

RESPONSE OF GHANAIAN DENTISTS TO THE COVID-19 PANDEMIC: A CROSS-SECTIONAL STUDY

Nyako E.A¹, Hewlett S.A¹, Konadu A.B^{1,2}, Osei-Tutu K^{1,3}, Blankson P.K², Aprese D¹

¹Department of Restorative Dentistry, Dental School, University of Ghana

²Dental Department/Oral and Maxillofacial Surgery Unit, Korle-Bu Teaching Hospital

³Dental Department, Effia-Nkwanta Regional Hospital, Ghana Health Service

ABSTRACT

INTRODUCTION: Many Oral healthcare personnel are at great risk of acquiring the SARS CoV-2 infection. Physical proximity due to the close face-to-face contact with patients and repeated exposure to respiratory tract secretions, blood, saliva, and other contaminated body fluids are some of the reasons

OBJECTIVE: To explore the response of Ghanaian Dentists to the COVID-19 pandemic

METHODS: This study targeted all Dentists in Ghana working in the teaching hospitals, public hospitals, and private clinics. An online questionnaire was sent out to them consisting of questions about their socio-demographic characteristics, their response to the pandemic and what infection control measures they had implemented for transmission prevention. Summary statistics was done and described.

RESULTS: One hundred and ninety-five (195) dentists responded consisting of 115 (59.0%) males and 80 (41.0%) females. Majority of the participants (42.6%) were in the 30-39yr age group, and most worked with the Ghana Health Service (30.3%). Majority of respondents (71.8%) saw only emergency cases, during the early phase of the pandemic. 8.7% saw patients as usual. Extractions and incision/drainage of dental abscesses were among the commonest procedures done during this period. Many respondents were concerned about PPEs, and 43% of respondents had not had any training on COVID-19.

CONCLUSION: Ghanaian Dentists are very conscious of COVID-19 symptoms, and the possible modes of transmission in the Dental setting. Majority who were still practicing had instituted extra infection control measures recommended by international and national bodies including the Ghana Dental Association.

KEYWORDS: Practice, attitude, COVID-19, Dental surgery, Ghana

INTRODUCTION

Like many parts of the world, Ghana has been immensely affected by the surge of the COVID-19 pandemic, taking a significant toll on its economy, resources, and the entire society. Since its first report in Wuhan, Hubei Province, China, as clusters of patients with pneumonia of unknown cause¹, COVID-19 has seen a violent and fast spread worldwide, which has led to the World Health Organization declaring it as a pandemic.² Africa's first COVID-19 case was recorded in Egypt on 14 February, 2020 while in Ghana, the Ministry of Health (MOH) on the 12th of March, 2020 confirmed its first two cases. The impact of the COVID-19 pandemic has been devastating as fragile healthcare systems have been challenged.³

Similar to SARS-CoV and the Middle East Respiratory Syndrome (MERS-CoV) virus, SARS-CoV-2 is zoonotic virus, spreading from non-human animals to humans. In this case, Chinese horseshoe bats are reported to be the most probable origin.⁴ The disease usually goes through an asymptomatic incubation period to diverse clinical manifestations.⁵

Many healthcare personnel are at great risk of acquiring the infection, as their profession requires some level of proximity to patients. Of greater concern however, are oral and parodontal health workers who are at a higher risk of contagion due to the very close physical proximity within which they have to work.⁶ This is because of the close face-to-face contact with patients, repeated exposure to respiratory tract secretions, blood, saliva, and other contaminated body fluids.⁷

SARS-CoV-2 transmission during dental procedures has been noted to occur through inhalation of aerosol/droplets from infected individuals.^{8,10} Direct contact with mucous membranes, or oral fluids, and contaminated instruments and surfaces have also been implicated.^{11,12}

To limit the spread of the virus, and reduce the rate of infection among health workers, governments and Health professional organizations issued protocols to the general population and health workers respectively. The International Dental Federation (FDI), and other international associations and organizations, issued protocols to advise on the mode of practice.^{13,14,15,16} In Ghana, the Ministry of Health (MOH) and Ghana Health Service (GHS) issued further directives for Out Patient Departments (OPDs) and routine dental treatments. Among other recommendations, dental staff have been required to run shifts to decongest the clinics and to ensure physical distancing while intensifying infection prevention and control practices.

