measures score and waste disposal score after the intervention.

Conclusion: The infection control measures implemented by health care providers in their dental practice were effective. Hence, it is necessary to educate, raise awareness of professionals, and promote constant updating courses on procedures aiming at improving safety in the dentistry practices.

Keywords: Cross-infection, Infection control, Practices, Medical Waste, Dentist Role

INTRODUCTION

Patient safety is a vital medical discipline that targets improving the quality of patient care, minimizing treatment errors, and ensuring safety. Infectious diseases represent a public health concern that challenges health care systems in many countries. Dental care is not free from risk [(1)].

The role of infection control is to eliminate the transfer of microorganisms which may be accomplished in several methods. These methods include the use of personal protective equipment, immunization of dental healthcare workers against the infectious disease of concern, correct cleaning, and disinfection of surfaces and instruments, and proper technique for handling sharp instruments [(2)].

Bacterial, fungal and some viral infections can be completely avoided if strict infection control measures are followed. About 36% of these infections are preventable through the adherence to strict guidelines by healthcare workers when providing dental services to patients [(3)]. Thus, this study aimed to assess the practices of infection control among dental staff after the application of a health education program.

METHODOLOGY

An intervention study was carried out between August and December 2019. The participants were doctors and nurses who work at dental Clinics in the Primary health care centers (PHC) at Bilqas District. Lists of all dental clinics in the PHC in Bilqas District were identified **(**20 clinics**)**. All Dental staff were invited to participate in the study. The total number of dentists was 20, all of whom agreed to participate; there were only five nurses specialized in dental care and they consented to participate in the study. The participants were asked to fill in a questionnaire. The pre-structured questionnaire included:

1. **Personal and occupational data** of the dentists: These data comprised age, sex, residence, marital status, qualification, and the number of years of dental practice.

2. Pattern of practice: This item was concerned with the medical practice of dentists like the number of working hours per day, the number of patients seen daily.

The second tool was a valid and reliable observation checklist for practice assessment adopted from The United States Department of Labor's Occupational Safety and Health Administration (OSHA) regulations and recommendations of the Egyptian Central Dentistry Administration. The occupational checklist was formed of three main

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parts: Occupational safety measures (10 items with scores of 14), infection control measures (7 items with scores of 14), and dental waste management (one item with scores of two) [10, 11].

The Intervention program was performed over eight sessions; each session was provided once a week and lasted for two hours. The intervention was completed in two months. The program employed PowerPoint presentations and used booklets that included data concerning infection control.

Two posters were used to visualize the information to the participants: the first presented the steps of handwashing, and the other was about how to correctly remove gloves after work. Both posters were hung on the walls of each in the health unit.

All recruited participants received comprehensive information regarding the objective and the expected benefit of the study. All ethical considerations were taken throughout the whole work.

Ethical Consideration:

All participants signed informed written consent to take part in the study. Permission from the Faculty of Medicine Ethical Committee was also obtained, **and approval from the institutional review board was taken.**

An official written administrative permission letter was obtained from the Manager of Menoufia Health Governorate and the Manager of Bilqas Health District.

Statistical analysis

Analysis of data was conducted using the Statistical Program for Social Sciences version 20 (SPSS Inc., Chicago, IL, USA). Descriptive and inferential statistics were prepared. Chi-square test was conducted to determine the associations between the categorical variables, while the Fisher test was used to compare two groups of qualitative data with the expected value of one cell <5, and finally, the student T-test was used to compare the means of two groups of parametric continuous data. All p-values less than 0.05 were considered statistically significant.

RESULTS

The participating dental health care providers where characterized as follows: 44% of whom were not specialized, 36% had specialty degrees of Diploma, Masters, or MD, and 20% were nurses. Besides, most of the participants lived in urban sites. The percentage of males 64% while the percentage of females was 36%. The average duration of accumulative work in practicing dentistry was 14.1 years.

Table 1 shows that the mean of daily working hours is 6.3 with an SD of 2.2. Almost half of the studied health care providers kept medical records of their patients. Fifty-eight percent of them reviewed and updated their patients' records frequently. In 69.8% of these records only past medical history was recorded. However, 96% of the studied health care providers gave antibiotics for patients who had rheumatic fever before examination or any intervention while 4% of them never did so.

As shown in **Table 2,** there was a significant change in all items of occupational safety measures. There was also a significant change in all items of infection control measures except for "using boiling method and management of compromised patients before examining them" as presented in **Table 3.** There was a significant change in dental waste disposal after the intervention **(Table 4)**.

