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Knowledge and awareness level of Syrian dentists towards Novel Coronavirus pandemic: Cross-sectional study.

Nivel de conocimiento y actitud de los dentistas sirios sobre la nueva pandemia de coronavirus: estudio transversal.

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Abstract: **Objetive:** An outbreak of a novel and alarmingly coronavirus disease (COVID-19) was announced in China in December 2019, which later affected about 180 countries worldwide. Thus, this study aims to assess the awareness and attitude of dentists towards COVID-19 in Syria. **Materials and Methods:** The questionnaire was an online survey; it contained 19 questions formulated based on the information given by WHO and CDC for COVID-19. Study participants were dentists practicing in Syria. The questionnaire was translated into Arabic and published on the internet into multiple platforms. **Results:** 7233 dentists responded to the questionnaire; 64% of the participants were females. The majority of the respondents were general practitioner (78%), nearly half of the respondents had been practicing dentistry for at least 2-4 years (51%). The majority of the respondents has knowledge about COVID-19 and was aware it is contagious. Over half of the Syrian dentists received their information about COVID-19 from social media platforms (55%). Even though the majority of the dentists were aware that the incubation period could last up to 14 days, nearly half of the participants were not aware that symptomless patients can spread the virus (49%). **Conclusions:** Syrian dental practitioners were aware of COVID-19 definition, incubation period and prevention measures in the dental clinic. However, they had limited attitude regarding COVID-19 symptoms, mode of transmission and management.

Keywords: *Public health; infection control; COVID-19; dentists; surveys and questionnaires.*

Abstract: **Objetivos:** En China se anunció en diciembre de 2019 un brote de una nueva y alarmantemente enfermedad por coronavirus (COVID-19), que luego afectó al rededor de 180 países en todo el mundo. Por lo tanto, este estudio tiene como objetivo evaluar el conocimiento y la actitud de los dentistas hacia COVID-19 en Siria. **Material y Métodos:** El cuestionario se aplicó como una encuesta en línea; contenía 19 preguntas formuladas en base a la información proporcionada por la OMS y los CDC para COVID-19. Los participantes del estudio fueron dentistas que practicaban en Siria. El cuestionario fue traducido al árabe y publicado en Internet en múltiples plataformas. **Resultado:** 7233 dentistas respondieron al cuestionario; El 64% de los participantes eran mujeres. La mayoría de los encuestados eran dentistas generales (78%), casi la mitad de los encuestados habían estado practicando odontología durante al menos 2-4 años (51%). La mayoría de los encuestados tiene conocimiento

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sobre COVID-19 y sabía que es contagioso. Más de la mitad de los dentistas sirios recibieron su información sobre COVID-19 de redes sociales (55%). Aunque la mayoría de los dentistas sabían que el período de incubación podría durar hasta 14 días, casi la mitad de los participantes no sabían que los pacientes sin síntomas pueden transmitir el virus (49%). **Conclusion:** Los odontólogos sirios conocían la definición de COVID-19, el período de incubación y las medidas de prevención en la clínica dental. Sin embargo, tenían una actitud limitada con respecto a los síntomas de COVID-19, el modo de transmisión y el manejo.

Palabra Clave: *Salud pública; control de infecciones; COVID-19; odontólogos; encuestas y cuestionarios.*

INTRODUCTION.

Coronavirus refers to any of RNA-containing spherical viruses of the family Coronaviridae, including several that cause acute respiratory illnesses. SARS and MERS are coronaviruses that have spread among humans previously in 2002 and 2012, respectively.[1] Coronaviruses appear under electron microscopy to be surrounded by a spiky array thought to have a crown-like shape.[2]

An outbreak of a novel and alarming coronavirus disease (COVID-19) was announced in Wuhan, China in December 2019, which later affected about 180 countries worldwide.[3]

Currently, the available COVID-19 genome sequences suggest that this virus is evolutionarily related to bat coronaviruses. Primarily, COVID-19 is an acute respiratory infection that can cause death, with no more than 2% mortality rate.[4] Moreover, it is the first pandemic caused by coronaviruses since the World Health Organization (WHO) characterized COVID-19 as a global pandemic in March 2020.[5,6] The commonest symptoms of patients suffering from COVID-19 are fever, cough, dyspnea and myalgia.[7] Despite the low fatality rate associated with COVID-19, its transmission routes are not easy to control. They can be summarized as inhalation transmission through respiratory droplets especially between people who are in close contact (within about 6 feet) and contact transmission by touching a surface or object contaminated by the virus.[8]

