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ASSESSING "INFECTION CONTROL" MEASURES BETWEEN DENTAL LABORATORY TECHNICIANS IN TRIPOLI CITY DURING COVID-19 PANDEMIC

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Abstract

Statement of problem: As a dental healthcare team, we are exposed to many sources of infection. Dental laboratories play an important role in cross-contamination through their handling of contaminated impressions and dental prostheses. **Introduction:** The dental laboratory personnel are at risk of contracting infection from a variety of microorganisms, including the covid-19 virus. To prevent viruses from spreading during the various stages of dental treatment, we should ensure a safe working environment. **Aim of study:** The purpose of this study was to assess "infection control" measures between dental laboratory technicians in Tripoli city during the COVID-19 pandemic. **Samples and methods:** We developed a pre-designed questionnaire consisting of four sections and different items related to infection control measures. 158 dental laboratory technicians in Tripoli city were surveyed using this questionnaire-based survey. The data were recorded and analyzed. **Results:** The study found that (92.9%) of dental technicians regularly followed hand hygiene protocols before and after dental impressions, models, and prostheses contact, (91.6%) washed their hands before and after using gloves, (92.3%) wear gloves when they receive jobs from the clinics, (89.7%) change gloves when they become torn, (86.5%) wear uniforms in the workplace, (73.5%) wear eye glasses/face shields (76.1%) and also, (79.4%) have received COVID vaccines. **Conclusion:** In Tripoli city, dental technicians are better trained and motivated to practice infection control measures in dental laboratories

Key word: dental laboratory, covid 19, infection control protocol.

Introduction

In dentistry, there is a serious problem of cross-contamination between dental staff and patients.[1] By consuming blood and saliva, dental patients, and dental staff (dentists, dental laboratory technicians and assistants) can become infected with pathogenic microorganisms that can then be transmitted directly or indirectly to dental settings. [2, 3] It is possible to contract serious diseases in the dental field caused by a variety of microorganisms, such as Hepatitis B (HBV), Hepatitis C (HCV), HIV, Pseudomonas, Acinetobacter, Diphtheroid, Lactobacilli, Staphylococci, Streptococci and Mycobacterium, [4] and Herpes simplex.[5]

There have been recent reports of SARS-COV-2 being detected in patients' saliva, so dentists are also vulnerable to Covid-19 infection. [6] Asymptomatic and mildly symptomatic cases were found to be the source of infection During dental procedures, huge quantities of saliva, saliva droplets, and blood are produced when using headpieces and ultrasonic instruments, forming bio-aerosol.[7]

In bio-aerosols, tiny particles called droplet nuclei (1–5 μ) and droplets (>5 μ) are carried in the aerosols by organisms. A droplet nucleus can remain suspended in the air for a long time, travel a long distance, or fall onto surfaces, resulting in airborne diseases.[7] The main source of SARS-COV-2 transmission is dental procedures that generate aerosol containing droplets that could be inhaled or directly contact oral mucosa, nasal and ocular membranes.[8] Then Pathogenic microorganisms can be transmitted from the dental office to the dental laboratory via impression trays, record bases, occlusal rims, articulators, and dental prostheses.[1] It has been reported that bacteria are transmitted from impressions to casts and from dentures to pumice, where they continue to live.[1] Therefore, infection control plays a crucial role in the practice of health professionals.[9]

In dental laboratories, disease transmission should be minimized through vaccination against viruses as well as barrier techniques such as washing hands with alcohol before starting work. Dental technicians and technologist should always wear personal protective equipment, e.g., protective eyewear, gloves, and masks to prevent contamination.[10] Thus, the aim of this questionnaire-based study was to assess "infection control" measures between dental laboratory technicians in Tripoli city during covid-19 pandemic.

Samples and methods:

This study collected data on cross-infection procedures using a questionnaire approved by 158 dental laboratory technicians from February 2022 to November 2022. Out of 158 dentists who filled out the survey, only 155 responded.
It was divided into four sections: The first section collected demographic information, the second section collected information on hand hygiene protocols, the third section

focused on personal protective equipment use, and the fourth section focused on recorded information about the covid-19. A computer was used to transfer data. All questionnaires were entered into the program, and Data Statistical Consultation Services used the Statistical Program for Social Science (SPSS 15.0 for Windows) to conduct statistical analyses. For each variable, simple frequencies were calculated.

