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Abstract- *Background:* An outbreak of Corona virus disease (SARS-CoV-2) was first identified in Wuhan, China and spread worldwide. This disease was officially named as Corona virus disease (COVID-19) by WHO on February 12, 2020. The main routes of transmission of SARS-CoV-2 are through respiratory droplets and direct contact with the infected person. There is a high risk of COVID-19 transmission in dental practices. The aerosols and droplets generated during dental procedures can increase risk of transmission. Due to the high risk of COVID-19 transmission via dental practice, the dentists need to take infection control measures. SARS CoV-2 can be prevented in the dental setting by taking protective measures i.e. using adequate personal protecting equipment (PPE), prescribing mouth rinses prior to dental treatment, cleaning and disinfecting workplace and good ventilation.

Keywords: *COVID-19, dental knowledge, PPES, dental practice, disinfectants.*

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Covid-19 Outbreaks in Hospitals and Dental Clinics of Pakistan

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Abstract- ***Background:*** An outbreak of Corona virus disease (SARS-CoV-2) was first identified in Wuhan, China and spread worldwide. This disease was officially named as Corona virus disease (COVID-19) by WHO on February 12, 2020. The main routes of transmission of SARS-CoV-2 are through respiratory droplets and direct contact with the infected person. There is a high risk of COVID-19 transmission in dental practices. The aerosols and droplets generated during dental procedures can increase risk of transmission. Due to the high risk of COVID-19 transmission via dental practice, the dentists need to take infection control measures. SARS CoV-2 can be prevented in the dental setting by taking protective measures i.e. using adequate personal protecting equipment (PPE), prescribing mouth rinses prior to dental treatment, cleaning and disinfecting workplace and good ventilation.

Aim: The aim of this study is to determine infection control measures taken by dentists during COVID-19 outbreak. This study may be useful in reducing the risk of COVID-19 transmission during clinical practice.

Materials and Methods: This study was a Cross-sectional; based on Google form questionnaire, conducted among 250 dentists working in dental clinics and hospitals of Pakistan, to study the knowledge of dentists about infection control measure for Covid-19 and structure of their work place. Dentists with age range of 25-40 years of both genders were included in research.

Results: Out of 250, 80% of the dentists were of 25-30 years of age, 18.8% were 30-35 years of age, and 1.2% was 35-40 years of age. 62.8% graduated from private institutes, 35.6% graduated from public institutes and 1.6% was graduates of other institutes. 49.2% participants were working in a private hospital/clinic and 37.2% in a public hospital. 48.8% of the participants were working but less frequently, 22.0% were assisting emergencies only, 18.8% were not working because of pandemic and 10.4% were not working due to other reasons. 64.8% of the participants had received only general instructions about COVID-19 preventive measures, 28.4% had not received any training and only 6.8% had received practical training. 24.0% were provided with disposable surgical masks for assisting patients, 21.6% with N95 masks, 13.6% with disposable surgical caps, 13.6% with protective goggles and 16.0% with face shields. 42.4% were using disposable surgical masks for assisting patients, 25.6% were using N95 masks, 17.2% were using surgical masks over N95 masks, 10.0% were using double disposable surgical masks and 0.8% was using surgical masks over reusable fabric masks. The structure of prime workplace of 36.4% participants was adapted to allow patient's treatment during the pandemic, only waiting area of 28.4% was adapted, entire work environment of 21.2% was adapted and according to 14.0% the only office was adapted. 56.4% of participants and their employees were following official recommendations for routine clinical practice; while 30.8% weren't following any recommendations.52.0% were screening their patients by performing face to face application of specific questionnaire and only 10.4% of them were checking temperature of their patients. 33.9% were using 70% alcohol as a disinfectant, 18.4% were using diluted sodium hypochlorite, 17.2% were using bleach, 4.9% were using undiluted sodium hypochlorite and 6.4% were not using any disinfectants or antimicrobials.

