

# Infection Control Practices among Dental Practitioner in a Public Sector Tertiary Care Hospital During Second Wave of Covid-19 Pandemic in Karachi, Pakistan

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## ABSTRACT

**Objective:** To determine the infection control practices among dental practitioner in a public sector tertiary care hospital during a second wave of COVID-19 pandemic in Karachi, Pakistan.

**Study Design:** Cross-sectional study

**Place and Duration of Study:** This study was conducted at the Jinnah Sindh Medical University (JSMU) and Jinnah Postgraduate Medical Center (JPMC) from December 2020 to February 2021.

**Materials and Methods:** An online survey was conducted and a self-prepared questionnaire was disseminated in closed social media group of the two institutes. The questionnaire included following components; consent form, patients screening, use of personal protective equipment (PPE), hand hygiene practices, environmental cleaning, injection safety precautions. Practices were considered as acceptable if the score was  $\geq 80\%$  of the total questionnaire score based on Bloom's threshold.

**Results:** Most of the participants were house officers (64.4%) and responded from JSMU (61.4%) and. The highest frequency for acceptable infection control measures was observed for injection safety precautions (96.2%) followed by hand hygiene (86.4%), use of PPE (77.3%), patient screening (58.3%) and environmental cleaning (56.1%). On individual items, poor practice was observed for ventilation system in clinics (38.6%), hand washing before wearing gloves (43.2%), use of N-95 masks or powered air-purifying respirators, disinfecting the clinical contact surfaces (54.5%) and covering surfaces that cannot be cleaned (67.4%).

**Conclusion:** Infection control practices were unsatisfactory in terms of COVID-19 patient triaging and screening, use of N-95 masks during aerosol procedures and disinfection of surrounding objects after attending the patient

**Key Words:** COVID-19, infection control, dental practitioner, second wave, public sector hospital, Karachi, Pakistan

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## INTRODUCTION

The COVID-19 outbreak was instigated in December 2019 in Wuhan, the city of China, as a pneumonia of unknown cause that rapidly spread around the world<sup>(1)</sup>. The outbreak was sixth public health emergency of international concern which was declared as pandemic by World Health Organization (WHO) on March 11, 2020<sup>(2)</sup>.

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The government of Pakistan officially announced the second wave COVID-19 on October 28, 2020<sup>(3)</sup>. Earlier the virus was M-164 but during the second wave, a mutated form of virus was observed i.e. 614-G. The protein based substance in initial strain was replaced with glycine that transformed the virus into more infectious and communicable form<sup>(4)</sup>.

The achievement of preventing the virus spread varied from country wise depending on their prevention approach and their healthcare systems<sup>(5)</sup>. Worldwide, governments and healthcare organizations are collaboratively doing battle against COVID-19 with implementation of newly designed guidelines recommended by Center for Disease Control and Prevention (CDC) and other global agencies (6). The Government of Pakistan also promptly adopted the prevention guidelines and recommendations put forward by WHO and CDC to save the healthcare soldiers<sup>(6)</sup>.

As a result of dental procedures, a cloud of aerosol generates rendering the dental clinics areas the highly

contagious for healthcare workers and visiting patients<sup>(7)</sup>. It is a fact that public healthcare system in Pakistan is comparatively weaker and showed a slow response to combat in situation of COVID-19 pandemic<sup>(8)</sup>. However, a cross-sectional nationwide survey conducted in Pakistan during first wave of COVID-19 reported that  $\geq 80\%$  participants were sanitizing/washing their hands before and after attending patients, taking history of COVID-19 symptoms, ensuring that patients and visitors are wearing masks and using face shields and eye protectors whereas less than 80% reported that they were not using N-95 masks and pre-procedural mouthwash and did not install physical barriers<sup>(9)</sup>. According to another survey conducted all over the Pakistan during first wave of COVID-19, 66.89% survey respondents said they were taking patients' temperature in their dental clinics<sup>(10)</sup>.

In the beginning of the pandemic, the fear and anxiety of being infected with virus was also at the peak due to which dental practitioners were maintaining good hygiene practices as indicated in the previously published literature. However, surveillance is an ongoing process and pandemic has not been over yet. Hence it is of very immense importance to determine how dental practitioners are taking infection control measures when they have already learnt to survive in the situation of pandemic. Therefore, we conducted the current study to determine the infection control practices among dental practitioner in a public sector tertiary care hospital during a second wave of COVID-19 pandemic in Karachi, Pakistan.