On 31 January 2020, the U.S. Centers for Disease Control and Prevention announced that all people returning from Wuhan, China, would be subject to quarantine for up to 14 days to prevent the spread of the virus while asymptomatic.[9]

However, Lauer *et al.*,[10] reported recently that the median incubation period of COVID-19 is 5.1 days. This period is the most critical one is transmitting the disease inadvertently as patients cannot know that they are infected. Also, high SARS-CoV-2 viral loads of have been found in salivary glands and saliva, which can indicate the importance of saliva for testing the disease in asymptomatic patients.[11,12]

Many strategies have been released in order to reduce the spread of COVID-19 internationally. For instance, staying home and social distancing can be the best way to protect others from getting infected regardless of symptoms. On the other hand, healthcare professionals are a critical group that should be present in their workplaces in order to help counteracting the virus or to manage any other urgent and emergent medical conditions when needed.[13]

By the nature of their work, dental practitioners are one of the groups of healthcare professionals most vulnerable to COVID-19.[14] Dental procedures require the dentist to be in close proximity to the oral cavity of patients, and cause the production of large quantities of aerosols and droplets mixed with the patient's saliva and blood.[15]

Therefore, to prevent the spread of COVID-19, dental professionals should be versed in the way COVID-19 is transmitted, what protective measures should be applied during practice, how to recognize patients infected by COVID-19, and what type of procedures can be carried out.[14]

Although there are limited confirmed COVID-19 cases in Syria until now, this country is vulnerable to the spread of the infection by this coronavirus. For that reason, more preventive measures should be taken into consideration to aid in the avoidance of viral transmission.

However, little is known about the knowledge and awareness of Syrian dental practitioners concerning COVID-19, and efforts are needed to determine any knowledge gaps. This study therefore, aims to assess the awareness and attitude of dentists towards COVID-19 in Syria.

MATERIALS AND METHODS.

Ethical Approval

Ethical approval was obtained from the Damascus University Research Ethics Committee.

Study Design

This study design was a cross-sectional study done using an online questionnaire. Study participants were dentist practicing in Syria. This questionnaire was on the internet for 30 days from 20th February 2020 to 20th March 2020. The STROBE statement for reporting cross-sectional studies was applied in this research.

Sample size calculation

Sample size was calculated using G* power software. Based on previous studies that used online questionnaires to assess the knowledge and awareness of dentists towards SARS, it was estimated that 400 respondents were sufficient.[16,17]

Research Questionnaire

The questionnaire was an online survey containing 19 questions formulated based on the information given by WHO and CDC for COVID-19. The questionnaire was translated into Arabic and published on the internet into multiple platforms (Facebook, Twitter, Reddit, etc.).

The questionnaire was divided into multiple sections to assess knowledge and awareness of Syrian dentists towards COVID-19.

The first section was about demographics of participants which included five questions about gender, age group, clinic setting, specialty and number of practicing years.

The second section included seven questions to evaluate dentists' awareness about the definition, symptoms, and routes of transmission, protection, and source of information about COVID-19.

The third section included four precise questions investigating knowledge, such as rate of fatality around the world, period of incubation, treatment and whether symptomless patients during incubation period can spread COVID-19.

The fourth section included five questions about the relationship between dentistry and the outbreak of COVID-19.

The questionnaire was assessed for validity: it was directed to two experts from the Prevention Dentistry and Infection Control Association in Syria, who had insight of the COVID-19 guidelines for health workers that are published by WHO. Then, a pilot study was carried out by giving the questionnaire to 30 dental practitioners in order to help us in recognizing if the questionnaire is understandable and if it is obvious and precisely directed towards the aim of the study. All the participants mentioned that the questions were convenient and easy to understand.

The questionnaire was then subjected to the same test again with a period gap of 10 days. Coefficient alpha value (Cronbach's alpha) of 0.80 was obtained, which indicates a high reliability value.

