



Anxiety and perceptions on the impact of COVID-19 pandemic among orthodontic patients visiting a tertiary care center: A Cross-sectional study

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Article History:

Received on: 15 Nov 2020

Revised on: 06 Dec 2020

Accepted on: 08 Dec 2020

Keywords:

Anxiety,
COVID-19,
Orthodontic treatment,
Patient psychology

ABSTRACT

As the COVID-19 pandemic is steadily rising, there is an increase in psychological distress among the orthodontic patients regarding their ongoing treatment. Thus aim of the study was to assess the anxiety and perceptions among orthodontic patients regarding the impact of COVID-19 pandemic on orthodontic treatment. A closed end online questionnaire was sent as Google forms to 300 adult patients' currently undergoing orthodontic treatment at a tertiary care center. 266 patients answered the survey with a response rate of 88.7%. Online consent was taken before participation in the study and the survey was anonymized and did not contain any identifying information. The descriptive data included the participants' responses using frequency and proportions. The difference in the distribution of responses were compared using Chi-square goodness of fit test and the level of significance was fixed at $p < 0.05$. Level of anxiety between males and females was compared using independent t-test. Among the respondents, 126 were males and 140 were females. The mean level of anxiety level among males was 4.28 ± 2.28 whereas for females it was 5.85 ± 2.48 . The differences in the distribution of responses by the participants were statistically significant. The COVID-19 pandemic showed to have a greater impact on orthodontic appointments and anxiety levels of patients. Females showed greater anxiety than males for visiting the dental clinics. The greatest concern that patients reported was the increase in their treatment duration and they also recognized the importance of monthly orthodontic reviews.



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ISSN: 0975-7538

DOI: <https://doi.org/10.26452/ijrps.v11iSPL1.3705>

Production and Hosted by

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INTRODUCTION

The highly infectious coronavirus disease (COVID-19) is caused by the newly discovered "novel coronavirus" (nCoV). The first case of this outbreak was reported in Wuhan, China in December 2019. The novel coronavirus strain (SARS-Cov 2) belongs to the same group of viruses that causes severe acute respiratory syndrome (SARS) and Middle East respiratory syndrome (MERS), for which animal-to-human and human-to-human transmission have been reported (Lee and Hsueh, 2020).

Globally approximately 60.4 million people have been affected by this disease with more than 1.42 million fatalities. In 30 January 2020, the World Health Organization (WHO) declared it as a pan-

demic (World Health Organization, 2020). In India, 9.27 million cases have been reported so far, with approximately 1,35,000 deaths till date of this study and these case numbers are progressively rising, with the disease spreading rapidly (Coronavirus Update, 2020).

In India, Kerala was the first state to report the COVID-19 case and by early March 2020 Kerala had the highest number of active covid cases (Menon et al., 2020). To control this pandemic disease, countries across the globe began to take appropriate measures for prevention. In India, a mandatory lockdown was imposed by the government wherein the people were instructed to stay at home. People were also advised to follow social distancing, maintaining a distance of at least six feet from other individuals (Ministry of Health and Family Welfare, 2020). Only essential services were made available. Since the virus can be transmitted through aerosol, the risk of transmission to dentists was deemed to be high. (van Doremalen et al., 2020) showed that the virus can remain infectious and viable for hours in aerosols and on surfaces up to days. As a result, dental practice was put on hold. Due to the unprecedented nature of COVID-19 pandemic and the mandatory lockdown, orthodontic practice was also adversely affected. It is thus important to assess the anxiety and perceptions among orthodontic patients regarding the impact of COVID-19 pandemic on orthodontic treatment.

MATERIALS AND METHODS

The study population comprised of adult patients (18 years and above) undergoing orthodontic treatment of both fixed and removable appliances at the Department of Orthodontics, Amrita School of Dentistry, Kochi. Informed consent was obtained from all respondents prior to the study and only consented subjects were allowed to participate in the study. Ethical approval for this study was obtained from IRB committee, Amrita Institute of Medical Sciences, Kochi, Kerala.

Based on the proportions of psychological distress among orthodontic patients regarding their visit to orthodontist during Covid pandemic as observed in a previous study by Shenoj et al. (2020) and with 95% confidence and 5% allowable error the minimum sample size comes to 242. Modified closed end online questionnaires (Shenoj et al., 2020) were distributed to consented subjects through WhatsApp Messenger (WhatsApp Inc) using an online data collection mode called Google forms. Anticipating 10–20% of a non-response rate for online surveys, a total of 300 questionnaires were sent,

and 266 patients answered with a response rate of 88.7%. Questionnaire was available for response from September 10, 2020 to September 30, 2020. The survey was anonymized and did not reveal any identifying information about the participant.