Results

There were four sections where different questionnaire items were completed by the consenting 155 directors of dental technician laboratories.

Table 1: Shows the demographic date of dental laboratories technicians:

Item	Choices	Count	Percentage
Gender	Male	83	53.5%
	Female	72	46.5%
AGE	19-32	105	67.7%
	33-46	50	32.3%
years of work	Less than 7 years	91	58.7%
	From 7 years to less than 14	49	31.6%
	From 14 years to less than 21	12	7.7%
	From 21 years to less than 29	1	6.0%
	29 years or more	2	1.3%
Work of place	Private	113	72.9%
	Public	42	27.1%

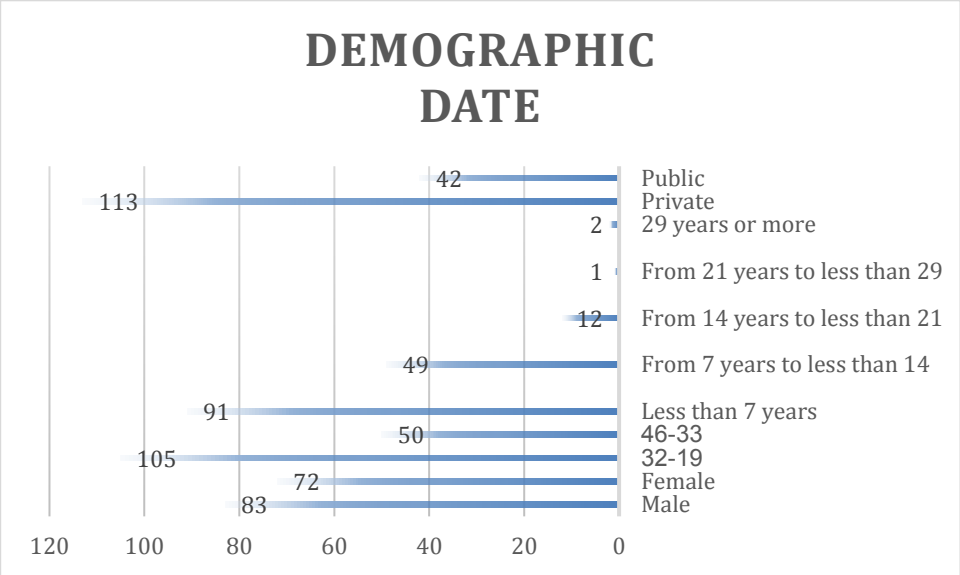

Figure1: Shows the demographic date of dental laboratories technicians

Table 2: The different practices of dental technicians upon used hands hygiene Protocol are summarized:

II	Hands hygiene		Yes	No knowledge	No	Mean	Std. Deviation
A	Do you use any kind of hand hygiene protocol before and after all kinds of dental impression, model, and prosthesis contact?	N	144	0	11	2.93	0.4
		%	92.9	0	7.1		
B	Do you wash your hands before and after using gloves?	N	142	1	12	2.91	0.31
		%	91.6	0.6	7.7		
The degree of attention to hand hygiene						2.92	0.231