Statistical analysis

Data were transferred into Microsoft Excel datasheets and were analyzed using Statistical Package for the Social Sciences (SPSS) v25.0 (IBM, NY, USA). Descriptive statistics were used for quantitative data. Correlation between demographic data and participants' answers was analyzed using chi square test.

RESULTS.

After 30 days, 7233 (30.2%) dentists out of 23890 registered dentists in Syria had responded to the questionnaire in this study.

Regarding demographic data, 64% of the participants were females. Also, the majority of the respondents were general practitioners (78%) while the highest frequency of respondents' age group was between 25 and 35 years (68%). Nearly half of the respondents had been practicing dentistry for at least 2-4 years (51%). Detailed descriptive data about the demographics of the participants. (Table 1)

Nevertheless, there was no association between independent variables and respondents' answers ($p>0.05$). Regarding knowledge of SARS-CoV-2, most of the respondents have knowledge about COVID-19 (93%) and were aware it is contagious (86%) and it is different than the actual virus that caused SARS in 2003 (82%).

However, only 45% were familiar with the fact that cough, fever and shortness of breath are all the common symptoms of COVID-19.

Furthermore, over half of the participants were aware of routes of transmission (59%) and community protective measures to avoid exposure to COVID-19 (62%). In regard to the source of information about COVID-19, social media was in the first place (55%) while only 15% of participants were relying on the WHO website as a main source of information. (Table 2)

In the third section of the questionnaire, precise knowledge of COVID-19 was assessed. Even though

Table 1. Section 1: Demographic data for dentists.

Demographics		Frequency (%)
Gender	Male	36
	Female	64
Age group	<25 years	16
	25-35 years	68
	36-45 years	10
	>45 years	6
Specialty	General practitioner	71
	Specialist	29
Years of dental practice	≤ 1 year	16
	2-4 years	51
	5 -10 years	24
	>10 years	9
Dental practice setting	Private clinic	47
	Dental Medical Center	22
	Hospital Medical Center	13
	University/Union Medical center	18

Table 2. Section 2: Awareness of COVID-19.

Questions	Answers	Frequency (%)
Are you aware of the definition of COVID-19?	Yes	93
	Not sure	2
	No	5
Is COVID-19 contagious?	Yes	86
	Not sure	5
	No	9
Is COVID-19 virus different from the SARS virus?	Yes	82
	Not sure	11
	No	7
What are common symptoms of COVID-19?	Cough	14
	Fever	27
	Shortness of Breath	12
	All of the above	45
	Don't know	2
What are the routes of transmission of COVID-19?	Close contact with an infected person	9
	Respiratory droplets from infected person	19
	Contact with contaminated surfaces or objects	7
	All of the above	59
	Don't Know	6
How can you do to avoid exposure to COVID-19?	Wash your hands often with soap and water for at least 20 seconds	2
	Social distancing	2
	Cover your mouth and nose with a tissue when you cough or sneeze or use the inside of your elbow.	10
	All of the above	62
	Don't know	6
What is your main source of information regarding COVID-19?	Social media *(Facebook, Twitter, Reddit etc.)*	55
	Minister of Health (MOH)	16
	World Health organization (WHO)	15
	Center for Diseases Control and prevention (CDC)	4
	Community	9
	Not interested	1

Table 3. Section 3: Precise knowledge of COVID-19.

Questions	Answers	Frequency (%)
How long can incubation period of COVID-19 last?	2 weeks	79
	1 month	6
	3 months	3
	Don't know	12
Can asymptomatic patients (during incubation period) spread COVID-19?	Yes	50
	No	49
	Don't Know	1
What is the rate of fatality of COVID-19?	2-4%	35
	5-10%	32
	15-20%	18
	30-50%	4
	Don't know	11
What is the treatment of COVID-19?	Supportive treatment	33
	Vaccine	15
	No available treatment	45
	Don't know	7

Table 4. Section 4: Relationship between Dentistry and COVID-19.