Questionnaire consists of 15 questions divided into three sections.

Section 1

Patient perceptions on the significance of regular monthly appointments (Q1–Q5).

Section 2

Impact of COVID-19 pandemic on patients' visit to orthodontic clinic for treatment needs (Q6–Q12).

Section 3

Psychological distress among patients (Q13–Q15).

A numerical rating scale (Johnson, 2005) was used to assess the level of anxiety of orthodontic patients for visiting dental appointments during COVID-19 pandemic. Participants were able to rate their anxiety levels between 0-10; 0 being no anxiety and 10 showing extreme anxiety.

The content validity and reliability of the questionnaire was also performed. The survey questions were validated by five subject experts. The content validity score Index based on average method was 0.89, Fleiss Kappa score of 0.80 showing substantial agreement and percentage agreement was 85.3%.

Statistical Analysis

Statistical analysis was performed using IBM SPSS 20 (SPSS Inc, Chicago, USA). The participants' response data to the study questionnaire were described using frequency and proportions. The difference in the distribution of responses by the participants were compared using Chi-square goodness of fit test and level of anxiety between males and females were compared using independent t-test. The level of significance (p -value) was fixed at $p < 0.05$.

RESULT

Test-retest reliability using Cronbach's alpha and intraclass correlation for the questionnaire were 0.99 and 0.98 excellent scores as per interpretation.

Total 300 questionnaires were sent, and 266 patients answered with a response rate of 88.7%. Among the respondents, 126 were males and 140 were females. The comparison of differences in the distribution of responses and respondents is given in Tables 1, 2 and 3. The mean level of anxiety about visiting dental appointments during COVID-19

pandemic among males was 4.28 ± 2.28 whereas for females it was 5.85 ± 2.48 and was statistically significant. (Table 4)

DISCUSSION

The COVID-19 pandemic has significantly affected the health care system across the globe. Especially the dentists are largely affected because of the high exposure levels in the dental clinic settings. Same way, the orthodontic practice also has been severely affected by this pandemic. Monthly orthodontic reviews could not be conducted during and post lockdown which has led to an increase concern among the patients regarding their treatment. Thus, assessing the anxiety and perceptions among orthodontic patients due to the impact of COVID-19 pandemic is significant at this time as they not only raise clinically relevant information but also helps the orthodontist to better provide mental support and attention to their patients.

Patients' general perspective and the importance of regular appointments comprised the first section of the questionnaire. 54.5% of the respondents replied as they have not attended orthodontic appointments for more than over two months. For a successful orthodontic treatment, regular monthly reviews are at most important.

Certain treatment mechanics requires regular reviews or follow up like space closure mechanics, retraction using elastics, force-decay over time. Plaque accumulation around the brackets and bands due to poor oral hygiene can lead to demineralization around the brackets (Srivastava et al., 2013). This is usually not noticed by patients, as they are unaware of the same. Whereas evident disturbances like a broken bracket, loosened band, poking distal wire causing lacerations are often overlooked. Of the 266 responses, 137 (51.5%) orthodontic patients are very worried because they are not able to attend the regular appointments. Due to which 38.4% patients do not have the materials like elastics to be worn and thus could not follow instructions properly. 63.1% respondents are worried that their orthodontist have not called them post lockdown whereas 34.3% responded as their orthodontist regularly keeps a check on them.

The second section covers the impact of pandemic on patients visit to orthodontist for treatment needs. Here 76.7% patients felt that their treatment will take longer duration since they were not able to attend the monthly appointments which leads to an increase in overall treatment time. Whereas 21% felt that their treatment can go wrong leading to an increased treatment duration. Previous

studies (Moresca, 2018; Beckwith et al., 1999) have evaluated the factors affecting longer treatment time and found that patient compliance was one important factor associated with treatment duration. Patient compliance related factors include missing appointments, poor oral hygiene, appliance breakage which leads to increase treatment time.

