ORIGINAL ARTICLE POJ 2023:15(1) 10-16

Practice of orthodontic residents amidst Covid-19: An insight into their attitude, awareness and satisfaction towards cross-infection protocol

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Abstract

Introduction: To assess attitude, awareness, satisfaction and practice of the orthodontic residents regarding cross-infection control protocol and perceived impact of the Covid-19 pandemic on their training.

Material and Methods: Online questionnaires were circulated amongst the orthodontic residents via WhatsApp. The residents' demographics; satisfaction and practice regarding the cross-infection control protocols and perceived impact of the pandemic on their training were recorded. Results were reported in counts and percentages.

Results: Mostly, residents were dissatisfied with cross-infection control measures (52.7%) and social distancing (69.6%). They were well-aware regarding the importance of ventilation, hand hygiene, patients' referral, infection-control training. Most of the participants identified the risk of aerosol generating procedures (95.9%) and safe use of etchant and hand instruments. However, they lacked awareness on effective pre-procedural mouth rinses (24.6%), etchant's viscosity (19.3%), safe radiography and use of anti-retraction valves and burs.

Conclusions: Residents had reservations regarding the standards of cross-infection control being observed at their institutes, though most of them were well-aware. Poor knowledge and practice was shown towards guidelines on certain chairside procedures. Training was adversely affected.

Keywords: Awareness; covid-19 infection; cross-infection control practice; orthodontic postgraduate trainees

Introduction

Bats are believed to be the natural hosts of the Corona virus disease that wreaked havoc worldwide and has been the cause of the pandemic since, late 2019.[1] Humans are infected by transmission through person to person contact, contact with infected surfaces and aerosols or droplets carrying the virus.[2-4] The disease is characterized by symptoms of: fever, cough, flu, gastrointestinal disturbance, vomiting, fatigue and pneumonia.[5,6] The incubation period was reported to be 14 to 24 days (during the 3rd wave of the pandemic) during which the virus is contagious. This explains the rapid spread of the disease as people could be in close contact with potential asymptomatic carriers and easily exposed to the virus, unknowingly. Moreover, most of the dental procedures generate aerosols-a confirmed route of transmission of the virus.[2,3,5]

Healthcare workers, especially, dentists who work in close proximity to the patients' oral cavities had been risking their health and lives during Covid-19 pandemic.[2,3,5] Covid-19

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pandemic led to a paradigm shift in the orthodontic practice to contain the spread of the virus.[7,8] Literature reports knowledge and awareness of general dentists and dental assistants towards Covid-19. The same study reported the healthcare professionals to be more aware of the cross-infection control protocols and guidelines regarding PPE (Personal Protective Equipment) than the dental assistants.[9]An association was reported between lack of knowledge of the healthcare professionals regarding the SARS-Cov-2, guidelines on use of PPE resulting in transmission of the virus.[10-12] A change in orthodontists' attitude towards the practice was observed. They followed cross-infection control protocols; delayed the Aerosol generating procedures (AGPs), dealt with emergencies only and used pre-procedural antimicrobial mouth rinses when performing chairside procedures. The pandemic also had taken its toll on the mental health of the orthodontists and they felt more vulnerable when the people around them lacked awareness and did not follow the cross-infection control measures.[13] Nigerian orthodontists and orthodontic residents were reported to be having adequate knowledge about the orthodontic procedures that risked the spread of Covid-19, necessary extra-protective measures, while, they lacked knowledge regarding the appropriate pre-procedural mouthwashes.[14] In China, orthodontists and orthodontic residents' knowledge did not affect their willingness to treat cases of Covid-19.[15]The pandemic adversely affected clinical exposure of the trainees.[16] This had been worrisome for the residents who showed concern around the quality of their training.[17]

Our study aimed to assess the satisfaction, awareness and practice of the orthodontic residents around the cross-infection control guidelines during the Covid-19 pandemic.

Material and Methods

A descriptive cross-sectional study was conducted for the total duration of three months by distributing the questionnaires online to orthodontic residents enrolled in the postgraduate training program, throughout the country. Ethical approval was taken from a postgraduate dental teaching institute, Number, 4210/DCD.

