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Practice Adaptations of Dental Practitioners during the COVID-19 Pandemic in Chattogram City of Bangladesh

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ABSTRACT

Introduction: Significant adjustments in dental practice were required to reduce the risk of transmission during the COVID-19 pandemic since dental clinics are among the high-exposure settings. This study aimed to explore the modifications made in dental practice setups throughout the COVID-19 pandemic by the dental practitioners in Chattogram city of Bangladesh.

Materials and Methods: A cross-sectional study was conducted among 96 dental practitioners in Chattogram city using a structured questionnaire. Data on patient screening and crowd control, infection control measures, hygiene practices, personal protective measures, and aerosol control strategies as well as practitioners' demographics were collected. Descriptive statistics and Fisher's exact test were used for analysis using SPSS.

Results: Modal age 37.75±7.64 (27-70) years with a male-to-female ratio of 1.34:1. Two-thirds (66.67%) were dental graduates and majority (91.7%) worked in the private dental clinics. Commonly adopted safety practices included hand hygiene (100%), patient screening (84.4%), surface disinfection (95.8%), and social distancing (78.1%). High-volume suction was used by 61.5% of respondents, while advanced measures like HEPA filters (16.7%) and rubber dams (24.0%) were less frequently implemented. Statistically significant associations were found between age group and the use of face shields and vacuum suction ($p < 0.05$).

Conclusion: Dental practitioners in Chattogram city demonstrated commendable efforts in modifying their clinical practices during the COVID-19 pandemic. However, the limited use of advanced aerosol control measures highlights the need for better resource access and institutional support. Continued education and national guidelines are recommended to strengthen pandemic response in dental settings.

Keywords: COVID-19, dental practice, infection control, practice adaptation, aerosol control, Chattogram, Bangladesh.

INTRODUCTION

The COVID-19 pandemic displayed a spread in an exponential manner[1,2] in China, has spread rapidly since December 2019, causing more than 100,000 confirmed infections and 4000 fatalities (as of 10 March 2020 causing hundreds of thousands of deaths[3] and affecting millions of people worldwide. These caused unique challenges to healthcare systems globally, and dental services were amongst the high risk of catching this infection[4] due to aerosol-generating procedures. The speedy transmission of SARS-CoV-2 demanded strict infection control

protocols and significant modifications in dental practice settings. Without the standard protective measures in regular dental practice, the risk of infection transmission from the dental office cannot be limited.[5] According to the guidelines of World Health Organization (WHO) and American Dental Association (ADA), the dentists had to follow enhanced use of personal protective equipment (PPE), limitations on aerosol-generating procedures, and rigorous disinfection routines.[6,7] Moreover, using antibacterial mouth washes, rubber dam, N-95 masks, face shields, and high-volume suction machine, during treatment procedures with recurrent scrubbing and sterilizing of surfaces of floors, chairs, and door handles were strongly recommended.[5,8] Such changes, even though crucial for infection control, necessitated swift resilience and adaptation from dental professionals.

Chattogram city, the second largest city of Bangladesh, is rich in dental care facilities- both public and private. Its population is more than 3.2 million.[9] Huge burden of dental patients made dental practitioners to face unprecedented difficulties in balancing patient care with infection prevention under constrained resources. Limited access to PPE, inadequate infrastructure, and the need to comply with evolving safety guidelines created pressure on both public and private dental services. Understanding the modifications made in clinical setups during the pandemic is essential for evaluating preparedness, detecting gaps, and guiding upcoming responses to public health emergencies. Moreover, examining the socio-demographic and professional characteristics of dental practitioners can provide valuable context on the adaptability and capability of different groups within the profession as these may influence the degree and nature of practice modifications during a crisis.

This study aimed to explore the clinical setup modifications implemented by dental practitioners during the COVID-19 pandemic in Chattogram city and to assess their socio-demographic and professional profiles.

MATERIALS AND METHODS

Ethical clearance for the study was issued from the Ethical review committee (ERC) of University of Health Sciences (BUHS). From May 2023 to April 2024, this cross-sectional study was conducted among 96 dental surgeons working in Chattogram city of Bangladesh, who served their patients physically in dental clinics through the COVID-19 pandemic period, and also actively modified their working protocol to combat the pandemic. Convenience sampling technique was employed to select the respondents.