Questions	Answers	Frequency (%)
Which medical profession has the highest risk of getting infected with COVID-19?	ENT specialist	5
	Pharmacist	2
	Dentist	85
	Nurses	1
	Paramedic	7
	Don't Know	0
Which dental procedure has the highest risk of spreading COVID-19?	Non-surgical tooth extraction	4
	Scaling and root planing	95
	Orthodontic treatment	1
	Fluoride application	0
	Don't know	0
What are the procedures your practice is following to minimize the risk of spreading COVID-19?	Extensive infection control procedures while providing all kind of treatments	15
	Extensive infection control while providing emergency treatment only	77
	Practice site/Clinic is closed until further notice	8
	None of the above	0
What are the dental protective procedures you should follow to avoid spreading COVID-19?	Preprocedural mouth rinse with 0.2% povidone-iodine.	7
	Avoid intraoral imaging	1
	Rubber dam is mandatory if applicable	20
	All of the above	69
	Don't Know	3
What of the following statements is true regarding the surgical mask?	Surgical mask should be replaced every 24 hrs.	16
	Surgical mask should be replaced every 20 min.	53
	Surgical mask should be replaced only when wet	25
	Don't know	6

the majority of dentists were aware that the incubation period could last up to 14 days, nearly half of the participants were not aware that asymptomatic patients can spread the virus (49%).

Nevertheless, only 25% of dentists were aware of the fatality rate (2-4%) of COVID-19 and only one in three dentists (33%) were aware that the management of COVID-19 is basically supportive care. (Table 3)

In the final section, dentists' awareness about the relation of COVID-19 pandemic and dentistry was evaluated. The majority of respondents were aware that dentists face the greatest risk of getting infected with COVID-19 (85%).

Also, almost all of the dentists were aware that scaling has the highest risks of spreading COVID-19 (95%). In the current pandemic, 3 out of 4 dentists are only accepting emergency cases (77%) and 69% of dentist are applying protective measure during dental treatments.

However, only half of the participants (53%) were aware that surgical masks should be replaced every 20 minutes.

DISCUSSION.

Currently, COVID-19 is a common discussion subject in the media and among people in general.

This survey brings an insight into the level of perception and awareness of Syrian dental practitioners towards COVID-19 at the time of its outbreak in 2020. Such surveys can be beneficial when outlining health education programs about contagious infectious diseases.

The questionnaire started on 20th February 2020, and 7233 dentists responded to the questionnaire during the 30 days. The Syrian government imposed a national lockdown that mandated the temporary closure of schools, universities and non-essential shops and businesses.

This mandatory lockdown has affected dentists' workflow, allowing for more free time for dentists to spend on social media and for a bigger chance to find the online survey, which might explain the high response rate in a short period.

Social media use by the general public has increased sharply over the past nine years, and it is not surprising that health care professionals nowadays rely on social media applications to share facts, to debate health care guidelines and to promote healthy lifestyles.[18]

As COVID-19 became a pandemic, it turned into a trending topic globally in all social networks that are easy access to get facts. The findings of this study show that 65% of the participants receive their information about COVID-19 from social media applications, and only 15% were relying on the WHO website as a main source of information.

Although policy makers try to publish the latest information as fast as they can on social media applications, a lot of wrong information is also posted daily 19.

For that reason, it is advisable for the dentists to access WHO and CDC websites to obtain updated data and information content about COVID-19.

This study showed that 93% of the participating dentists were familiar with the definition of COVID-19, and 86% were aware it is contagious.

In addition, 82% of the participants reported that they know SARS-CoV-2 is different from the original SARS virus. This may give the impression that Syrian dental practitioners have sufficient information about the viral evolution in the context of COVID-19, and of SARS-CoV-2 as one of the coronaviruses.

On the other hand, only 45% of the respondents were familiar with the clinical symptoms associated with COVID-19. This can be justified by the fact that dental practitioners basically do not deal with people diagnosed with COVID-19. However, dentists should know all of the COVID-19 symptoms in order to recognize the risk and take the required precautions when meeting such patients, which is considered a ground stone for offsetting disease spread.[14]

Moreover, it is crucial to understand the route of transmission of COVID-19 and to know the community protective measures that should be followed in order to counteract the outbreak of this virus. However, only 59% of Syrian dentists were aware of the ease of transmission of COVID-19 either by inhalation or contact transmission. Also, 62% of respondents correctly reported which were the protective measures that should be used by the community. In this pandemic, precise knowledge about COVID-19 should be acquired by medical staff and dentists.