Inclusion criteria:

a) Orthodontic postgraduate residents enrolled in four-year training program
b) Residents using smart phones and accessible through WhatsApp
c) Residents who participated voluntarily by filling and submitting the questionnaires
d) Residents who could understand English language

Exclusion criteria:

a) Residents who did not consent to participate in the study
b) Residents who could not successfully complete or submit the questionnaires

Data collection:

Initially, a pilot study on 20 residents was performed, after which the actual survey was carried out. 52% responses, 171 in total were received. 2-3 weekly reminders were given to the residents for submission of their responses.

Questionnaire:

Online questionnaire was made on google forms and circulated amongst the orthodontic residents in the country through WhatsApp. It comprised sections on 1) Demographics; 2) Satisfaction of the residents regarding cross-infection control protocols being followed at their training institutes; 3) Measures taken by the residents to reduce transmission of Covid-19 during performance of chairside procedures and 4) their perception with regard to the impact of the pandemic on academic and clinical aspects of their training.

Statistical analysis

SPSS (Statistical Package for Social Sciences) version 23.0 was used to analyze the results after recording the responses obtained from the survey. Counts and percentages were reported on baseline characteristics of studied samples which included information on: age

group, gender, training institution and year of residency.

Results

Table -I reports the baseline characteristics of studied samples. A total of 171 samples were surveyed. 53.8% of which were aged 20 -29 years old, 70.2% were females, 60.2% were from public training institutes and 61.4% were final year residents.

13.5% residents were satisfied / very satisfied by the current standard of infection control measures being practiced at their training institutions (Table II). They were aware about the importance of a well-ventilated OPD (Out Patient Department). More than half of the residents immediately stop their procedures and refer patients for Covid-19 testing if the latter were found sneezing in the clinics. Most of the respondents were aware of hand hygiene and willing to take proper training in infection control. A great majority, 95.9%, identified the high risk of AGPs for Covid-19 transmission.

Table-III reports the awareness of the orthodontic residents regarding measures to be taken during performance of chair-side orthodontic procedures to minimize the risk of transmission of Covid-19 infection. The results showed less awareness of residents around use of effective mouth rinse, 72.5% residents considered pre-procedural rinse with 0.2% Chlorhexidine by the patients, whereas, 24.6% agreed on 0.2% Povidine. They were not quite aware of safe use of radiography as only 21.6% favored limiting the use of intraoral images and resorting to OPG (Orthopantomogram). 19.3% thought, less viscous etchant could control cross-contamination during orthodontic bonding. 23.4% preferred tungsten carbide burs over diamond ones for removal of composite. 38% favored using hand pieces with anti-retraction valves, showing residents' lack of knowledge in this regard. However, residents were aware of safe use of hand instruments, 91.2 % preferred them for adhesive removal over hand pieces.

Table I: Baseline Characteristics of Studied Samples (n=171)

Characteristics		n	%
Age Group	20-29 years	92	53.8
	30-39 years	79	46.2
Gender	Female	120	70.2
	Male	51	29.8
Sector of training institute	Private	68	39.8
	Public	103	60.2
Year of residency/training	R1 (1st year Resident/trainee)	13	7.6
	R2	27	15.8
	R3	26	15.2
	R4	105	61.4

Table II: Satisfaction and Practice of Orthodontic residents during the COVID-19 pandemic

Questions		N	%
How satisfied are you regarding the current standards of infection control being practiced at your training institute?	Very Dissatisfied/Dissatisfied	90	52.7
	Neutral	58	33.9
	Satisfied/Very Satisfied	23	13.5
How satisfied are you with the social distancing being observed in your OPD/training institute?	Very Dissatisfied/Dissatisfied	119	69.6
	Neutral	39	22.8
	Satisfied/Very Satisfied	13	7.6
In your opinion, should the dental clinic/OPD be well-ventilated to reduce the transmission of Covid19?	It is better to have a ventilated one, but I would work if it is otherwise, too	20	11.7
	No	8	4.7
	Yes	143	83.6
If your patient continuously sneezes or coughs in the dental clinic/OPD, do you immediately stop the procedure and refer the patient for Covid-19 testing?	No	30	17.5
	Sometimes	48	28.1
	Yes	93	54.4
Do you wash your hands before AND after doing procedures on each patient?	No	7	4.1
	Sometimes	24	14.0
	Yes	140	81.9
	I am willing to take proper training in Infection Control	102	59.6