After obtaining informed consent from the participants, data was collected either through face-to-face interview using a structured questionnaire or via online Google Forms. Anonymity and confidentiality of the respondents were maintained strictly.

Data were analyzed using IBM SPSS software [version 26]. Descriptive statistics such as means, standard deviations, frequencies, and percentages were used to summarize the variables. Fisher's exact test was performed to explore associations between practice modifications and professional profiles.

RESULTS

Among the 96 respondents, there were males' predominance; male-to-female ratio of 1.34:1. Respondents' age ranged 27-70 years with the mean age of 37.75±7.64 years. Forty-five (46.8%) participants belonged to the age group of 31-40 years and 27 (28.2%) belonged the age group of 41-50 years. Two-thirds (66.67%) of them were BDS graduates only, and one-third had different post-graduation degrees in different disciplines. Majority (91.7%) of the respondents worked in private clinics (table I).

Table 1: Demographic and professional information of the respondents.

Variables		Frequency	Percentage (%)
Gender	Male	55	57.3
	Female	41	42.7
Age (in year)	Mean± SD	37.75±7.64	
Age group	27-30 years	18	18.8
	31-40 years	45	46.8
	41-50 years	27	28.2
	51-70 years	6	6.2
Educational qualification	*BDS only	64	66.7
	#DDS	5	5.2
	$FCPS	18	18.8
	xMS/MPH	9	9.3
Practice area	Public hospital	8	8.3
	Private clinic	88	91.7

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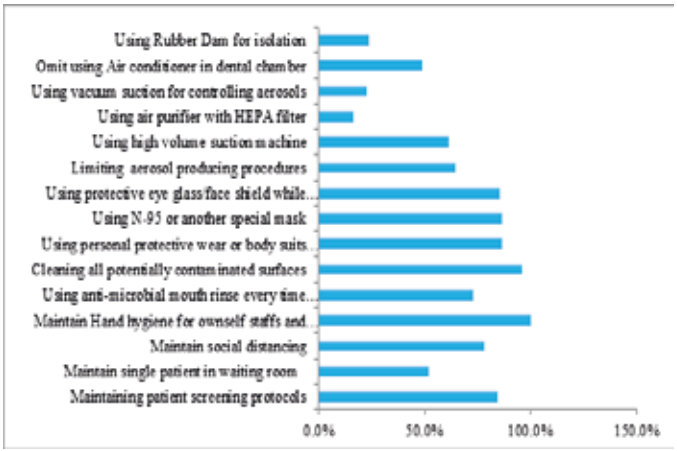
Figure 1 shows the modification in set up of the clinical area. In terms of patient screening and crowd control, majority (84.4%) of the respondents followed screening protocol before treating patients, while only half (52.1%) of the respondents maintained single patient in waiting room. Three-fourths (78.1%) of the respondents maintained social distancing within the clinic. All (100%) participants followed infection control and hand hygiene practices. About three-fourths (72.9%) of them used anti-microbial mouth rinses for patients every time before dental works. Almost all (95.8%) participants cleaned all potentially contaminated surfaces after working. For personal protective measures, majority (86.5%) of the respondents used personal protective wear or body suits before attending patient and also used N-95 or another special mask. During dental works, protective eye glass/face shield was used by 85.4%

respondents. Concerning aerosol control strategies, aerosol producing procedures were limited by about two-thirds (64.6%) of the respondents. Though high-volume suction machine was used by 61.5% respondents, 16.7% used air purifier with HEPA filter and 22.9% used vacuum suction for controlling aerosols. About half (49.0%) of the respondents omitted using air conditioner in dental chamber. Rubber dam was used for isolation by only about one-fourth (24.0%) of the respondents.

Figure 1: Frequency of modification in set up of the clinical area.



Fisher's exact test was adapted for analyzing the set-up modification of the clinical area and sociodemographic (age, sex), and also professional profile (educational degree, type of job etc.). Only signification associations are presented in Table II. Other associations were not found statistically significant.

Table 2: Association between age of the respondent and modification in set up.