According to the latest updates from the WHO and CDC, the incubation period of COVID-19 could range from 2 days to 14 days. Despite the fact that SARS-CoV-2 is highly contagious when patients present symptoms, yet due to the incubation period,

asymptomatic patient can spread the disease too.[20,21] Half of the dentists participating in this questionnaire were not aware of this fact, which can have catastrophic sequences, especially, if patients in dental clinic were to be classified as infected with SARS-CoV-2 only when symptoms are apparent.

In this questionnaire, 35% of dentist stated that the fatality rate of COVID-19 is 2-4% while 32% selected 5%-10%. WHO has estimated the overall mortality rate of COVID-19 to be 1.5% in China and 3.6% outside of China.

However, a recent report re-estimated the mortality rate based on a 14-day delay and found that the global mortality rate was 5.7%.[22] Since the number of infected persons is increasing rapidly daily, the figures for fatality rates should be re-evaluated when this outbreak finishes.

Until this date, there is no valid or proven treatment nor there is a vaccine recommended for COVID-19. However, oxygen therapy is considered the most significant intervention to manage severe cases of COVID-19.[23]

According to WHO recommendations, there are three approaches for managing respiratory failure and those are as following:

1) Protective mechanical ventilation
2) High-flow nasal oxygen (HFNO)
3) non-invasive ventilation (NIV).[24]

The management of COVID-19 is considered supportive in nature.[24] However, only 33% of Syrian dentists were aware of this fact. On a positive note, the majority of participants were aware that dental care providers are facing the greatest risk of being infected with COVID-19.[14] Even though the Ministry of Health in Syria have reported only limited cases of COVID-19 up to this date, 77% of dental practitioners in Syria have been only providing emergency care endorsing the latest recommendation of American Dental Association (ADA).

Also, 95% of dentists were aware that any kind of treatment that generates aerosols might spread SARS-CoV-2 in the dental office, especially, scaling and root planing. Infection control is one of the basic topics in dentistry.

However, with the recent outbreak of COVID-19, there are some implication in dental care that dentists should be aware of during dental treatment.[25]

Earlier studies have reported that SARS and MERS were extremely affected by oxidation.[26] Therefore, preoperational mouth rinse with 1% hydrogen peroxide or 0.2% povidone-iodine might reduce the load of coronaviruses in saliva.[27] Intraoral x-rays might trigger a coughing reflex which in turn can spread the virus in the office. Thus, extraoral imagining like panoramic x-ray or CBCT are preferred in this period.[28]

According to ADA, rubber dam can minimize splatter generation and should be used (if applicable) during this pandemic outbreak whether for a simple restorative procedure or an endodontic treatment.[29] Even though 69% of respondents were employing protective measures during dental procedures, nearly 75% of the participants were not aware that surgical masks should be replaced when wet.

Another study conducted among dental practitioners in Georgia revealed that about half of the study population *(dental students, residents, and specialists)* did not give enough importance or had sufficient awareness of viral infections such as human immunodeficiency virus (HIV) and hepatitis-B virus (HBV).[30]

However, the difference in the study sample between our study and that one can justify the contrast between the results, as in our study only dental practitioners were involved. Less information can be managed by dental students and residents.

This study was in agreement with others conducted in Jordan and Saudi Arabia. Both studies revealed that dentists were enough aware of COVID-19 symptoms, mode of transmission, and infection measures in dental clinics.[16,17]

This can be due to the similarity of the study samples and due to the resemblance in the precautions and guidelines published by the Ministry of Health in Syria, Jordan and Saudi Arabia, where the outbreak of this virus is having a similar pattern. In this type of studies, many limitations should be considered before generalizing the results to the whole community.

One of the limitations is that the respondents might not answer truthfully the questionnaire which could affect the results of the study.

Also, dentists who are less confident users of electronic services or devices may be less willing to complete an online questionnaire.

In spite of having a high level of knowledge and awareness, dentist all around the world are still in a state of anxiety and fear due to the COVID-19 pandemic's impact on humanity.[31]

CONCLUSION.

Syrian dental practitioners were aware of COVID-19 definition, incubation period and preventive measures in the dental clinic. However, they had limited awareness of COVID-19 symptoms, modes of transmission and management.