## MATERIALS AND METHODS

An online cross-sectional survey was conducted in Jinnah Sindh Medical University (JSMU) and Jinnah Postgraduate Medical Center (JPMC), Karachi, Pakistan during December 2020 to February 2021 with the approval from Institutional Review Board (IRB #JSMU/IRB/2021-401) in writing. The Google Docs link of the questionnaire was shared on closed social media group of JSMU and JPMC. The study included clinical demonstrators, residents and dental house officers. The consent to participate in a survey was taken online. Sample size was estimated using online available Rao soft sample calculator assuming 50% response distribution, a confidence interval of 95% and taking total population of 200 dental practitioners in both the institutes. The calculated sample size was 132 responses. The survey link was deactivated when 132 complete responses were received.

The questionnaire was constructed in accordance with the CDC guidelines. The first component was demographics including age, gender, designation, working experience. The second part of the

questionnaire assessed the infection control practices with total 18 questions to explore practices related to COVID-19. Questions were related to patient screening and triage, use of PPEs, hand hygiene practices, standard injection safety precautions and environmental cleaning and disinfection. All the questions had binary responses either yes or no and a score of 1 was assigned to correct practice. Scoring was done for all 18 items together and for each sub-components. Practices were categorized as satisfactory practices using a Bloom's threshold of  $\geq 80\%$  score<sup>(11)</sup>.

The data was entered and analyze in IBM SPSS version 21. Descriptive statistics was computed in terms of frequencies with percentages for categorical values, Median with inter-quartile range (IQR) was computed to summarize numerical variables.

## RESULTS

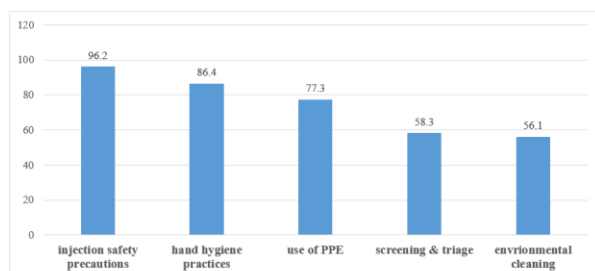
The median age of the study participants was 25 (IQR=24 – 27.75) years and majority of them were females (n=103, 78%). More than half of the study participants were house officers (n=85, 64.4%) whereas some of them were residents (n=27, 20.8%) and clinical demonstrators (n=20, 15.1%). Majority of the study participants were working in JSMU (n=81, 61.4%).

Table 1 depicts the responses against every item of the survey. Nearly 50% responded that they were not screening patients for COVID-19 and there was no particular workflow. Around 50% reported that they do not wash their hands before wearing hand gloves. Among all the measures of PPE, the lowest compliance was observed for use N-95 masks or powered air-purifying respirators (PAPRs). Regarding the injection safety measures, highest compliance was observed for discarding for single use devices, keeping the needles or sharp-pointed instruments away from the body followed by avoiding aerosol generating procedures as possible and use of one hand scoop technique for capping used needles. When asked about the environment related safety measures, nearly 40% participants reported for proper ventilation system in their clinics whereas nearly half of them were disinfecting the contact surfaces before attending the new patient into the clinic. More than half of them also said that they covered the surfaces with some barrier that can't be cleaned.

Figure 1 represents, the overall infection control practices for all the components of the questionnaire. The highest acceptable practices were observed for injection related safety measures followed by hand hygiene practices, use of PPE, patients' screening and triage for COVID-19 infection and disinfection of patients' contact surfaces.

**Table No.1: Survey participants' response distribution for each survey items**

Survey items	Yes n(%)	No n(%)
<b>Patient screening and triaging</b>		
Does your dental setting have a work plan (workflow) for COVID-19 patient screening and dental management?	77(58.3)	55(41.7)
<b>Hand washing practices</b>		
Do you wash your hands before putting on gloves?	57(43.2)	75(56.8)
Do you wash your hands immediately after removing gloves?	111(84.1)	21(15.1)
Do you wash your hand after bare handed touch of instruments or equipment?	126(95.5)	6(4.5)
Do you wash your hands with alcohol or soap for at least 20 seconds when they are visibly soiled with blood?	132(100)	0(0)
<b>Use of personal protective equipment</b>		
Do you wear surgical mask strictly in clinics and outside the clinics?	126(95.5)	6(4.5)
Do you wear either lab coats or sterilized scrub dresses in clinics?	122(92.4)	10(7.6)
Do you change mask when it is wet?	123(93.18)	9(6.8)
Do you remove the gloves if they are torn or puncture?	129(97.7)	3(2.3)
During aerosol generating procedures do you use an N95 respirator or a powered air-purifying respirators (PAPRs)?	40(30.3)	92(69.7)
Do you change your surgical mask when you go out of clinical area?	105(79.5)	27(20.5)
<b>Standard injection safety precautions</b>		
Do you use one hand scoop technique for capping used needle?	111(84.1)	21(15.9)
The direction of needle/probe or sharp instrument is always away from you?	131(99.2)	1(0.8)
Do you discard the single use devices after using once?	131(99.2)	1(0.8)
Do you avoid aerosol generating procedures whenever possible, including the use of high-speed dental handpieces, air/water syringe, and ultrasonic scalers?	126(95.5)	6(4.5)
<b>Environmental cleaning and disinfection</b>		
Is your dental OPD properly ventilated or does it has HEPA filtration unit?	51(38.6)	81(61.4)
Clinical contact surfaces disinfected after every patient?	72(54.5)	60(45.5)
The surfaces which cannot be cleaned properly are covered with surface barrier?	89(67.4)	43(32.6)

