

# Covid-19 Pandemic and its Impact on Orthodontic Patients in Lahore, Pakistan

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## ABSTRACT

**Objectives:** To determine the effect COVID-19 pandemic had on orthodontic patients during the lockdown phase as well as to determine the knowledge of patients regarding the COVID-19 disease, its spread, its symptoms, and its prevention.

**Methodology:** This was a cross-sectional descriptive study. It was carried out by distributing a self-administered questionnaire to 300 patients undergoing orthodontic treatment via electronic mail and whatsapp platform. The questionnaire assessed the knowledge of the patient regarding the COVID-19 disease, the impact it had on their orthodontic treatment, and their perception of risk and their attitude towards the COVID-19 disease.

**Results:** 274 out of 300 patients responded to our questionnaires; Out of them 73% were females and 27% were males. A large number of patients were able to correctly identify the cause, spread, symptoms, and necessary measures needed to be taken to contain the disease. Although majority of the patients considered COVID-19 to be severely dangerous and felt highly vulnerable to the disease; 54.5% were still willing to continue their treatment during the pandemic. The main reason for their willingness was the fear of increased missed appointments leading to increase in treatment time and cost.

**Conclusions:** The pandemic has had an adverse impact on orthodontic treatment regardless. Nevertheless, patients were still inclined to continue their treatment with appropriate infection control and precautionary measures observed both by the patients themselves and the orthodontic clinical staff.

**Keywords:** COVID-19, Health knowledge, Attitude, Practice, Pandemic

## INTRODUCTION

Corona virus disease (COVID 19) now recognized as being caused by severe acute respiratory syndrome virus (SARS-COV2) first surfaced in Wuhan, China at the end of 2019(1). There after it rapidly spread throughout the world at such an alarming rate that the World Health Organization (WHO) labeled it as a global pandemic on 11 March 2020(2). On 26<sup>th</sup> February 2020 the first case of COVID-19 was confirmed by the ministry of Health, government of Pakistan (3). Since then, the country has experienced five different waves of COVID 19 with 1,488,958 confirmed cases and 29,828 deaths (4).

COVID-19 results in a broad range of symptoms which vary from being very mild to severe leading to fatalities in some cases. The symptoms are usually seen from 2 to 14 days after exposure to the virus. The mode of transmission of the disease is by aerosol, droplets and close contact with infected people or surfaces. The symptoms associated with this disease include shortness of breath, cough, and difficulty in breathing, muscle pains, chills, fever, loss of taste or smell and sore throat (5).

To contain the spread of COVID-19, Pakistan was forced to declare an emergency situation with smart and complete lock downs, travel restrictions, and implementation of social distancing (6). The government also announced cessation of elective surgical procedures and OPDs in all districts headquarter hospitals, tertiary care hospitals, private clinics and dental practices. Only essential services were allowed to continue functioning. (7;8)

Dental health care workers and patients are at risk of contracting the disease as many of the dental procedures generate aerosol mist of blood droplets and saliva. Orthodontic treatment also poses a risk of exposure to the disease due to close contact with patients (2). Since orthodontic treatment is a lengthy process requiring almost 2 to 3 years for completion, delaying the treatment till the pandemic is over would have prolonged the overall treatment with serious repercussions for both the orthodontist and patients (8;9). Keeping in mind the aforementioned scenario, many orthodontists resumed their practices with enforcement of precautionary measures such as temperature check, social distancing, epidemiologic record evaluation, and use of Personal Protective Equipment to reduce the spread of infection (2).

Both dental health care workers and patients should have a sound understanding of COVID-19 and the guidelines and protocols for infection control to avoid its transmission, and protect

themselves from getting infected (9). The aim of this study was to assess the effect COVID-19 pandemic had on orthodontic patients during their treatment as well as the patients' knowledge regarding spread and prevention of the disease.

## MATERIALS AND METHOD

The study was approved by the ethical committee of Azra Naheed Dental College, Lahore. It was a cross-sectional descriptive study. A total of 300 patients aged 12-24 years, who were currently undergoing orthodontic treatment (with removable or fixed appliance) and who consented to take part, were included in the study.

A self-administered questionnaire on Google Forms was drafted and given to 4 senior orthodontists to assess the validation. Changes were made according to their recommendations. The questionnaire was composed of four sections; demographic data, impact of COVID-19 on orthodontic treatment, knowledge about the disease, perception of risk and attitude towards the COVID-19. It was sent via email and WhatsApp to patients over a period of 6 weeks. The responses were tabulated in excel sheets and statistical analysis was done using SPSS (version 23.0; IBM, Armonk, NY). Chi square test was used to find association between willingness to continue treatment with gender, duration of treatment and age, Association was also assessed between level of education with knowledge of the disease using Chi square test. P value of 0.05 was considered as significant.

## RESULTS

274 (91.3%) responses were received from patients aged 12-24 years. A majority 73% of the patients were female while 27% were males. 47.3% patients had received tertiary level of education. 70.1% were undergoing fixed orthodontic treatment while 18.2 % were undergoing orthodontic treatment using removable appliances.