Conclusions: Dentists are at high risk of COVID 19and they should wear all Personal Protective equipment i.e. N95 mask, gown, face shield, goggles and gloves while dealing patients suspected or confirmed of COVID-19.Patients and attendants should be screened before any procedure or entrance at dental hospitals/clinics. Dental Practitioners must receive training on use of PPE, Donning and doffing of PPE and proper disposal of PPE.

Keywords: COVID-19, dental knowledge, PPES, dental practice, disinfectants.

I. Introduction

COVID 19 is caused by a novel corona virus SARS-CoV-2, that began in Wuhan, China in late 2019. World Health Organization (WHO) declared Corona virus disease as public health emergency of international concern on January 30, 2020. [1] The transmission of COVID 19 can occur by direct, indirect or close contact with the infected person. The most common routes of transmission are droplets and close contact. Moreover, SARS-CoV-2 is also detected in gastrointestinal tissue, tears and conjunctival secretions of patients with COVID-19. [2]

The most commonly stated symptoms of covid-19 are fever, dry cough and myalgia. In addition to these, nausea, diarrhea, reduced sense of smell (hyposmia) and abnormal taste sensation have also been reported. [3] The Dental Practitioners are at high risk of COVID-19 due to the nature of their profession, close proximity to the patient and exposure to saliva, blood and other body fluids during dental procedures. [4] Most of the dental procedures produce droplets and aerosols, for this reason infection control measures must be taken by the dentists. [5]

SARS CoV-2 can be prevented in the dental setting by taking protective measures like prescribing

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mouth rinses prior to dental treatment, wearing medical masks, cleaning and disinfecting workplace, good ventilation and limiting aerosol generating procedures. [6] No specific antiviral treatments or vaccines are available for SARS-CoV-2. Therefore, the treatment is symptomatic and is limited to support and palliative care. [7]

The aim of this study is to determine whether dentists of Pakistan are well aware of infection control protocols and are implementing them in their dental practices. This study may be useful in reducing the risk of spreading COVID-19 during clinical practice.

II. Materials and Methods

a) Study Design

A Cross-sectional study was conducted among dentists working in dental clinics and hospitals of Pakistan. The study was approved by Research Committee of Riphah International University, Islamabad, Pakistan.

b) Sample Selection

A Sample of 250 individuals (118 Males, 132 Females) was collected from dental practitioners working in different dental clinics and hospitals of Pakistan. Their ages ranged from 25 to 40 years.

c) Data Collection

Respondents for this study were recruited through online google form that included information on demographic characteristics, professional profile and knowledge of infection control measures taken by dentists during COVID-19 outbreak. In total, 250 respondents provided consent to participate in the survey. Participation was on a voluntary basis. The data were collected and statistically analyzed using the Statistical Package for the Social Sciences (IBM SPSS-22).

d) Questionnaire

All the dentists were asked to fill a questionnaire. The questionnaire contained a series of questions regarding infection control measures taken by dentists during COVID 19 outbreak.

e) Questionnaire Design

The questionnaire was divided into three sections:

Section I: Questions related to demographic and professional profile

Section II: Questions related to infection control measures in professional practice during the pandemic

Section III: Questions related to structure at prime workplace

f) Inclusion Criteria

1. Both genders
2. Age range 25 to 40 years
3. Dentists working at dental clinics/ hospitals

g) Exclusion Criteria

1. Dentists who were younger than 25, older than 40
2. Dentists who were not doing any practice

h) Statistical Analysis

IBM SPSS Statistics for Windows, version 22.0, was used for the statistical analyses. Descriptive statistics were reported using frequency with percentages for categorical variables.

III. Results

The 250 participants were 25-40 years of age, 80.0% were 25-30 years of age, 18.8% were 30-35 years of age, and 1.2% were 35-40 years of age. (Table 1)

Table 1

Age

		Frequency	Percent
Valid	25-30	200	80.0
	30-35	47	18.8
	35-40	3	1.2
	Total	250	100.0

52.8% were females and 47.2% were males. (Table 2)

Table 2

Gender

		Frequency	Percent
Valid	Female	132	52.8
	Male	118	47.2
	Total	250	100.0

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Of the study participants, 62.8% were graduates of private institutes, 35.6% were graduates of public institutes and 1.6% were graduates of other institutes. 49.2% of the study participants were working in a private firm (hospital/clinic) and 37.2% were working in a public hospital. (Table 3)

Table 3

From which type of institution did you graduate in Dentistry?