Attributes	Up to 40 years	Above 40 years	P value
Using protective eye glass/face shield			0.030*
Yes	50 (79.4%)	32 (97.0%)	
No	13 (20.6%)	1 (3.0%)	
Using vacuum suction machine			0.039*
Yes	10 (15.9%)	12 (36.4%)	
No	53 (84.1%)	21 (63.6%)	

DISCUSSION

In the present study, male respondents slightly outnumbered females (57.3% vs. 42.7%), which was similar to another Bangladeshi survey[10] but contrasts with the findings from Pakistan11 and other multinational surveys[12], where female participation was higher. The mean age of participants in our study was higher than the Pakistani study (22.87 ± 4.75 years)[11] and similar to the Italian sample[13]. Most participants in our study were general dental practitioners (66.7% BDS), comparable to findings from multinational studies where general dentists predominated (78.62%).[11,12] A significantly larger proportion (91.67%) of our respondents worked in private clinics, aligning with the global trend where private sector employment remains dominant among dental professionals.[12,13] Unlike some studies that reported a mix of hospital and clinical affiliations, our study found limited dual practice.[12] As reported in another native study, three-fourths of the dentists worked in private practices, while just 18.5% of dentists were providing dental care for government.[10] These variations may reflect regional differences in healthcare systems, educational structures, and the gender distribution of the dental workforce.

Patient screening and crowd control

Present study revealed that majority of the respondents (84.4%) maintained screening protocol before treating patients. According to ADA and WHO guidelines, it was advised to use caution when choosing patients, manage appointments, and only accept emergency situations.[6,7] It was promising that dentists were aware of these guidelines for preventing cross-infections in dental offices, which also included getting patients' travel histories and taking their body temperatures.[12,14] Approximately 97.1% dentists in Bangladesh concurred that patients may conceal their medical history because of social stigma.[10] In Italy, practitioners excluded COVID-19 linked symptoms by screening through telephone (86.5%) and reduced the number of patients in the waiting room (87.1%).[13]

Infection control and hygiene practices

In the present study, all dental surgeons performed hand hygiene which was particularly crucial for dental professionals. The significance of maintaining good hand hygiene had been underscored during the COVID-19 pandemic on multiple occasions. Research suggested that maintaining good hand hygiene, which involve cleaning with alcohol-based sanitizers and washing hands with soap and water, was crucial for preventing the transmission of respiratory morbidity like SARS.[15,16] As a result, the WHO advises dental professionals washing their hands frequently or use hand sanitizers with alcohol. Nearly all Iraqi dentists (95.0%) noted that patients washed their hands both before and after receiving treatment.[17] Applying infection control measures while doing dental treatment is thought to require information on the characteristics of COVID-19 and how it spreads. Over 80.0% of the dentists said they were knowledgeable about the most recent WHO recommendations for cross-infection prevention techniques in dental practices.[7] A questionnaire was used by tri-national participants to screen their patients for COVID-19-related symptoms. In Austria, Germany, and Switzerland, mandatory use of masks in the waiting room were enforced in 94.3%, 84.0%, and 35.0% of cases, respectively.[18]

Personal protective measures

In this study, majority of the respondents (>85.0%) used personal protective wear or body suits, N-95 or another special mask, and protective surgical glass/face shield before and/or during treatment. Treating individuals suspected of having COVID-19 had been advised to involve the use of a particle respirator, for instance the N-95 mask. If not, while a dental healthcare professional was treating a patient and they were less than one meter away, at the very least a surgical mask was to be worn.[19] When it came to the efficiency of surgical masks in preventing cross infection, Iraqi dentists scored the lowest (31.7%) compared to almost 80% of participants who said that N-95 masks must be worn regularly in dental practices.[17]Ninety-four percent of the dentists in the Central European survey reported using surgical masks on a regular basis.18 About 9.1% previously used respirators of either the FFP2 or FFP3 standard. The percentage of dentists regularly used surgical masks fell to 51.0% overall during the pandemic's initial peak. Austria was the country who utilized FFP2 or FFP3 respirators the most (86.9%), followed by Germany (56.7%) and Switzerland (61.2%). Using an additional pair of gloves increased at the pandemic's initial peak, accounting for 6.8% of cases. There may have been a more noticeable increase in the usage of face shields and protecting clothes during the pandemic lockdown. Face shield and over gown use also rose in Austrian, German and Swiss respondents.[18]

At the dental offices, approximately 88.1% of Pakistani dentists used PPE.21 Previous to the Sars-CoV-2 pandemic, every practitioner in Italy (n=356) stated that they regularly used the most popular PPE, including gloves, masks, disposable gowns, and protective eyewear. Moreover, 77% of them acknowledged that during the COVID-19 pandemic, they had to either use more PPE or change the types of PPE they were using.[13]