It was also found that majority of the patients (47.7%) had broken brackets or elastics came out from the appliance whereas 33.1% responded that there was no inconveniences related to the fixed or removable appliances. (Gyawali et al., 2019) previously suggested that the main cause for orthodontic emergencies was loosened bracket or bondable buccal tube followed by loosened bands. The other major causes includes lacerations caused by ligature wire, poking distal wire, dislodged elastomeric chains, ulcerations caused from hooks etc. (Caprioglio et al., 2020) described an orthodontic emergency as a problem arising from an orthodontic appliance, where an urgent appointment with the specialist is required to correct the issue. Thus, by providing adequate emergency services on time will minimize the inconveniences and distress caused to the patient thus increasing patient confidence towards both doctor and treatment (Popat et al., 2016). In this study, 18% of respondents had an orthodontic emergency but took self-medication without informing the orthodontist. Here comes the importance of virtual assistance which helps the patient to be aware of what to do during orthodontic emergency stage rather than going for self-treatment (Caprioglio et al., 2020). Final section evaluated the psychological stress among patients regarding post lockdown visit to orthodontist and treatment charges. Regarding the treatment cost, a minority 14.7% felt that orthodontist may charge extra to make up for the money loss. This shows their concern which should be addressed by the orthodontist and reassure them regarding the treatment charges. In addition, they should be made aware that if at all any extra cost is charged, it would be for personal protection equipment, thus ensuring safety of both patient and the doctor (Monteiro et al., 2018).

Even though patients were anxious, 57.2% responded that they will wait for the orthodontist to give appointment rather than rushing to the hospital or dental clinic. It shows the patients trust towards their doctor and their willingness to wait. About 29.3% patients were very anxious that they were not willing to visit the clinic until this pandemic ends. This reflects the level of awareness and anxiety they have towards this pandemic and it is the orthodontist responsibility to make them reas-

Table 1: Comparison of differences in the distribution of responses on the patient perceptions on the significance of regular monthly appointments

Questions	Responses	n	%	X^2	P-value
1. How long has it been since you visited your orthodontist?	More than 1 month.	107	40.2	102.459	.000*
	Much more than 2 months.	145	54.5		
	I do not remember.	14	5.3		
2. How worried that you are not getting to go for regular follow-ups for your treatment?	Very worried, I wish to meet my orthodontist soon.	137	51.5	47.241	.000*
	Not so worried, everything that goes wrong can be fixed later.	46	17.3		
	I am more concerned about the worldwide pandemic.	83	31.2		
3. Are you following all the instructions given by your orthodontist, such as wearing of elastics and other oral hygiene instructions?	Yes, following all of it very accurately.	124	46.6	42.797	.000*
	Sometimes, not too regular.	40	15		
	No, I do not have the material needed (e.g., My elastics got over and lack of floss).	102	38.4		
4. Have you been in touch with your orthodontist?	Yes, I call my orthodontist if at all I have any problems regarding my treatment.	113	42.5	84.594	.000*
	No, I have not called my orthodontist since the lockdown started.	134	50.4		
	I tried calling my orthodontist, but he/she is never reachable.	19	7.1		
5. Does your orthodontist check on you regularly?	Yes, my orthodontist calls me regularly to check if everything is okay.	91	34.3	146.263	.000*
	No, my orthodontist has not called me since the lockdown started.	168	63.1		
	My orthodontist calls me, but I do not pick up because anyway there is no use since I cannot visit him/her.	7	2.6		

*Statistically significant

Table 2: Comparison of differences in the distribution of responses on the impact of COVID-19 pandemic on patients' visit to orthodontic clinic for treatment needs

Questions	Responses	n	%	χ^2	P-value
6. What exactly are you most worried about regarding your treatment?	My treatment time will be longer and I will have my braces on for much more time.	204	76.7	239.128	.000*
	My treatment can go wrong, things that are not supposed to happen with my teeth can happen.	56	21		
	My orthodontist will have a lot of work post lockdown, so he/she will not be able to give enough time to my treatment.	6	2.3		
7. Have you had any problems with anything fixed in your mouth (e.g., brackets, elastics, appliances and plates)	Yes, there are broken brackets and a few things like elastics have come out	127	47.7	32.579	.000*
	No, everything is as it was before	88	33.1		
	I do not know how to check, and I am unsure.	51	19.2		
8. What problems are you most commonly facing with your braces?	The wire came out and is poking me, and I have pain.	64	24.1	11.398	.003*
	A few brackets and elastics have come out.	108	40.6		
	No problems	94	35.3		
9. Have you suffered from any emergency such as pain, swelling, lacerations/cuts, etc., due to treatment since the lockdown?	No, my braces/ appliances have not given me any problem.	122	45.9	31.789	.000*
	Yes, but I called my orthodontist and asked him/her what to do.	96	36.1		
	Yes, but I took self-medication without informing my orthodontist and I am fine.	48	18		
10. Do you think that orthodontic treatment should be considered an emergency?	Yes, because I do not want anything to go wrong with my treatment	67	25.2	9.571	.008*
	Yes, because sometimes certain problems can be considered as emergencies such as cuts/ lacerations, swellings, etc.	91	34.2		
	No, because it is not life threatening	108	40.6		
11. Who do you think this pandemic has affected more?	I think my orthodontist is more affected than I am	13	4.9	333.842	.000*
	I think I am more affected than my orthodontist.	24	9		
	I think this lockdown is affecting both me and my orthodontist equally.	229	86.1		
12. This COVID-19 lockdown has:	Made me realize the importance of me being regular with my appointments	115	43.2	123.842	.000*
	Made me realize that is okay to miss appointments because nothing happened	5	1.9		
	Made no difference to what I think about my treatment	146	54.9		