	I do NOT have any experience of training in Infection Control neither am I interested in taking it	31	18.2
	I have taken or taking proper training in Infection Control	38	22.2
Do aerosol generating procedures pose high risk for Covid-19 transmission?	May be	5	2.9
	No	2	1.2
	Yes	164	95.9

Table III: Awareness of the orthodontic residents on the cross-infection control measures during performance of chairside procedures to minimize the risk of transmission of Covid-19:

Measures	N	%
Pre procedural rinse with 0.2% chlorhexidine by the patients	124	72.5
Pre procedural rinse with 0.2% providing iodine by the patients	42	24.6
Limiting the use of intraoral images and resorting to OPG	37	21.6
Using etchant with decreased viscosity	33	19.3
Using tungsten carbide burs instead of diamond ones for removal of composite	40	23.4
Blot drying with cotton roll after etchant removal	106	62.0
Using hand pieces with anti-retraction valves	65	38.0
Using hand instruments for adhesive removal rather than hand pieces	156	91.2

Discussion

This study's data was collected through an online questionnaire, circulated amongst the orthodontic residents during the third wave of the Covid-19 pandemic. Latter claimed health and lives of many due to it being highly contagious and transmitting readily from patient to patient, patient to healthcare workers and amongst healthcare workers themselves.[4,18] Orthodontists work in close proximity to their patients and had risked their physical and mental health. This study was done on the orthodontic residents, enrolled in postgraduate training program throughout the country. Out of a total of 171 (52%) respondents, mostly were females 70.2%, final year residents 61.4% 53.8% in the age range of 20-29 years and enrolled at public training institutes 60.2%.

With regard to the residents' satisfaction about the infection control standards being practiced at their training institutes, mostly were either dissatisfied or very dissatisfied (52.7%) and same was shown for social distancing that was being observed (69.6%). Social distancing is crucial to contain the virus and a study reported that 48% of the orthodontic residents were aware of the fact and opined that it should be practiced by all.[14] In this study, 83.6% of the residents preferred a well-ventilated clinical setting, while, 11.7% were ready to work in either case. The result shows a good number of the residents being aware of the significance of ventilation which corroborates with the recommendation of well-ventilated operatory, waiting area, use of air filters to control cross-infection.[8,18,19]

With regard to the change in their practice in the pandemic, 54.4% of the residents preferred suspending the procedures and immediate referral of the symptomatic patients for Covid-19 testing. This showed that more than half of the residents were aware and following the guideline which made the screening of patients necessary and defer those showing symptoms of lower respiratory tract infection.[2,4] 81.9% reported washing of their hands both before and after attending each patient. This was in accordance with the WHO guideline which reinforced washing of hands before and after seeing each patient, for at least 20 seconds to prevent spread of the microorganism. [2,3,20] This finding showed better practice of the respondents as compared to the previous studies which reported only 27% of the dental professionals being aware of the hand hygiene measures, while, Nemati et al. found it to be 57%. [9,21]

59.6% of the residents were willing to take standard infection-control training. The results were in accordance with the

recommendation, where the orthodontists should be educated about the disease (Covid-19), and its route of transmission, cross-infection control protocol and regulations to combat the crisis.[22-23]

AGPs were considered highly risky for transmission of Covid-19 virus by 95.9% of the residents. National Health Services (NHS) also categorized AGPs as high risk care pathway in terms of the spread of Covid-19.[21] Orthodontic procedures classified under AGPs include: bonding/re-bonding/debonding of brackets using high and low speed rotor drills, triple syringe, ultra-sonic/sonic hand pieces and sandblasting.[22-24] 2.1% of the Nigerian orthodontic residents thought, AGPs in pre-orthodontic treatment activities pose a high risk; 37.5% opined that replacement of bands/brackets carried a high risk; while, 95.8% agreed on debonding being a highly risky procedure in post-orthodontic treatment procedures.[14] Aerosols and splatter generated by use of rotary instruments during debonding of orthodontic brackets contain a high number of infectious microbes, which could exceed that present in the cough or sneeze of the infected individuals.