		Frequency	Percent
Valid	Public	89	35.6
	Private	157	62.8
	Other	4	1.6
	Total	250	100.0

60.8% of the participants hadn't done post-graduation in dentistry, 22.0% had completed their post-graduation and 17.2% of the participants were enrolled but hadn't completed their post-graduate education. (Table 4)

Table 4

Have you completed postgraduate education in Dentistry?

		Frequency	Percent
Valid	Yes	55	22.0
	No	152	60.8
	No, but I'm currently enrolled	43	17.2
	Total	250	100.0

48.8% of the participants were working but less frequently, 22.0% were assisting emergencies only, 18.8% were not working because of pandemic and 10.4% were not working due to other reasons. (Table 5)

Table 5

How do you describe your current work status in the place you work most?

		Frequency	Percent
Valid	I'm working, but less frequently	122	48.8
	I'm assisting emergencies only	55	22.0
	I'm not working because of the pandemic	47	18.8
	I'm not working due to other reasons	26	10.4
	Total	250	100.0

64.8% of the participants had received general instructions or online training regarding COVID-19 preventive measures, 28.4% had not received any training and 6.8% had received practical training. (Table 6)

Table 6

Have you received any training on COVID-19 preventive measures?

		Frequency	Percent
Valid	No	71	28.4
	Only general instructions or online training	162	64.8
	I have received practical training	17	6.8
	Total	250	100.0

31.6% had received training on use of different personal protective equipment, 24.4% had received training on standard PPE insertion and removal sequence, 18.0% received training on preparation of the office before and after appointments, 11.0% received training on infection control in workplace and 14.0% received training on COVID-19 screening in patients.

Participants were asked to describe about their work status during the pandemic. 34.4% of the participants were intermediately prepared to assist patients with confirmed cases of COVID-19, 23.2% were poorly prepared, 23.2% were not prepared at all, 16.0% were well prepared and 2.8% were very well prepared. (Table 7)

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Table 7

How prepared do you feel to assist patients with confirmed diagnosis of COVID-19?

		Frequency	Percent
Valid	I do not feel any prepared	58	23.2
	poorly prepared	58	23.2
	Intermediately prepared	86	34.4
	well prepared	40	16.0
	very well prepared	7	2.8
	6	1	.4
	Total	250	100.0

Participants were asked about PPE availability for appointments in their work place. 24.0% were provided with disposable surgical masks, 21.6% were provided with N95 masks, 13.6% were provided with disposable surgical caps, 13.6% were provided with protective goggles and 16.0% were provided with face shields. 42.4% of the participants were most frequently using disposable surgical masks for assisting patients, 25.6% of the participants were using N95 masks, 17.2% were using surgical masks over N95 masks, 10.0% were using double disposable surgical masks and 0.8% were using surgical masks over reusable fabric masks. (Table 8)

Table 8

Currently, which type of mask are you most frequently wearing for assisting patients?

		Frequency	Percent
Valid	Disposable surgical mask	106	42.4
	N95 mask	64	25.6
	Surgical mask over N95 mask	43	17.2
	Two disposable surgical masks	25	10.0
	N95 mask over surgical mask	10	4.0
	Surgical mask over reusable fabric mask	2	.8
	Total	250	100.0

According to 36.4% participants, the structure of prime workplace was adapted to allow patient's treatment during the pandemic, according to 28.4% only waiting area was adapted, according to 21.2% the entire work environment was adapted and according to 14.0% the office was adapted. (Table 9)

Table 9

Was the structure of your main workplace adapted to allow patients' treatment during the pandemic?

