ORIGINAL ARTICLE

Prevalence of SARS-COV-2 Antibodies in Dental Healthcare Providers

SHAWANA IQBAL[1], SHAHAB ADIL[2], NAJEEB-UL-HAQ[3], MOHSINA HAQ[4], KAWISH SYED[5], NAILA SUMBAL[6], MADIHA ISHFAQ[7]
[1,6]TMOs, [2]Professor, Department Orthodontics, Peshawar Dental College, Warsak Road Peshawar
[3]Professor, Department of Medicine, Peshawar Medical College, Warsak Road Peshawar
[4]Associate Professor, Department of Microbiology, Peshawar Medical College, Warsak Road Peshawar
[5]Associate Professor, Department of Periodontology, Sardar Begum Dental College, Ghandara University Peshawar
Correspondence to: Shawana Iqbal, Email: drshawanaiqbal@gmail.com, Cell: 0321-9397100

ABSTRACT

Background: Occupational hazards and risks are a common public health issue, especially when healthcare workers safety is concerned; they are on high risk of catching infections such like COVID-19. The possibility of cross-infection between dental practitioners and patients is significantly higher due to the close exposure of dental staff to patient oral environment.
Aim: To assess the prevalence of SARS-COV-2 antibodies in dental workers working in the Peshawar Dental College and Hospital, Peshawar.
Study Design: Cross sectional study
Place and Duration of Study: Department of Orthodontics, Peshawar Dental College & Hospital, Peshawar from 1st January 2020 to 31st December 2020.
Methodology: One hundred and thirty three dental workers were enrolled. The investigation was run to detect immunoglobulin G and M antibodies against the SARS-CoV-2-2. The aspirated aerosol and air was evacuated and dissipated into the atmosphere.
Results: Mean age was 29.4±1.4 years and males were dominant 74 (55.6%) and male workers found greater with positive antibodies. The prevalence of SARS-CoV-2 antibodies was 33.0%. Proportionately dental assistants (20.5% vs 16.9%) and ancillary staff (20.5% vs 10.1%) had higher prevalence. Sore throat and body aches were more common in positive antibodies cases while travel history was found significantly associated with it (40.9% vs 25.0%, p-value, 0.05).
Conclusion: High frequency of SARS-COV-2 antibodies was found in dental workers showing a high infection rate of COVID-19 in healthcare workers in local settings.
Keywords: Dental workers, COVID-19 infection, Antibodies, SARS-COV-2

INTRODUCTION

Health practitioners taking care of patients suffering from coronavirus disease 2019 (COVID-19) are at high risk of catching infection.[1] However, in Dental hospital the cross-infection between dental practitioners and patients is more stronger due to the close exposure of dental staff to patient oral environment.[2] COVID-19 is an airborne infection, its incubation period averages from, 5-6 days, however can be up to 14 days. During incubation time this virus may or may not present with sign and symptoms, but this it is highly contagious, thus transmission is most likely definite.[3]

Most dental procedures are aerosol generating, so all aerosol-generating procedure should be done with caution according to the guideline like using personal protective equipment, double gloves, airborne precautions and hand hygiene. On the other hand many precautionary measures will be required for prevention of its spread in hospital.[4] These measures may include reducing the number of dental appointment per day and also sanitization of the unit every half an hour can reduce the number of affected individuals, but will increase the suffering of the individuals in need of urgent dental care. It will also incense the burden on hospitals emergency departments.[3,4]

The clinical symptoms associated with COVID-19 differ case to case basis, but fever, shortness of breath, severe headache, nausea, red eye, persistent dry cough, myalgia, lose of taste and smell are the most frequent of these.[5] Antibodies are frequently detected 1 to 3 weeks after the onset of illness, which is the most prominent indicator and later on it has substantial decrease in infectiousness and a degree of immunity from possible infections.

Nearly all immune competent individuals will develop an immune response following SARS-CoV-2 infection.[6,7] Like infections with other pathogens, SARS- CoV-2 infection elicits development of IgM in acute infection and IgG antibodies in immunity, which are the most useful for assessing antibody response because little is known about IgA response in the blood.[8] The presence of both IgM and IgG suggest that patient should be in their first month of infection and theoretically immune to the virus and re-infection. These antibodies are also used for the diagnostic purpose of total antibodies (igG + igM), 38% present in first week of infection, 90% in second week and 100% after one month of infection.[9,10] Recurrence of COVID-19 disease appears to be very rare, indicating that the presence of antibodies may grant at least short-term immunity to SARS-CoV-2 infection.[11]

The purpose of the study was to assess the prevalence of SARS-CoV-2 antibodies in dental care providers and also to check their practices to implement more strict precautionary measure to prevent its spread among dental care providers.