Despite the instructions released by the Syrian Minister of Health concerning infection control measures in dental clinics during the viral outbreak, there is still a gap in the information needed to help dentists in halting the spread of the virus. This is because the majority of Syrian dentists obtain their information about COVID-19 from social media applications according to this study.

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REFERENCES.

1. Wan S, Xiang Y, Fang W, Zheng Y, Li B, Hu Y, Lang C, Huang D, Sun Q, Xiong Y, Huang X, Lv J, Luo Y, Shen L, Yang H, Huang G, Yang R. Clinical features and treatment of COVID-19 patients in northeast Chongqing. J Med Virol. 2020;92(7):797-806.
2. Bischof E, Chen G, Ferretti MT. Understanding COVID-19 new diagnostic guidelines - a message of reassurance from an internal medicine doctor in Shanghai. Swiss Med Wkly. 2020;150:w20216.
3. Li Q, Guan X, Wu P, Wang X, Zhou L, Tong Y, Ren R, Leung KSM, Lau EHY, Wong JY, Xing X, Xiang N, Wu Y, Li C, Chen Q, Li D, Liu T, Zhao J, Liu M, Tu W, Chen C, Jin L, Yang R, Wang Q, Zhou S, Wang R, Liu H, Luo Y, Liu Y, Shao G, Li H, Tao Z, Yang Y, Deng Z, Liu B, Ma Z, Zhang Y, Shi G, Lam TTY, Wu JT, Gao GF, Cowling BJ, Yang B, Leung GM, Feng Z. Early Transmission Dynamics in Wuhan, China, of Novel Coronavirus-Infected Pneumonia. N Engl J Med. 2020 Mar 26;382(13):1199-1207.
4. Baud D, Qi X, Nielsen-Saines K, Musso D, Pomar L, Favre G. Real estimates of mortality following COVID-19 infection. Lancet Infect Dis. 2020;20(7):773.
5. Mahase E . Covid-19: WHO declares pandemic because of "alarming levels" of spread, severity, and inaction. BMJ 2020;368 :m1036.
6. Sohrabi C, Alsafi Z, O'Neill N, Khan M, Kerwan A, Al-Jabir A, Iosifidis C, Agha R. World Health Organization declares global emergency: A review of the 2019 novel coronavirus (COVID-19). Int J Surg. 2020;76:71-6.
7. Yang W, Cao Q, Qin L, Wang X, Cheng Z, Pan A, Dai J, Sun Q, Zhao F, Qu J, Yan F. Clinical characteristics and imaging manifestations of the 2019 novel coronavirus disease (COVID-19):A multi-center study in Wenzhou city, Zhejiang, China. J Infect. 2020;80(4):388-93.
8. Fang Y, Nie Y, Penny M. Transmission dynamics of the COVID-19 outbreak and effectiveness of government interventions: A data-driven analysis. J Med Virol. 2020 Jun;92(6):645-59.
9. Lai S, Bogoch I, Ruktanonchai N, Watts A, Lu X, Yang W, Yu H, Khan K, Tatem AJ. Assessing spread risk of Wuhan novel coronavirus within and beyond China, January-April 2020: a travel network-based modelling study. medRxiv [Preprint]. 2020.
10. Lauer SA, Grantz KH, Bi Q, Jones FK, Zheng Q, Meredith HR, Azman AS, Reich NG, Lessler J. The Incubation Period of Coronavirus Disease 2019 (COVID-19) From Publicly Reported Confirmed Cases: Estimation and Application. Ann Intern Med. 2020;172(9):577-82.
11. Khurshid Z, Asiri FYI, Al Wadaani H. Human Saliva: Non-Invasive Fluid for Detecting Novel Coronavirus (2019-nCoV). Int J Environ Res Public Health. 2020;17(7):2225.
12. Hamid H, Khurshid Z, Adanir N, Zafar MS, Zohaib S. COVID-19 Pandemic and Role of Human Saliva as a Testing Biofluid in Point-of-Care Technology. Eur J Dent. 2020;1-7.
13. Parmet WE, Sinha MS. Covid-19 — The Law and Limits of Quarantine. N Engl J Med 2020; 382:e28.
14. Peng X , Xu X, Li Y,Cheng L , Zhou X, Ren B . Transmission routes of 2019-nCoV and controls in dental practice. Int J Oral Sci. 2020; 12(9):1-6.
15. Sabino-Silva R, Jardim ACG, Siqueira WL. Coronavirus COVID-19 impacts to dentistry and potential salivary diagnosis. Clin Oral Investig. 2020;24(4):1619-21.
16. Khader Y, Al Nsour M, Al-Batayneh OB, Saadeh R, Bashier H, Alfaqih M, Al-Azzam S, AlShurman BA. Dentists' Awareness, Perception, and Attitude Regarding COVID-19 and Infection Control: Cross-Sectional Study Among Jordanian Dentists. JMIR Public Health Surveill. 2020;6(2):e18798.
17. Quadri, Mir. (2020). Novel corona virus disease (COVID-19) awareness among the dental interns, dental auxiliaries and dental specialists in Saudi Arabia: A nationwide study. Journal of Infection and Public Health. 13. 10.1016/j.jiph.2020.05.010.
18. Ventola CL. Social media and health care professionals: benefits, risks, and best practices. P T. 2014;39(7):491-520.