		Frequency	Percent
Valid	No	91	36.4
	Yes, the waiting room	71	28.4
	Yes, the office	35	14.0
	Yes, the entire work environment	53	21.2
	Total	250	100.0

56.4% of participants and their employees were following official recommendations for the clinical routine in their main workplace, while 30.8% weren't following any recommendations. (Table 10)

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Table 10

Did you (or your employer) follow official recommendations for adapting the clinical routine in your main workplace?

		Frequency	Percent
Valid	Yes	141	56.4
	No	77	30.8
	Maybe	32	12.8
	Total	250	100.0

28.0% of the participants fully disagreed with social distancing measures adapted in their cities, 27.6% partially agreed, 27.6% fully agreed and 16.8% disagreed. (Table 11)

Table 11

Do you agree with social distancing measures adopted currently in your city?

		Frequency	Percent
Valid	Fully disagree	70	28.0
	Not agree or disagree	42	16.8
	Partially agree	69	27.6
	Fully Agree	69	27.6
	Total	250	100.0

When asked about COVID-19 screening before appointments in main workplace, 52.0% answered that they perform face to face application of specific questionnaire for COVID 19. 29.2% performed previous application of specific COVID 19 questionnaire via telephone, text message or similar. 10.4% performed temperature check of patients in the office. 5.6% requested temperature check before patient arrival at the office, 2.4% recommended mouthwashes or antimicrobials in the office and 4% recommended mouthwashes or antimicrobials for the patients before their arrival at the office.

33.9% of the participants were using 70% alcohol to disinfect contaminated surfaces at their prime workplace, 18.4% were using diluted sodium hypochlorite, 17.2% were using bleach, 4.9% were using undiluted sodium hypochlorite and 6.4% were not using any disinfectants or antimicrobials. (Table 12)

Table 12

Which of the followings disinfectants or antimicrobial agents are you adopting to decontaminate surfaces or the environment in your main workplace?

		Frequency	Percent
Valid	None	27	6.4
	70% Alcohol	144	33.9
	Bleach	73	17.2
	Diluted Sodium hypochlorite	78	18.4
	Undiluted Sodium hypochlorite	6	4.9
	Phenolic compounds	3	19.3
	Total	250	100.0

IV. Discussion

Universal precautions should be taken by dental practitioners to minimize the spread of corona virus and its associated disease. Centers for Disease Control and Prevention (CDC) recommends using additional infection prevention and control practices during the COVID-19 pandemic, along with standard practices recommended as a part of routine dental healthcare delivery to all patients. According to Centers for Disease Control and Prevention (CDC) recommendations, dental healthcare personnel (DHCP) should wear eye protection in addition to facemask to ensure protection of the eyes, nose, and mouth; use an N95 respirator or a respirator that offers an equivalent or higher level of protection during aerosol generating procedures.

All patients should be considered as potentially infected by Corona virus and all dental practitioners

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need to review their infection control policies during these challenging times. This might reduce the risk of spreading COVID-19 during clinical practice.

According to predictions, COVID-19 will persist in our population although it will be less virulent. Thus it is important to take precautionary measures to contain the spread of virus. Through this study, we also invite researchers to further investigate the infection control measures taken by dentists during COVID-19 outbreak.

V. Conclusion

Dentists are at high risk of COVID 19 and its associated disease. Dental practitioners should wear a facemask at all times at their workplace. All patients and their caretakers/attendants should be screened for fever and symptoms consistent with COVID-19 before entering the health care facility. Number of visitors to the health care facility should be limited to only those who are essential for patient's well-being.

The Personal protective equipment (PPE) recommended when caring for a patient with suspected or confirmed COVID-19 includes respirator/facemask, eye protection (goggles or face shield), gloves and gown. Dental Practitioners must receive training on use of PPE, Donning and doffing of PPE and proper disposal of PPE.

Aerosol generating procedures (AGPs) should be avoided as much as possible. If Aerosol generating procedures (AGPs) need to be performed, Dental practitioners should take all protective measures i.e. use of N95 Mask or high level respirator, protective eye goggles, face shield, gloves and gown.

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