MATERIALS AND METHODS

This cross sectional study was conducted in the Department of Orthodontics, Peshawar Dental College & Hospital, Peshawar. All the dental staffs working in the dental college and hospital were included. The study was approved by the institutional review board. A written informed consent was taken from all enrolled dentists and other staff. The dental staff included senior faculty, trainees/medical officers, house officers, dental assistants, ancillary staff and administrative/support staff.

All dental workers underwent a serological test after getting enrolled in this study. The investigation was run to detect immunoglobulin G and M antibodies against the SARS-CoV-2-2. The V6000 aspirating system with a vacuum controller (dry or semidry mode) and high-efficiency particulate air (HEPA) filters was used at the hospital. The aspirated aerosol and air was evacuated and dissipated into the atmosphere. All investigations followed these recommendations for dental patient management and types of personal protective equipment used.

The study variables included, age, gender, antibodies test results, clinical presentation and any sign and symptoms in dental workers as well as status of their practices during the COVID-19 pandemic.

SPSS version 22.0 was used for statistical analysis. The continuous numerical variables like age were measured as mean and standard deviation. The categorical variables like gender, test result, sign and symptoms, practices of dental workers were measured as frequency and percentages. All study parameters were compared between antibodies positive and negative categories using chi square test. A p-value of <0.05 was considered significant difference.

RESULTS

The overall mean age of subjects was 29.4±1.4 years. Most of the respondents were male 74 (55.6%) compared to 59 (44.4%)

females. Out of the total 133 dental workers, the prevalence of SARS-CoV-2 positive antibodies was noted to be 33.0% in this study (Fig. 1).

There were 44 positive antibodies and 89 negative antibodies. The average age was younger (27.9±6.0 vs 30.2±8.2 years) in dental healthcare workers who had their antibodies tested positive. The prevalence of positive antibodies was greater in male dentists 32 (72.7%) compared to their female 12 (27.3%) counterparts and found statistically significant (p-value, 0.005). Overall professional background or various dental health cadres were similar in terms of antibodies positive findings, however, proportionately dental assistants (20.5% vs 16.9%) and ancillary staffs (20.5% vs 10.1%) was having greater prevalence of positive antibodies. (Table 1)

There was no major illness found in the dental workers and this finding was found similarly distributed between SARS-COV-2 antibodies positive and negative cases. When overall symptoms of SARS-COV-2 were compared, it was found out that cases with positive antibodies findings had high frequency of symptoms (45.5% vs 30.3%) compared to negative antibodies and this difference was close to statistical significance (p-value, 0.08). Similarly, almost all the individual symptoms such as fever, cough, sore throat, headache, loss of smell and taste were more frequent in cases of positive antibodies. Body aches were found significantly more prevalent in dental healthcare workers who had positive antibodies test (20.5% vs 6.7%) compared to those with negative findings (p- value, 0.02). Similarly, sore throat was also found more common in antibodies positive cases (31.8% vs 13.5%, p-value, 0.01) (Table 2).

Social distancing and wearing masks was found similarly distributed among antibodies positive and negative dentists. However, history of contact was more prevalent in antibodies positive cases (75.0% vs 61.4%), however, it was not statistically significant (p-value, 0.10). Similarly, those worker who performed AGP were also found more likely to have positive antibodies findings (59.1% vs 44.9%), however, this difference was also not significant (p-value, 0.12). On the other hand travel history was found significantly associated with positive antibodies findings (40.9% vs 25.0%, p-value, 0.05). (Table 3)

Table 1: Sociodemographic characteristics

Variable	SARS-COV-2 antibodies		P value
	-ve (n=89)	+ve (n=44)	
Age (years)			
Up to 40	82 (92.1%)	41 (93.2%)	0.82
Above 40	7 (7.9%)	3 (6.8%)	
Gender			
Male	42 (47.2%)	32 (72.7%)	0.005
Female	47 (52.8%)	12 (27.3%)	
Profession			
Faculty	13 (14.6%)	5 (11.4%)	
TMOs	19 (21.3%)	5 (11.4%)	
House officers	20 (22.5%)	9 (20.5%)	
Dental Assistants	15 (16.9%)	10 (22.7%)	
Ancillary staff	9 (10.1%)	9 (20.5%)	
Admin	13 (14.6%)	6 (13.6%)	

Table 2: Presentation and practices of patients

Variable	SARS-COV-2 antibodies		P value
	-ve (n=89)	+ve (n=44)	
Major illnesses			
Not significant	81 (90.9%)	40 (90.7%)	
Diabetes	1 (1.1%)	2 (4.7%)	0.44
Hypertension	6 (6.8%)	1 (2.3%)	
Asthma	1 (1.1%)	1 (2.3%)	
Overall symptoms	27 (30.3%)	20 (45.5%)	0.08
Fever	12 (13.5%)	9 (20.5%)	0.29
Cough	14 (15.7%)	10 (22.7%)	0.25
Sore throat	12 (13.5%)	14 (31.8%)	0.01
Body aches	6 (6.7%)	9 (20.5%)	0.02
Diarrhea	3 (3.4%)	4 (9.1%)	0.32
Breathlessness	1 (1.1%)	1 (2.3%)	0.85
Headache	2 (2.2%)	3 (6.8%)	0.39
Loss of smell	-	2 (4.5%)	0.59
Loss of taste	1 (1.1%)	1 (2.2%)	0.85