19. Depoux A, Martin S, Karafillakis E, Preet R, Wilder-Smith A, Larson H. The pandemic of social media panic travels faster than the COVID-19 outbreak. J Travel Med. 2020;27(3):taaa031.
20. CDC. Coronavirus Disease 2019 (COVID-19). HEALTHCARE WORKERS. Interim Clinical Guidance for Management of Patients with Confirmed Coronavirus Disease (COVID-19). 2020. Available from: https://www.cdc.gov/coronavirus/2019-ncov/hcp/clinical-guidance-management-patients.html
21. WHO. Coronavirus.2020. Available from: https://www.who.int/health-topics/coronavirus#tab=tab_1
22. Baud D, Qi X, Nielsen-Saines K, Musso D, Pomar L, Favre G. Real estimates of mortality following COVID-19 infection. Lancet Infect Dis. 2020;20(7):773.
23. Cascella M, Rajnik M, Cuomo A, Dulebohn SC, Di Napoli R. Features, Evaluation and Treatment Coronavirus (COVID-19). StatPearls. Treasure Island (FL): StatPearls Publishing; 2020.
24. World Health Organization. Coronavirus disease (COVID-19) technical guidance: Patient management. 2020. Available from: https://www.who.int/emergencies/diseases/novel-coronavirus-2019/technical-guidance/patient-management.
25. Centers for Disease Control and Prevention (CDC) . CDC Releases Interim Reopening Guidance for Dental Settings. USA. 2020. Available from: https://www.cdc.gov/oralhealth/infectioncontrol/statement-COVID.html.
26. Kariwa H, Fujii N, Takashima I. Inactivation of SARS coronavirus by means of povidone-iodine, physical conditions, and chemical reagents. Jpn J Vet Res. 2004;52(3):105-12.
27. Eggers M, Koburger-Janssen T, Eickmann M, Zorn J. In Vitro Bactericidal and Virucidal Efficacy of Povidone-Iodine Gargle/Mouthwash Against Respiratory and Oral Tract Pathogens. Infect Dis Ther. 2018;7(2):249-59.
28. Meng L, Hua F, Bian Z. Coronavirus Disease 2019 (COVID-19): Emerging and Future Challenges for Dental and Oral Medicine. J Dent Res. 2020;99(5):481-7.
29. American Dental Association. ADA Coronavirus (COVID-19) Center for Dentists. 2020.
30. Kochlamazashvili M, Kamkamidze G, McNutt LA, DeHovitz J, Chubinishvili O, Butsashvili M. Knowledge, attitudes and practice survey on blood-borne diseases among dental health care workers in Georgia. J Infect Dev Ctries. 2018;12(10):864-70.
31. Ahmed MA, Jouhar R, Ahmed N, Adnan S, Aftab M, Zafar MS, Khurshid Z. Fear and Practice Modifications among Dentists to Combat Novel Coronavirus Disease (COVID-19) Outbreak. Int J Environ Res Public Health. 2020;17(8):2821.