Despite these proposed directives, it is difficult to ascertain the level of preparedness of this unique group of health professionals in coping with the COVID-19 pandemic. This present study therefore aimed at evaluating the response of Ghanaian Dentists to the pandemic, while exploring their readiness towards the prevention and transmission of the virus in their dental practice settings. Findings from this survey is important to guide further policies regarding the practice of dentistry in Ghana, and could be useful in hypothesis generation for future studies in the area.

METHODS

This was a cross-sectional study carried out in March 2020 to evaluate the response and attitudes of all Dental surgeons in Ghana to the COVID-19 disease outbreak. Ghana currently has an active Dentist population of about 400 who are distributed in both public and private facilities across the country in all sixteen (16) geo-political regions. All Dentists are however registered with the Ghana Dental Association (GDA), which has the email addresses of all its dentists, and also several social media platforms for its members.

The data collection instrument consisted of a semi-structured questionnaire, which included closed and open-ended questions to explore respondents' response, designed on Google Forms. Implemented as a survey, the online link was circulated through social media including WhatsApp, Facebook, Twitter and e-mails through the GDA to dental professionals, and received responses through an online survey submission. Only one completed survey, could be submitted per Dentist. Participants included registered Dental surgeons within the country who consented to be part of the study.

Data collected included age, sex, professional position, category of workplace, and region of practice. Outcome variables inquired if respondents' clinic was closed, what measures had been implemented, and which procedures were being carried out. Other variables explored whether Dental surgeons had had any formal training on COVID-19, which PPEs were being used before, and during the pandemic, knowledge of the disease, the opinion of the respondent on the way forward and their preferred guidelines guiding their practice.

Data was entered using Microsoft Excel (2010), and analyzed using Stata 14 software (StataCorp. College Station, TX). Background characteristics for all respondents were described, and descriptive summaries for all variables were reported. Consent was sought from all participants.

RESULTS

The study included one hundred and ninety-five (195) respondents consisting of 115 (59.0%) males and 80 (41.0%) females. These included ten consultants (5.1%), specialists 27 (13.8%), Medical officers 111(56.9%), 37(18.9%) House Officers and other ranks 10 (1.0%). Majority of the participants (42.6%) were in the 30-39 age group. Most of the respondents worked with the Ghana Health Service (30.3%), consisting of regional and district hospitals, while 49 participants (23.1%), worked with the Ministry of Health's Teaching Hospitals (Korle-Bu Teaching Hospital, Komfo-Anokye Teaching Hospital, Cape Coast Teaching Hospital, and Tamale Teaching Hospital). Twenty-four respondents (12.3%) practiced in Quasi government facilities (37-Military Hospital and Ghana Police Hospital), while 37(19.0%) were in private practice (Table 1).

The Greater Accra region had the highest number of respondents (65.1%), while the northern region had a representation of two respondents (1%). Majority 140 (71.8%) of respondents indicated the facilities they were working, and were not closed but managed only emergency cases.

Out of the 140 respondents who said their facilities were managing emergency cases, 47(33.6%) were working within Ghana Health Service agencies, 35(25.0%) were with the teaching hospitals (MOH), and 25(17.9%) Private Practices. The rest are listed in table 2.

However, 38(19.7%) dentists reported complete closure of their dental facilities, as shown in table 2. Dentists still running clinics and undertaking normal routine clinic

procedures as usual, were in the minority 17(8.7%). The distributions per institution is shown in table 2.

The facilities that were closed were non-functional for periods ranging from, a few weeks to over one month; two weeks 3(1.5%), three weeks 9(4.6%), one month 7(3.6%), and more than a month 19(9.7%). The remaining 157(80.5%) respondents said their facilities were never closed.

A total of 84 (43.1%) of the respondents indicated that they had had no COVID-19 training. The respondents reported a statistically significant increase in the use of N95 masks compared to the period before COVID-19 ($p=0.0001$).

A high body temperature 194 (99.5%), a significant travel history 184 (94.4%) and contact with someone who was positive for SAR-Cov2 169 (86.7%) were some of the most frequent things, respondents selected as important components of patient screening to help identify possible COVID-19 cases.