Most of the patients (94.2%) had visited the orthodontist during the pandemic to get various procedures done. (Table.1) 54% of the patients went for their routine fixed appliance review appointments, 20.4 % went to get their loose brackets or bands fixed, 8% had protruding arch wires snapped and a further 8% required adjustments to their removable appliances.

A majority of the respondents (70.8%) considered their knowledge regarding the pandemic to be moderate to high. They

were able to correctly identify its incubation period (67.2%), the kind of infection (92.7%). Most respondents also correctly identified the common symptoms of COVID-19: cough (92.7%), fever (96.4%), sore throat (79.6%) and shortness of breath (88.3%) - and the most common modes of transmission - coughing (92%), handshaking (88.3%), and touching contaminated surfaces (90.4%). The preventive measures chosen by the patients were also mostly correct; washing hands with water and soap (91.2%), use of protective face masks (90.5%) and routine disinfection of infected surfaces (82.5%) were commonly chosen.

As far as the perception of the risk and attitude towards the COVID-19, we got a mixed response. Almost all respondents considered COVID-19 to be at least moderately dangerous yet 92% of them still opted to continue their treatment during the pandemic. (Table II).

About 27% of the patients were not sure about their susceptibility of being infected during visits whereas 26.3% believed they were moderately vulnerable and 24.8% were severely concerned regarding contracting the disease. COVID-19 was considered very dangerous by 54.7% patients whereas 43.8% considered it to be moderately dangerous. Regarding willingness to continue treatment, 92% of the patients were willing to continue their orthodontic treatment during the pandemic. (Table 1)

Table 1: The impact of COVID-19 on orthodontic practice

Have you visited your orthodontist after the onset of the COVID-19 pandemic outbreak?*	
Yes	94.2%
No	5.8%
If yes, what procedure was done?*	
Removable appliance adjustment	8%
Routine review appointment	54%
Protruding arch-wires adjustment	8%
Loose brackets or bands replacement	20.4%
Other	9.5%
What effect has the COVID-19 pandemic HAD on your orthodontic treatment?	
Fear of contracting the virus on routine orthodontic visits	40.9%
Missed routine appointments	54%
Increased treatment time	55.5%
Increased cost of treatment	13.9%
No effect	21.2%
Other	2.2%
How do you think COVID-19 will affect your orthodontic treatment?	
Increased cost of treatment	24.1%
Missed routine appointments	54%
Increase in treatment time	56.9%
No effect	19%
Other	5.1%
What economic impact COVID-19 has on your or parent's income?	
No impact	24.1%
Mildly negative	22.6%
Moderately negative	29.2%
Severely negative	14.6%
Mildly positive	4.4%
Moderately positive	0.7%
Very positive	4.4%
Do you believe that the pandemic will result in change in your willingness to continue orthodontic treatment in the near future?	
Yes	55.5%
No	44.5%
Are you concerned about undergoing orthodontic treatment during the pandemic?	
Yes	41.6%
No	45.3%
Indifferent	13.1%

Although 41.6% of the patients were weary of continuing with their ongoing treatment during the pandemic, 92% of them still opted to visit out of concern (56.9%) about the resultant increase in their overall orthodontic treatment time due to missed

appointments. 24.1% were worried about the increased cost of treatment.

Table 2: The Orthodontic patients' perception of risk and attitude towards COVID-19

Your perception of COVID-19 infection	
Very dangerous	54.7%
Moderately dangerous	43.8%
Not dangerous at all	1.5%
Your perception of the vulnerability to COVID-19 infection	
Not vulnerable	2.9%
Slightly vulnerable	19%
Moderately vulnerable	26.3%
Severely vulnerable	25.8%
I don't know	27%
Willingness to continue your treatment amid the period of the pandemic?	
Yes	92%
No	8%

The psychosocial well-being of the patients was also affected due to the pandemic. 43.1% patients reported a feeling of being depressed whereas 32.1% were upset by not being able to leave home and earn a living for themselves and their families.

Table 3: Psychological wellbeing affected by COVID-19

How has COVID-19 affected your psychosocial well-being?	
It has had no effect	19.7%
I feel depressed	43.1%
I am happy; it has given me time to rest	13.9%
I feel unhappy, not being able to work or earn an income	32.1%
I don't know	16.8%

There was no statistically significant relationship between willingness of continuing treatment during the pandemic with either gender (P value = 0.331), duration of treatment (P value = 0.287) or age (P value = 0.402). Similarly, there was no link of the level of education each patient received with their knowledge of the disease, its mode of action, spread, and prevention. (P value = 0.269).

## DISCUSSION

COVID 19 has changed everyday life around the globe requiring crucial global healthcare response and is the first pandemic to surface since the 1918 Influenza pandemic. The first case was documented in Wuhan, China in 2019. Thereon its spread worldwide took place due to travel of infected persons (8). COVID-19 transmission takes place through aerosol particles. If a person is infected with the virus, he or she can put the other person in front of him or her in danger. Since the working distance of a dentist and a patient is approximately 35 to 40cm coupled with the fact that orthodontic procedures require longer appointment times, the orthodontist can be at a greater risk of contracting the novel virus (10).