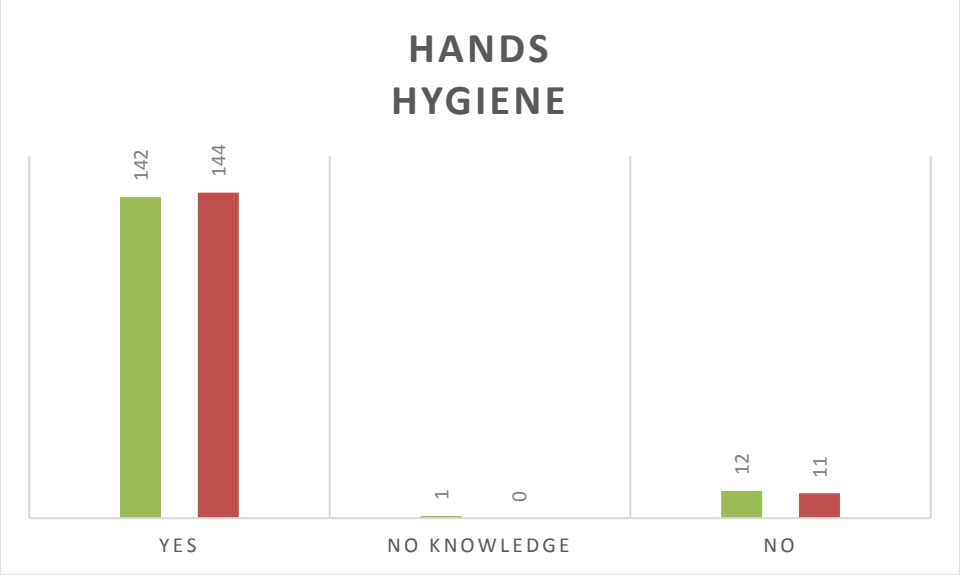

Figure2: Shows The different practices of dental technicians upon used hands hygiene Protocol

Table 3: Shows the used of - protective wear equipment

III	Use of protective wear?		Yes	No knowledge	No	Mean	Std.
A	Do you wear gloves when you receive jobs from the clinics?	N	143	0	12	2.92	0.268
		%	92.3	0	7.7		
B	Do you change your gloves if torn during practice is necessary?	N	139	0	16	2.89	0.306
		%	89.7	0	10.3		
C	Do you wear uniforms in workspace?	N	134	0	21	2.86	0.343
		%	86.5	0	13.5		
D	Do you wear eyeglasses/face shields to protect the eyes from infection?	N	114	0	41	2.74	0.442
		%	73.5	0	26.5		
E	Do you wear mask?	N	118	0	37	2.76	0.427
		%	76.1	0	23.7		
The degree of use of protective wear						2.83	0.258

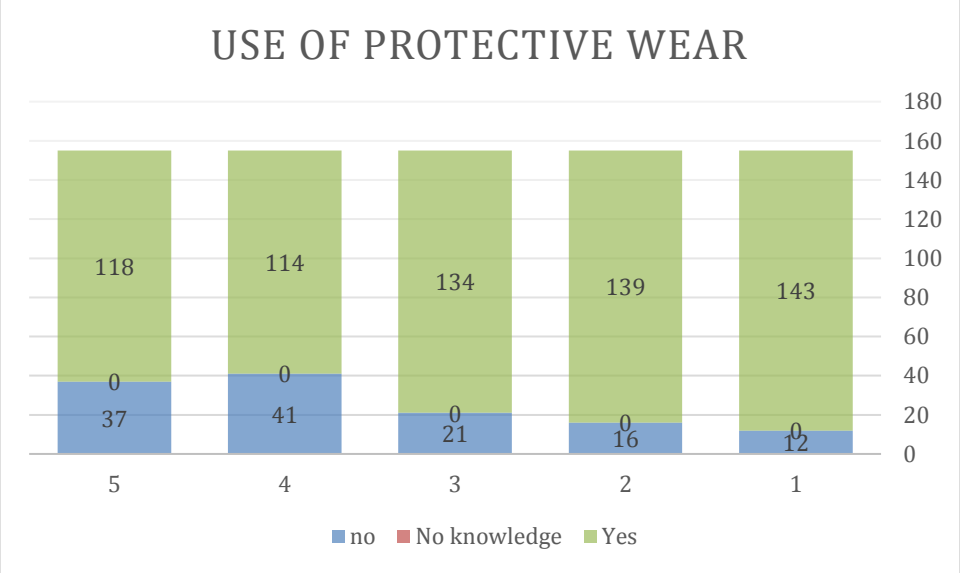

Figure3: Show the used of protective wear equipment

Table 4: Shows distribution number of the dental technician according to information of COvid-19:

IV	Covid-19		Yes	No knowledge	No	Mean	Std.
A	Dose laboratory you work in apply all staff measurements for Covid-19 including the temperature measurements before entering the laboratory?	N	99	7	49	2.60	0.577
		%	63.9	4.5	31.6		
B	Do you have any ideas about symptoms Covid-19?	N	128	1	26	2.82	0.402
		%	82.6	0.6	16.8		
C	Have you Received vaccine for COVID?	N	123	1	31	2.79	0.426
		%	79.4	0.6	20		
The degree of application of prevention measures covid-19						2.73	0.332

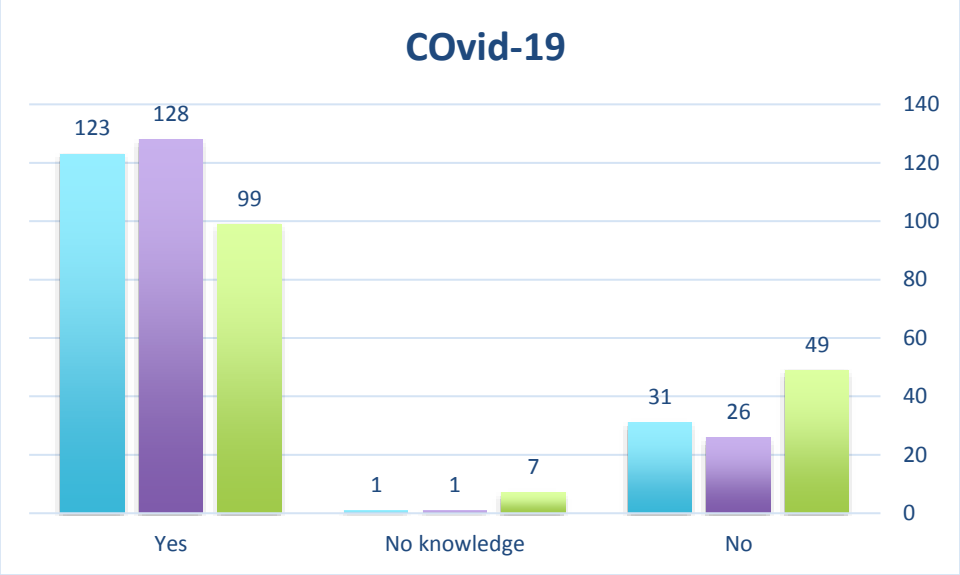

Figure4: Shows distribution number of the dental technician according to information of COvid-19:

Discussion

The dental healthcare team is at risk of exposure to sources of infection. Dental laboratories are one of the main ways of cross-contamination in dental settings.[11] The Centers for Disease Control and Prevention (CDC) established the principle of infection control in dental settings in 2003 and it has been widely used since.[12]

A variety of approaches have been used to assess cross-infection control practices in dental laboratories, but, despite the wide range of results available on this subject, substandard practices seem to be common.[13] The purpose of this study is to assess "infection control" measures among dental laboratory technicians in Tripoli during the covid-19 pandemic.

We designed the current survey for easy interpretation and quick responses, to reduce misunderstandings and incorrect answers to the provided questions. Additionally, we assessed their education and provided self-assessments of their knowledge and compliance with infection control policies. It is a study with an internal validity, which means the data represents Tripoli city, not the entire country.

Due to concerns that an increased number of questions would affect the accuracy of responses and response rates regarding knowledge and attitude of hands hygiene protocol, not all infection control procedures were investigated. In accordance with CDC reports, this protocol can reduce the potential pathogens and reduce the risk of infection to patients and health care providers.[14]

Several levels of adherence to hand hygiene recommendations were observed. These levels were similar to that observed in study of Myers et al. [15] study, but different from those observed in study of Sofola O and Savage KO. [16]

Furthermore, the results of this item are better than the results of Alharbi et,al study , where 52.2% of DHCPs and 31.3% of dental students always wash their hands before wearing gloves. [17] in their assessment of the compliance of Nigerian dentists with infection control. In their study, Sofola and Savage found that hand hygiene recommendations were not followed as well before and after gloves were removed.[16]

Based on the results of this study, most technicians understand that wearing personal protective equipment is mandatory for all laboratory tasks and wearing a face mask/shield and eye protection is mandatory when operating rotatory equipment to minimize injury and the potential of cross-contamination and disease transmission. Infection control standards are essential to reducing cross-infection risks, and all packing materials should be disposed of in accordance with MOH guidelines Laboratories Receiving area: Packing materials should be disposed of to avoid cross-infection.