The most used guidelines by the respondents were those from the Ministry of Health (75%), Ghana Health service (74%) and the World Health Organization (68%) (Figure 1). The commonest source of information and guidelines for practice was through the internet (73% of participants). The GDA approved WhatsApp group; "The Dental Hub" was the second common source of information for dentists. It was utilized by 51.3% of participants, while workplace distribution served 50.8% of the respondents. The GDA Google group and peer informants served 27% and 19% of the respondents respectively. There were varying areas of recommendations by the respondents to be used/improved in their workplaces. These included mostly personal protective equipment (PPEs), efficient patient screening systems, hand washing, and effective patient appointment systems (Figure 2).

Table 1: Background characteristics of Respondents

Variable	Number	Proportion (%)
Age(years)		
< 30 years	64	32.8
30-39 years	83	42.6
40-49 years	28	14.4
50- 59 years	10	5.1
60+ years	10	5.1
Sex		
Males	115	59.0
Females	80	41.0
Workplace		
Teaching Hospitals	45	23.1
Dental Schools	20	10.3
Ghana Health Service	59	30.3
Quasi Government	24	12.3
Hospital (Military/Police)	9	4.6
CHAG Institution	38	19.5
Private practice		
Rank		
Consultant	10	5.1
Specialist [†]	27	13.8
Medical Officer ^{**}	111	56.9
House Officer ^{***}	37	18.9
Others	10	1.0
Region		
Ahafo	1	0.5
Ashanti	26	13.3
Bono	5	2.6
Central	7	3.6
Eastern	17	8.7
Greater Accra	127	65.1
Northern region	2	1.0
Volta	3	1.5
Western	7	3.6

[†]Specialists/Senior Specialists, ^{**}Principal Medical Officers/Senior Medical Officers/Medical Officers, ^{***}House Officers/Senior House Officers

Table 2: Clinic closure during the early phase of COVID-19 outbreak

Work category	Clinic Closure during the early phase of the outbreak (N/%)		
	Complete Closure	Emergencies Only	Normal Clinic
Teaching Hospitals	7 (18.4%)	35 (25.0%)	3 (17.6%)
Dental Schools	14 (36.8%)	6 (4.3%)	0 (0.0%)
Ghana Health Service	6 (15.8%)	47 (33.6%)	6 (35.3%)
Quasi Government Hospitals	1 (2.6%)	21 (15.0%)	2 (11.8%)
CHAG Institution	2 (5.3%)	5 (3.6%)	2 (11.8%)
Private practice	8 (21.1%)	25 (17.9%)	4 (23.5%)
Others	0 (0.0%)	1 (0.7%)	0 (0.0%)
Total	38 (100.0%)	140 (100.0%)	17 (100.0%)

Figure 1: Preferred guidelines for clinical practice

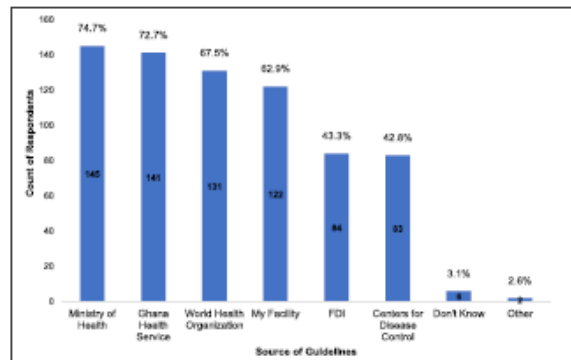
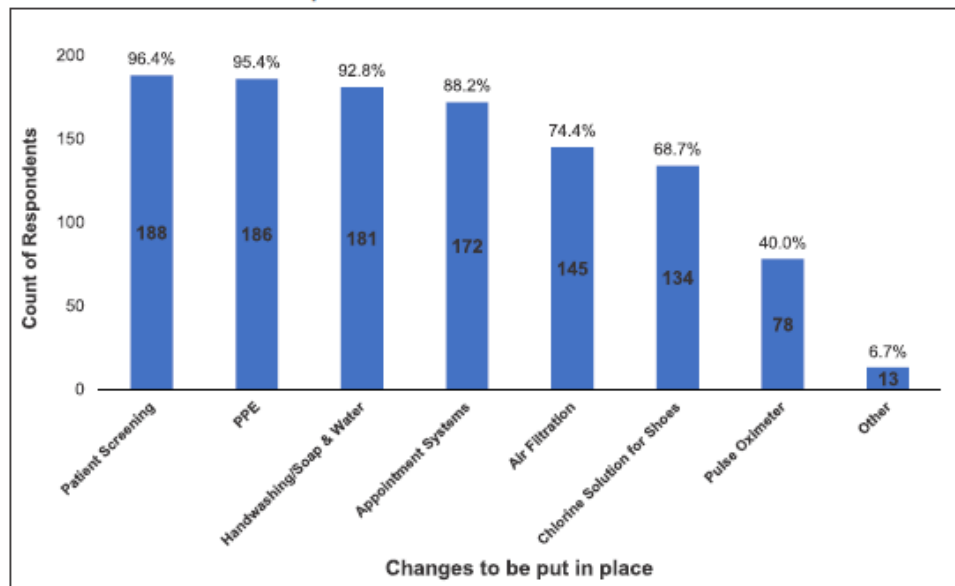