Once the pandemic was announced by the WHO many countries decided to put their population under complete or partial lockdowns in an attempt to curb the spread of the virus (11). Similarly, all the leading national dental organizations such as the BDA advised against routine dental procedures and allowed only for emergency treatments to continue (12). Considering the fact that no internationally recognized guidelines were put forward regarding orthodontic practice, it all came down to the discretion of the orthodontist and whether they were comfortable with continuing their practice or not. As we all know the orthodontic treatment lasts an average of 2 to 3 years with appointments after 1 to 2 months, it was the need of the hour to look upon the pandemic from the patient's perspective (13).

The results of this study showed that a high percentage of patients considered their knowledge regarding the virus as moderate (70.8%) and this could be further corroborated by the results regarding their knowledge about the incubation period

(67.2%), the kind of infection (92.7%), the common symptoms of COVID-19 - cough (92.7%), fever (96.4%), sore throat (79.6%) and shortness of breath (88.3%) - and the most common modes of transmission - coughing (92%), handshaking (88.3%), and touching contaminated surfaces (90.4%). A large majority believed the Corona virus to be a dangerous disease (54.7%), which is almost the same result as presented by Dorothy et al (14). This high level of fear could be due to the lack of research-based treatment modalities and their availability within the region, and the high number of death rates internationally resulting from the pandemic. Similarly, orthodontists have been of the same opinion that COVID-19 is dangerous as shown by a research carried out among orthodontists of Nigeria (15). Majority of the participants were well versed regarding how COVID-19 spread could be curbed in a dental setting, specifically in an orthodontic clinic.

We received a mixed response to the posed question regarding the patients' perception towards their vulnerability to COVID-19 infection. 19% believed themselves to be slightly vulnerable, 26.3% to be moderately vulnerable, and 25.8% believed themselves to be severely vulnerable, while 27% answered 'I don't know'. Despite this perception of vulnerability and at the same time, 92% patients opted to proceed with their treatment during the pandemic.

Majority patients (94.2%) had visited the orthodontist to get various procedures done during the pandemic. Mostly the patients came in for their routine appointments (54%), while some had loose brackets/bands (20.4%) or protruding arch wires and required adjustment of their removable appliances (8%). It could be seen from the results that even though 41.6% patients were concerned about contracting the virus while getting their orthodontic treatment done during the pandemic, 92% of them still wanted to continue visiting and have timely appointments. The biggest concerns that came up among patients were the resultant increase in the overall treatment time (56.9%). Many studies including a study done by Cortin et al, revealed a strong association of the willingness to continue treatment during the pandemic out of fear of an increase in the total time for completion of treatment (16)(17). A very valid concern as evidence has shown that many patients did miss at least one of their orthodontic appointments during a span of 4-6 months (18). Research has also shown that missed appointments were associated with increased amounts of treatment time and cost (19). Some of our patients were also worried about the cost of treatment (24.1%).

It has become clear that the spread of COVID 19 for numerous reasons may lead to anxiety and stress (20). Isolation during quarantine and social distancing resulted in increased susceptibility to disturbed mental health, stress lead to depression (17). A study conducted by Peloso et al reported the 28% patients became anxious due to the pandemic (21). Our study reported similar results with 43.1% patients feeling depressed. Cortin et al revealed that males were more willing to continue with treatment than females (17). On the other hand our study did not find any link between gender and the willingness to continue orthodontic treatment during the pandemic. This may be attributed to the fact that the majority of our participants were females (73%) and that studies also suggest that taking into account the severity and fatality rates associated with COVID 19, males are more vulnerable than females (22)(23).

The COVID-19 pandemic has wreaked havoc across the world, but there seems no end to it. The best possible way to tackle the pandemic is to get vaccinated, practice social distancing, and wear masks (14)(24)(25). This 'new normal' will take some time getting used to and similarly we will need to adapt preventive measures inside the dental clinic as well. CDC endorses the use of protective eye wear, gloves, gowns, N95 masks especially while performing aerosol generating procedures (26). In orthodontic cases we cannot afford to defer appointments for long periods of time as the treatment is time sensitive, and longer treatment times have their own detrimental effects (27). Orthodontic patients are also usually younger in age and therefore may be asymptomatic

carriers of the disease; therefore, special care must be put in managing this group of patients. Infection control procedures should be promoted within the dental setting.

As the whole world begins to open with vaccinations readily available for the general population, so should the dental clinics. Appropriate and effective cross infection controlling measures should be put in place and strictly adhered to if we are to continue practicing safely and efficiently. All precautionary measures should be observed with the patients, and arrangements made for regular training of the dentist and clinic staff.

The limitations of this study are the dependence on self-reported online questionnaire and the cross sectional design. Since the purpose of the study was to analyze the impact the lockdown had on orthodontic patients, this provided us with a better understanding of the problems faced by the patients with a resultant improvement of patient-doctor rapport.

## CONCLUSION

The pandemic has had an adverse impact on orthodontic treatment regardless. Nevertheless, patients were still inclined to continue their treatment with appropriate infection control and precautionary measures observed both by the patients themselves and the orthodontic clinical staff.

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