Table 3: Practices of dentists during COVID-19 pandemic

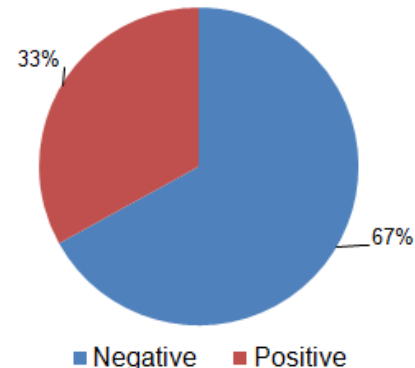| Variable	SARS-COV-2 antibodies		P value
	-ve (n=89)	+ve (n=44)	
Social distancing	63 (70.8%)	32 (72.7%)	0.81
History of contact	54 (61.4%)	33 (75%)	0.10
Performed AGP	40 (44.9%)	26 (59.1%)	0.12
Wear mask	82 (92.1%)	43 (97.7%)	0.76
Travel history	22 (25.0%)	18 (40.9%)	0.05

Fig. 1: Prevalence of SARS-COV-2 antibodies in the study (n=133)

DISCUSSION

Since the start of the pandemic many studies by various healthcare settings have assessed the prevalence of SARS-COV-2 antibodies, with the primary focus to assess, how many healthcare workers get affected by the disease. The current study found a high frequency of positive SARS-COV-2 antibodies in the Dental workers at the Peshawar Dental College and Hospital, Peshawar. Almost one- third (33.0%) dental workers in this study had positive antibodies findings, moreover, house officers, ancillary staff and dental assistants were the most frequent with positive antibodies status. There is some comparative previous evidence regarding this. A study by Sebastian P and colleagues reported 12.0% dental workers with positive antibodies results, and in their study clinical staff was more frequent with positive antibodies findings than non-clinical staff.[12] Another study by Gallus S and colleagues witnessed 10.8% dental staff with positive antibodies of SARS-COV-2-2, and most frequently affected staff was administrative in their study.[13] Another study by Sarapultseva et al[14] witnessed 11.5% dental staff with SARS-COV-2-2 infection. A study from Oman by Al-Naamani et al[15] reported a similar frequency (33.7%) of SARS-COV-2-2 positive antibodies. Many other previous studies from the developed world have found lower rates of COVID-19 infection in healthcare workers. The low prevalence reports from Netherlands (0.9%)[16] and China (1%),[17] could be due to the fact that they were conducted early in the pandemic. Another study from Qatar also witnessed a high rate of COVID-19 infection in healthcare workers (10%).[18]

In this study male staff and those with a history of travel were significantly more likely to have positive antibodies findings. A similar finding of gender distribution according to positive antibodies findings was witnessed by Gallus et al[13], where they found out males predominantly associated with positive antibodies findings. Other studies have found in contrast gender distribution to our study. Al-Naamani and colleagues[15] witnessed that female health staff was more prone to have positive antibodies findings. Another study by Sarapultseva et al[14] also witnessed female staff to be significantly associated with positive SARS-COV-2-2 antibodies.

In the present study the most frequent sign and symptom in the dental workers were sore throat and body aches which were found significantly related to positive antibodies results. The standard symptoms of SARS-COV-2-2 have been reported in healthcare workers by many previous reports.

This was one of the first study which also assessed the practices of dental workers during the COVID-19 pandemic. It was

witnessed that workers who had history of travel, who had history of contact with COVID-19 patients and also those who performed AGP were more likely to have positive antibodies findings. This proves that restrictions on travel and isolation of COVID-19 patients were remarkable strategy. Also since the healthcare workers and dental workers are more prone to exposure with undiagnosed people, they must be vaccine compliant and use proper protective equipment.[19,20]

There are many advantages of the current study. Firstly, this was one of the first studies on prevalence of SARS-COV-2-2 in dental staff in Pakistan. Secondly, a reasonable sample of 133 dental staff was selected and their information analysed. Thirdly, to date many studies in different parts of the world have assessed the prevalence of COVID-19 infection in healthcare workers, but no one was found assessing their practices and attitude during the pandemic.

CONCLUSION

A very high frequency of SARS-COV-2-2 positive antibodies was found in dental workers in this study showing a high infection rate of COVID-19 in healthcare workers in the local health settings. The male dental workers and those with a travel history were more prone to COVID-19 infection. Sore throat and body aches were the most common signs & symptoms in dental workers with positive antibodies.

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