Table 3. Patient Measures, Clinic Measures, and Procedures Done During COVID-19 pandemic

Measures taken	Number of Dentists	Proportion (%)
Patient Measures During pandemic*		
Temperature Checks	167	89.3
Travel History	159	85.0
Facemasks	138	73.8
Covid-19 Contact	137	73.3
Others	17	9.1
Pulse Oximeter	13	7.0
None	4	2.1
Clinic Measures During pandemic *		
Hand Sanitizers	157	84.0
Water and Soap Handwashing	155	82.9
Waiting Area Chair Spacing	136	72.7
No Handpieces & Ultrasonics	121	64.7
Reduced Patient Waiting Time	104	55.6
Patient Education	99	52.9
Pretreatment Mouth Rinses	45	24.1
Patient Barriers	42	22.5
Shoe Disinfection Chlorine Solution	12	6.4
Rubber Dam	12	6.4
Other	11	5.9
Air Filtration	9	4.8
Nothing Changed	6	3.2
Procedures Done During pandemic *		
Extraction	180	96.3
Incision and Drainage	93	49.7
Dentures	75	40.1
Fractures	56	29.9
Endodontics	52	27.8
Fillings	43	23.0
Hand Scaling	36	19.3
Ultrasonic Scaling	23	12.3
Orthodontics	23	12.3
Others	16	8.6

Multiple Response Data

Figure 2: Recommendations for clinical practice



DISCUSSION

This study set out to explore the response of Ghanaian dentists to the COVID-19 pandemic, while exploring areas for improvement.

Most clinics limited provision of oral healthcare services during the early phase of the pandemic to emergencies only. This limitation of dental services, especially during the initial phase of the pandemic was a general response in many places⁸, as it served to protect not only the Dental professional, but the patients as well. Also, the disease was still evolving and very little was known about it so it was a way of buying time while studying the disease characteristics. While many elective procedures were postponed, some respondents in this study still carried out some non-emergency procedures. The common emergency procedures carried out in the period were extractions, followed by incision and drainage of dental abscesses in most of the centres. Though severe odontogenic infections have been noted to be quite prevalent in Ghana¹⁷, the lack of access to oral health care during the early period of the COVID-19 pandemic could have influenced the progression to abscesses in many people with dental caries. Expectedly, there were much fewer dentists who carried out scaling and polishing (12%) and restorations (19%). Van Doremalen et al established that SARS-CoV-2 remained viable in aerosols throughout 3 hours of their study, a finding which is of particular importance to Dentistry because several procedures in the practice are aerosol-generating. It is therefore imperative that such procedures are done with the maximum protection and precaution.

Though many respondents reported that some measures were taken in the wake of the pandemic to limit the spread of infection, about 3% of the respondents opined that nothing had changed and they were using their already existing infection control measures before the pandemic. This finding though disturbing, and may point to a gap in institutional preparedness and education. It may also be that some clinics may have felt that existing infection control measures were good enough to adequately control the

COVID-19 infection. It is however necessary that all managers at all levels prioritize infection control, especially in these times, and institute measures to reduce the spread of the disease.