**Figure No.1: Frequency of acceptable infection control practices for different domains**

## DISCUSSION

In compliance to the WHO guidelines, a triage area must be established with dental clinics as a routine procedure to observe patients' temperature<sup>(12)</sup>. A study from China reported that 88% of COVID-19 patients present are febrile with temperature of more than 37.5 degrees<sup>(13)</sup>. However, it is quite upsetting to disclose that around 41.7% of the participants reported that there

was no proper arrangement in their clinics for screening of COVID-19 patients. A similar survey from Nepal also reported that 69% survey participants were taking body temperature whereas 90% of these study participants were inquired about travel history<sup>(14)</sup>. Hands are a critical vector for microorganism transmission<sup>(15)</sup>. The cross-transmission of these organisms happens if hands are not washed effectively. Globally the most effective and low cost prevention against COVID-19 infection is hand hygiene with alcohol rub<sup>(16)</sup>. In the present study, around half participants (56.8%) were not washing their hands before putting gloves which is quite alarming, 84.1% and 95.5% of participants were washing their hands after removing gloves and after working with instruments respectively. A survey from Lebanon reported 98.9% were using alcohol hand rub or soap for hands before and after attending patients.<sup>(17)</sup> Healthcare workers around the world are continuously in a combat state against COVID-19 with high risk of virus transmission for those involved in the aerosol-

generating procedure (AGP), such as noninvasive ventilation (NIV), high flow nasal cannula (HFNC), and endotracheal intubation<sup>(18)</sup>. In present survey, almost all of the participants were wearing surgical mask (95.5%), lab coats or scrub gowns (92.4%), changing their face mask on becoming wet (93.2%), changing their punctured gloves (97.7%). However, it was alarming that only 30.3% were using N-95 mask or powered air purifier respirators during AGPs. In the perception of 73.5% dental practitioners, dental treatment should be provided with using PPEs including goggles, gloves and particulate respirators, this was reported in another Pakistani survey that investigated knowledge, attitude and practices in dentistry regarding COVID-19<sup>(19)</sup>.

CDC infection control guidelines, indicates that dental impressions are potential sources of cross-contamination and should be handled in a manner that prevents exposure to practitioners, patients, and the environment<sup>(20)</sup>. In our survey, 99.2% of the participants reported that they discard the single use devices. 99.2% said that direction of needle is always from them. 84.1% reported that they use one hand scoop technique for capping used needles. In a precise way we can conclude that dental practitioner, the part of the current study, were performing up to the mark practices regarding instrument handling.

According to the WHO guidance for infection control in health-care settings, natural ventilation is widely used and accepted as “among the effective environmental measures to reduce the risk of infections transmission in health-care settings”. In the present study, 61.4% participants said that there is no ventilation system in their out-patient units. The possible reason for the low compliance could be fact that the study was conducted in a public sector institute where the desired infrastructure to maintain the required ventilation system in clinics is a crucial task due to high turnover of the patients and lack of necessary facilities in terms of manpower and equipment to cope-up the situation. Nearly half of the participants (54.5%) said that clinical surfaces are being disinfected after every patient and 67.5% said that surface barrier was applied where surfaces cannot be cleaned properly. The compliance rate for disinfecting the patient’s chair and other things was higher in dental clinics of Lebanon<sup>(17)</sup>.

The current study depicts the infection control measures for a single public sector institute. A multi-center survey is recommended to conduct to have generalized insights regarding the infection control practices among dental practitioners in public sector institutes.

## CONCLUSION

Infection control practices were unsatisfactory in terms of COVID-19 patient triaging and screening, use of N-

95 masks during aerosol procedures and disinfection of surrounding objects after attending the patients.

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**Conflict of Interest:** The study has no conflict of interest to declare by any author.

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