Regarding awareness of the residents on measures to reduce cross-contamination during performance of chairside procedures, 72.5% thought, pre-procedural rinse with 0.2% chlorhexidine mouthwash could help in mitigating the transmissibility of the virus, while, 24.6% favoured 0.2% Povidine iodine rinse. 0.1-0.12% chlorhexidine mouthwash or Povidine iodine for patients to rinse before the procedures was recommended.[25] This corroborated with the results of a previous study where 62.5% of the orthodontists/orthodontic residents were inclined towards using Chlorhexidine rinse.[14] Evidence proved 0.2% Povidine iodine rinse being more effective than Chlorhexidine as the SARS-CoV-2 is more sensitive to oxidation and while, chlorhexidine reduces the load of many microbes and viruses, its effectiveness against SARS-2 requires further investigation.[26,26] In another study, 17.2% favoured chlorhexidine rinse, whereas, 23.3% reported to be inclined towards Povidine iodine rinse.1[3] This study's result showed that the residents were not adequately updated on the guidelines regarding the appropriate use of pre-procedural mouth rinses.

21.6% of the residents in this study did not favour limiting the use of intra-oral images and resorting to OPG, extra-oral imaging technique. Residents were not aware of the recommendation of utilizing extra-oral radiography as opposed to prevent cross-infection through excessive salivation and gag reflex associated with intra-oral imaging.[28,29] Results of this study are contradictory to one of the studies where 22.9% of the orthodontic residents regarded extra-oral radiography as less risky.[14]

The residents' showed mixed level of knowledge regarding usage of proper viscosity of the etchant and its removal protocol as, only 19.3% favoured less viscous etchant and 62.0% preferred blot drying of the latter. Liquid gels or less viscous etchants are better in terms of cross-infection control because they reduce working time and use lower air water pressure to be washed off completely, as triple syringes are also an important source of AGPs. [30]

23.4% of the residents preferred using tungsten carbide burs over diamond burs for removal of composite (adhesive) after debonding of brackets. This depicts residents' lack of knowledge regarding the recommended protocol for debonding. Literature reports 43.5% reduction in aerosolized composite dust with the use of spiral fluted tungsten carbide burs in combination with high volume evacuator.[31,32]

38.0% of the residents showed agreement for using anti retraction valves with hand pieces, showing a small number of residents who were aware about the recommendation on usage of anti-retraction valves (to prevent back flow of water), which helps in reducing cross-contamination.[33,34]

91.2% of the residents preferred using hand instruments (for removal of the adhesive from tooth surfaces) over high speed hand pieces. This shows an impressive number of residents aware of the risk of using rotary instruments in spreading the disease through aerosols.[35] Literature highlights guidelines for adhesive removal and favors use of hand scalers and band removing pliers for removal of adhesive from anterior and posterior teeth, respectively.[36]

Limitations to our study include a limited response rate and an associated bias as recommended protocol/guidelines could be verified online before submitting the responses. This could affect the transparency of the results associated with the genuine knowledge, awareness and actual practice of the residents. Moreover, the residents belonged to different institutes from public and private sectors, diverse environment of which could affect the residents' attitude and satisfaction towards the pandemic in general.

Conclusion

- Most of the residents were not satisfied with the cross-infection control protocol being practiced, though most of them were interested in getting proper training in this regard
- Substantial number of residents showed awareness regarding proper hand hygiene, referrals of suspected cases of Covid-19 and associated cross-contamination with AGPs but lacked awareness towards the guidelines on some chairside procedures to minimize cross-contamination.
- Residents should be enlightened on the recommended usage of pre-procedural mouth rinses, radiological assessment and rotary instruments
- Residents were aware of the less risk associated with usage of hand instruments and proper etching protocol (without the generation of AGPs)

Conflict of interest

No conflict of interest.

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