However, no significant relationship was between the qualification of the participating care providers and the mean score of occupational safety, infection control measures, and waste disposal before intervention as shown in **Table 5.**

Table (1): General characteristics and medical practice pattern of the studied health care providers

A. General characteristics of health care providers	Distribution	
Age in years ($\bar{X}$ ± SD)	38.4 ± 10.1	
Years of practice ($\bar{X}$ ± SD)	14.1 ± 9.3	
Sex	No.	%
• **Male**	16	64
• **Female**	9	36
Residence		
• **Urban**	15	60
• **Rural**	10	40
Practice pattern		
Working hours/day ($\bar{X}$ ± SD)	6.3 ± 2.2	
Keeping patients' medical records		
• **Yes**	11	44
• **No**	14	56
Main items in these records		
• **Infectious diseases**	1	2.3
• **Past medical history**	30	69.8
• **Full medical history**	12	27.9
Frequencies of records reviewing and updating		
• **Never**	9	20.9
• **Occasionally**	9	20.9
• **Always**	25	58.1
Giving antibiotic before examination of those patients have RH fever or posses artificial valves		
• **Yes**	24	96
• **No**	1	4
Qualification		
• **B.Sc**	11	44
• **Post-graduation studies**	9	36
• **Nurses**	5	20

Table (2): Response of the studied participants towards some occupational infectious hazards

	Pre-intervention		Post-intervention		X^2	P-value
Occupational infectious hazards	**No**	**%**	**No**	**%**		
Uses of barrier protection Mask					19.0	<0.001*
No	5	20.0	0	0.0		
Occasional	15	60.0	5	20.0		
Always	5	20.0	20	80.0		
Uses of barrier protection Gloves					20.54	<0.001*
No	4	16.0	1	4.0		
Occasional	16	64.0	3	12.0		
Always	5	20.0	21	84.0		
Uses of barrier protection Eyewear					6.10	0.047*
No	14	56.0	7	28.0		
Occasional	8	32.0	8	32.0		
Always	3	12.0	10	40.0		
Uses of barrier protection Protective clothes					10.1	0.006*
No	18	72.0	8	32.0		
Occasional	4	16.0	4	16.0		
Always	3	12.0	13	52.0		
Hand washing					Fisher	<0.001*
Yes	10	40.0	22	88.0		
No	15	60.0	3	12.0		
Dealing with all specimens as infectious					Fisher	<0.001*
Yes	2	8.0	23	92.0		
No	23	92.0	2	8.0		
Dealing with all patients as infectious.					Fisher	<0.001*
Yes	16	64.0	25	100.0		
No	9	36.0	0	0.0		
Dentists seeking for evaluation after the exposure incident					3.33	0.06
Yes	15	60.0	25	100.0		
No	10	40.0	0	0.0		
Dealing with sharp objects					Fisher	0.148
Thrown in the trash basket	10	40.0	0	0.0		
Discarded in a leak-proof container or burned	15	60.0	25	100.0		
Vaccination against HBV					6.87	0.008*
Yes	11	44.0	20	80.0		
No	14	56.0	5	20.0		

Table (3): Response of the studied participants towards infection control measures

	Pre-intervention		Post-intervention		X^2	P-value
Infection control measures	**No**	**%**	**No**	**%**		
Using disposable instruments					6.65	0.009*
Yes	10	40.0	19	76.0		
No	15	60.0	6	24.0		
Using chemical disinfections +(hot oven or autoclave)					5.12	0.023*
Yes	9	36.0	17	78.0		
No	16	64.0	8	32.0		
Using a hot oven or autoclave					3.94	0.047*
Yes	10	40.0	17	78.0		
No	15	60.0	8	32.0		
Using chemical disinfection					Fisher	0.002*
Yes	17	78.0	25	100.0		
No	8	32.0	0	0.0		
Using the boiling method					Fisher	0.312
Yes	24	96.0	25	100.0		
No	1	4.0	0	0.0		
Management of compromised patients before examining them					0.08	0.776
Yes	14	56.0	13	52.0		
No	11	44.0	12	48.0		
Changing gloves between patients					Fisher	<0.001*
Yes	5	20.0	25	100.0		
No	20	80.0	0	0.0		

Table (4): Response of the studied participants towards dental waste disposal

	Pre-intervention		Post-intervention		X^2	P-value
Dental waste management	**No**	**%**	**No**	**%**		
Dental waste management:					15.07	0.005*
Incinerated in the hospital incinerator	10	40.0	23	92.0		
Burned by the dentist in the open air	7	28.0	1	4.0		
Going with ordinary trash.	8	32	1	4.0		

Table (5): The mean score of occupational safety, infection control measures, and waste disposal before and after intervention:

	Pre-intervention N=25		Post-intervention N=25		Paired t.test	P-value
Occupational safety measures Upper score = 14points	8.2	± 2.5	11.0	± 1.7	9.4	0.002*
Infection control measures Upper score = 14 points	7.9	± 1.96	11.2	± 2.7	11.3	<0.001*
Waste disposal Upper score = 2 points	0.25	± 0.05	1.16	± 0.19	6.01	0.04*
Total score Upper score = 30 points	15.7	± 3.6	23.4	± 3.6	10.8	<0.001*

DISCUSSION

The dental clinic offers an environment where disease transmission may easily transfer to patients and dental health care providers. Prevention of cross-infection in the dental clinic is, therefore, a crucial aspect of the dental practice, and dental clinic workers should adopt certain basic routines during the dentistry practices. Some of the infections that dental health care professionals (DHCPs) are at risk of may be caused by various microorganisms such as mycobacterium tuberculosis, hepatitis B and C viruses, staphylococci, streptococci, herpes simplex virus types, human immunodeficiency virus (HIV), mumps, influenza and rubella [(4)].

This study aimed to improve the standards of dental care quality of infection control performance at dental Clinics at Bilqas District.

This was an intervention study that was conducted at Dentist Clinics at Bilqas District where 20 doctors and five nurses who worked in dental clinics participated in the study.

In the present study, we assessed the general characteristics of the studied health care providers and revealed that 44% of them were not specialized, 36% have specialty degrees of Diploma, Masters, or MD, and 20% were nurses. It was also revealed that the majority of the participants lived in urban sites. Averagely, the participated dentists and dental nurses practiced dentistry for almost 14.1 years in the time of conducting the study.

Unlike the findings of the study conducted by **Matsuda *et al.*** [(5)] in which 614 dental surgeons were surveyed and reported that 70.36% were female, the mean age was 34 years, and 46.58% had been practicing dentistry for ten years or more. The majority (54.72%) had postgraduate training, with specializations mainly on endodontic (18.90%) and dental implant (12.93%). A high percentage (87.30%) performed surgical dental procedures; 46.34% of professionals assisted patients from the public sector and both private and health insured patients; 44.67% provided care to private patients only, 6.66% worked at the public sector, and 2.33% with health plans.

As per the relationship between levels of health care providers' awareness of cross-infection control and the changes in dental practice, the present study revealed that studied health care providers reported an improvement in their awareness towards cross-infection control in the past years.

About half of the studied health care providers spent more time with each patient as well as between patients due to employing more cautious, protective infection control measures. However, 74% of the studied health care providers claimed that the fees per patient did not change.

This finding is in line with that of the study by **Dagher *et al.*** [(6)] reported that less than 5% of the surveyed dentists were considered to have excellent levels of compliance and spend more time with each patient as well as between patients due to using more protective procedures and infection control measures, while approximately 27% and 35% of the respondents had fair or poor compliance scores, respectively. The level of compliance was not significantly affected by the sociodemographic and professional variables.

On the other hand, the present study revealed that there was a highly significant increase in infection control measures score and total score in the studied health care providers, also there is a significant increase in occupational safety measures score and waste disposal score after the intervention.

This seems in contrast with the findings of **Gichuhi *et al.*** [(7)] who reported that the overall compliance level to infection control measures was likely to be average with a mean score of 60.8% for the hospital. Adequately implemented infection control policy guidelines were handwashing, decontamination, sterilization (autoclaving), and waste management. Inadequately implemented IPPC policy guidelines were high-level disinfection, standard procedure, and housekeeping.

Regarding the qualifications of the studied Health care providers and its effect on the mean score of occupational safety, infection control measures, and waste disposal according to intervention, the present study revealed that there is no significant correlation between the qualification of the studied Health care providers and its effect on the mean score of occupational safety, infection control measures and waste disposal neither before nor after the intervention. Our findings are in line with those from the studies of **Dagher *et al.*** [(6)] and **Vega *et al.*** [(8)]. which revealed that there is a lack of significant differences between specialists and general practitioners It should be noted however that the present study did not attempt to identify the type of specialty e.g., oral surgery, orthodontics, periodontics, etc.) practiced in the surveyed sample. Oral surgery specialized dental practices may implement stricter infection control measures than other specialties or general dentistry-practicing clinics [(9, 10, 11)].

CONCLUSION

Considering the initial proposal and the results obtained, we can conclude that infection control actions implemented by dental health care providers in this due to this intervention were effective. It is necessary to educate dental professionals and raise their awareness of infection control measures.

Additionally, promoting constant updating courses on procedures aiming at improving safety in the dentistry practice is necessary for the sake of both dental health care providers' and patients' safety.

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Author Consent and Conflict of interest:

We hereby confirm that there have been no known conflicts of interest associated with this publication, and there has been no significant financial support for this work that could have influenced its outcome.

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