*Statistically significant

Table 3: Comparison of differences in the distribution of responses on the psychological distress among patients

Questions	Responses	n	%	X^2	P-value
13. What do you think about your treatment cost following the lockdown?	Orthodontist may charge extra or advice unnecessary procedures to make up for money loss	39	14.7	150.684	.000*
	Not worried, since I believe that the amount remains same that was told to me earlier.	183	68.8		
	I am okay with anything as long as my treatment finishes fast.	44	16.5		
14. When do you plan to visit your orthodontist?	I will rush to the hospital as soon as I can	36	13.5	77.805	.000*
	I will wait for my orthodontist to call me and give me an appointment	152	57.2		
	I will not go till the pandemic is entirely over.	78	29.3		
15. Are you scared to visit your orthodontist during this pandemic?	Yes, I am scared	69	25.9	41.737	.000*
	No, I am not scared	59	22.2		
	Not so much, but my fear has increased as compared to before	138	51.9		

*Statistically significant

Table 4: Level of anxiety about visiting dental clinics during COVID-19 pandemic

Gender	Mean	Standard deviation	P-value
Male	4.28	2.28	.000*
Female	5.85	2.42	.000*

*Statistically significant

sured that proper infection control, use of personal protection equipment will be used to prevent the spread of the disease. (Xiong *et al.*, 2020) found that over one-third of orthodontic patients experienced psychological distress during COVID-19 pandemic and some of the main factors affecting the level of anxiety was the type of orthodontic appliance, time since last review appointment, contact with their specialist during dental emergency.

Finally, regarding the anxiety to visit orthodontist during the pandemic times, 51.9% felt that their fear has increased when compared to before but 22.2% responded as not scared which may be due to the lack of understanding among the patients regarding the various routes and higher chance of transmission of COVID-19 in dental clinics (Peng *et al.*, 2020). Females reported greater anxiety levels when compared to males. Women have shown higher risk of psychological distress than men during quarantine (Taylor *et al.*, 2008). This was in agreement

with (Cotrin *et al.*, 2020) finding that women feels safer staying at home during pandemic and prefer attending only in case of an emergency. As this pandemic is still not under control, orthodontists are advised to contact patients regularly and if possible relay instructions about oral health maintenance and emergency handling COVID-19 pandemic has led to an increase in use of teledentistry as well as tele-psychiatry where the doctor can help the patient in reducing their anxiety advising any assistance requires and be a supporting system to maintain good oral hygiene and oral health care (Saccomanno *et al.*, 2020). It is important for the specialist to take necessary control measures during post-covid routine practices like maintaining social distancing at waiting room and reception area, hand hygiene, bioaerosol control, use of personal protection equipment, contact, droplet and aerosol precautions, daily monitoring of health status of clinical team members and proactive interaction with

patients (Janakiram *et al.*, 2020).

CONCLUSION

The COVID-19 pandemic showed to have a greater impact on orthodontic appointments and anxiety levels of patients. The greatest concern that patients reported was the increase in their treatment duration and showed increased anxiety in visiting the dental clinic when compared to before. Thus, with use of proper personal protection equipment, following strict sterilization and disinfection protocols can help to reduce the anxiety levels among patients regarding visiting orthodontic clinics for monthly appointments.

ACKNOWLEDGEMENT

The support of all staffs and colleagues of Department of Orthodontics and Department of Public Health Dentistry, Amrita School of Dentistry is gratefully acknowledged.

Conflict of Interest

The authors declare that they have no conflict of interest for this study.

Funding Support

The authors declare that they have no funding support for this study.

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