Aerosol control strategies

About one-fourth respondents used rubber dam for isolation in this study. Aerosol producing procedures were limited by about two-thirds of the respondents. Though high-volume suction machine was used by 61.5% respondents, only 16.7% used air purifier with HEPA filter and less than one-fourth respondents used vacuum suction for controlling aerosols. About half of the respondents omitted using air conditioner in dental chamber. About three-fourths of the participants used anti-microbial mouth rinse every time before dental work. Previous studies delineated that using an antibacterial mouthwash before beginning any dental surgery greatly lowered the germ load.[20,21] Despite the fact that the current epidemic recommends this technique, the majority of dentists reported ignoring it. The percentage of Iraqi dentists that responded about the usage of rubber dams as a strategy to combat infections was low, at 31.7%.[17] It was interesting to note that more over 40% of responders followed the WHO guidelines for the COVID-19 pandemic's recommendation using antiseptic mouthwashes before beginning dental procedures.[17] During the first shutdown, a rubber dam was utilized by 36.9% of Swiss, 13.6% of Germans, and 7.8% of Austrians for aerosol-producing preparations using high-speed handpieces.[18] Furthermore, mouthwashes that contain antiviral compounds like povidone-iodine have proven to be beneficial against a variety of respiratory infections.[22,25] By stopping the aerosols from spreading, using a rubber dam can effectively reduce cross-infection during dental treatments while also receiving positive patient acceptance. For most patients, high-volume suction is the best option when it comes to controlling the evacuation of aerosols during dental treatments.[19,24] An Indian study among 225 dentists revealed that only 42.2% of them used to mount air purification devices including UV light disinfection system (34.77%), HEPA filters (26.3%), high vacuum suction devices (15.76%), filter screens in air conditioners (14.75%) and Ozone air treatment system (8.42%).[25]

In the present study, Fisher's exact test revealed significant associations between age groups and certain practice modifications. Practitioners older than 40 years were significantly more likely to use face shields (79.4% vs. 97.0%, p =0.030) and vacuum suction systems (15.9% vs. 36.4%, p =0.039) compared to their younger counterparts. This may suggest that older practitioners were more aware, and more compliant with protective protocols, probably due to higher perceived risk of severe COVID-19 infection. This may also reflect their greater adherence to aerosol-reduction practices possibly due to more resources in established practices, along with experience and readiness to invest in equipment.

COVID-19 was caused by SARS-CoV-2.[26] It has been changing continuously into a number of variants. Prominent variants are alpha, beta, delta, and omicron. In recent months, health authorities of Bangladesh noticed a gradual increase in COVID-19 positivity. In April 2025, two new omicron subvariants were first identified at Chittagong Medical College Hospital, Chattogram.[27] So, the pandemic hasn't yet come to an end. There is a continuous risk of being exposed. So, evaluation of previous preparedness is indispensable to detect breaches to formulate further plans and programs to increase competency and compliance of dental practitioners during any emergency.

CONCLUSION

This study depicts how the dental practitioners of Chattogram city of Bangladesh modified their clinical set-ups and adapted those modifications during COVID-19 pandemic. There was widespread implementation of patient screening and crowd control, infection control measures, hygiene practices, personal protective measures, surface disinfection, etc. but aerosol

control strategies were not satisfactory. These modifications and adaptations reflect a strong awareness among practitioners of the need to safeguard the health of both patient and the care provider. Proper steps should be taken to address the gaps that remain in the adoption to ensure preparedness for future public health emergencies.

Limitations of the study

Self-reported data may have reporting bias. Lack of longitudinal follow-up prevents assessment of sustainability of the adaptations over time. The study did not take into account to assess the effectiveness of the adaptations in preventing infection transmission.

Recommendations

- Training and capacity-building programs should be implemented for dental practitioners to ensure they are well-equipped to handle infectious disease control and prevention protocols.
- Regular updates on infection control protocols should be issued by health authorities to guide dental practitioners in maintaining safety for themselves and their patients during pandemics.
- Multicentered study with multistage sampling may provide generalized data.

CONFLICT OF INTEREST

The authors expressed no conflicts of interest.

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DATA AVAILABILITY STATEMENT

The data presented in this study are available on reasonable request from the corresponding author.

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