In terms of personal protective equipment, there was 92% compliance with gloves and 76.1%, 86.5%, and 73% compliance with masks, uniforms, and eye protection, respectively. It is higher than what was found in previous studies in which 35.00% [13] and 8.70% [18] of technicians wore all recommended protective wear.

As a result, dental technicians may have been aware of personal protective equipment. As an example, face masks prevent inhalation of aerosol particles with particle sizes as small as 50 microns. Additionally, lab coats and gloves prevent cross-contamination as well.

In regard to vaccination status against hepatitis B, covid-19, tuberculosis in section IV. So, All OHCW must be immunized before because they are placed in risk situations where they may become susceptible to transmission of infections.

Approximately 79,4% of the DTs in this study had valid vaccinations against covid-19, which is similar to a study conducted by Alshiddi et al [19] in Saudi Arabia. In contrast to the Nigerian study, this study found poor compliance with recommended HBV vaccinations, as reported by the CDC.[20]

CONCLUSION

The results of this study indicated that there was better compliance to infection control measure in most dental laboratories in Tripoli city in regarding covid 19.

RECOMMENDATIONS

1-Mandatory infection control continuing education courses and seminars should be conducted to update the dental technicians on the current infection control protocols.

2-Assessment of infection control protocol in dental clinic

Thanks and appreciation

I extend my thanks and appreciation to all dental technicians in the city of Tripoli for their cooperation with us and everyone who contributed to this research

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تقييم مقاييس "مكافحة العدوى" بين فنيي معامل الأسنان في مدينة طرابلس أثناء جائحة كوفيد-19

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المستخلص

بيان المشكلة: يتعرض فريق الرعاية الصحية للأسنان للعديد من مصادر العدوى، حيث تلعب معامل الأسنان دورًا مهمًا في التلوث المتبادل من خلال تعاملها مع الطبعات الملوثة والتعويضات الاصطناعية

المقدمة: يتعرض العاملون في معامل الأسنان لخطر الإصابة بالعدوى من مجموعة متنوعة من الكائنات الحية الدقيقة، بما في ذلك كوفيد**19**- ولمنع انتشار الفيروسات خلال المراحل المختلفة لعلاج الأسنان، يجب علينا ضمان بيئة عمل آمنة

هدف الدراسة: الغرض من هذه الدراسة هو تقييم مقاييس "مكافحة العدوى" بين فنيي معامل الأسنان في مدينة طرابلس خلال جائحة كوفيد-19.

العينات وطرق العمل: قمنا بتطوير استبيان مصمم مسبقًا يتكون من أربعة أقسام وبنود مختلفة تتعلق بتقييم مقاييس مكافحة العدوى. حيث تم عمل مسح لعدد مكون من 158 من فنيي معامل الأسنان في مدينة طرابلس. ثم تم تسجيل البيانات وتحليلها إحصائيا

النتائج: وجدت الدراسة أن (92.9%) من فنيي الأسنان يتبعون بروتوكولات نظافة اليدين قبل وبعد مس طبعات الأسنان والقوالب والتعويضات الاصطناعية، (91.6%) يغسلون أيديهم قبل وبعد استخدام القفازات، (92.3%) من العينات يرتدون القفازات عندما يستلمون العينات من العيادات، (89.7%) يغيرون القفازات عندما تتمزق، (86.5%) يرتدون الزي الرسمي في مكان العمل، (73.5%) يرتدون النظارات و(76.1%) يرتدون أغطية الوجه وأيضًا (79.4%) حصلوا على لقاحات ضد مرض فيروس كورونا

الاستنتاج: فنيي الأسنان في مدينة طرابلس لديهم تدريب وتحفيز بشكل أفضل لممارسة طرق مكافحة العدوى بخصوص فيروس كوفيد-19 في معامل الاسنان

الكلمات المفتاحية: مختبر الأسنان، كوفيد 19، بروتوكول مكافحة العدوى.