The uncertainties, throughout the emergence of the pandemic, have been profound with the directives and guidelines on management and prevention sometimes changing and others conflicting. Several institutions and organisations therefore attempted to streamline clinical dental practice with some recommendations and guidelines. These started with nearly complete closures initially, especially for private clinics, followed by gradual easing of restrictions. The International Dental Federations, WHO, Centres for Disease Control, the Ministry of Health, and Ghana Health Service have been instrumental in this regard, providing guidelines for practice. These guidelines however sometimes varied leaving the practitioner in a fix as to which one to follow. It is therefore important that the Ghanaian Dental professional body organizes its front to give a unified, precise, customized dental recommendation for local use. From this study, social media seems to have been an effective means of communication among the Ghanaian Dental professionals. It can therefore be harnessed to improved awareness and promote new information and findings concerning COVID-19.

Respondents' recommendations and suggestions inform clinic and health managers and administrators about the areas which concerns Ghanaian dentists the most. From this study, most recommendations and concerns centered on insufficient PPEs, efficient patient screening systems, universal hand washing, and effective patient appointment system. Availability of PPEs has been of public concern in the recent past, with Government engaging several companies for their production to meet the country's demand. While confirmed cases continue to rise amidst the already existing burden of oral diseases, dentists may have to equip themselves, though cautiously, to manage patients with oral and maxillofacial conditions. It is therefore crucial that adequate PPEs are made available to this peculiar group of health workers to enhance their productivity and output.

This study is not without limitations. There was a low response rate from dentists, hence care must be taken in interpreting findings from this study. Our findings are however useful to guide further policies regarding dental practice and COVID-19, and could be useful in hypothesis generation for future studies in the area.

CONCLUSION

Dentists working in Ghana were well apprised with the COVID-19 pandemic and the peculiar challenges of clinical practice it introduced. Several steps were taken to protect the dental team, patients, and the general populace. There was overwhelming adoption of enhanced PPE protocols, and abolishing of elective/urgent care procedures that tend to generate aerosol. Patient screening, and social distancing measures among others, were enforced in response to practice guidelines from national and international sources. Respondents were forward looking in their suggestions for practice post COVID-19. They believed that appointment systems, appropriate patient screening, patient hand hygiene and enhanced PPE's were essential in the post COVID-19 era.

ACKNOWLEDGEMENT

The authors are thankful to the President and the secretary of the Ghana Dental Association and the office of the Chief Dental Officer for their invaluable assistance.

REFERENCES

1. She J, Jiang J, Ye L, Hu L, Bai C, Song Y. 2019 novel coronavirus of pneumonia in Wuhan, China: emerging attack and management strategies. *Clin Transl Med.* 2020;9(1).
2. Heymann DL, Shindo N. COVID-19: what is next for public health? *Lancet.* 2020;395(10224):542-545.
3. Chakraborty I, Maity P. COVID-19 outbreak: Migration, effects on society, global environment and prevention. *Sci Total Environ.* 2020;728:138882.
4. Li JY, You Z, Wang Q, et al. The epidemic of 2019-novel-coronavirus (2019-nCoV) pneumonia and insights for emerging infectious diseases in the future. *Microbes Infect.* 2020;22(2):80-85.
5. Kolifarhood G, Aghaali M, Mozafar Saadati H, et al. Epidemiological and Clinical Aspects of COVID-19; a Narrative Review. *Arch Acad Emerg Med.* 2020;8(1):e41.
6. van Doremalen N, Bushmaker T, Morris DH, et al. Aerosol and Surface Stability of SARS-CoV-2 as Compared with SARS-CoV-1. *N Engl J Med.* 2020. doi:10.1056/nejmc2004973
7. Meng L, Hua F, Bian Z. Coronavirus Disease 2019 (COVID-19): Emerging and Future Challenges for Dental and Oral Medicine. *J Dent Res.* 2020;2019.
8. Coulthard P. Dentistry and coronavirus (COVID-19) - moral decision-making. *Br Dent J.* 2020;228(7):503-505.
9. Ge Z yu, Yang L ming, Xia J jia, Fu X hui, Zhang Y zhen. Possible aerosol transmission of COVID-19 and special precautions in dentistry. *J Zhejiang Univ Sci B.* 2020;21(5):361-368.
10. Liu Y, Ning Z, Chen Y, et al. Aerodynamic analysis of SARS-CoV-2 in two Wuhan hospitals. *Nature.* 2020;582(7813):557-560.
11. Kampf G, Todt D, Pfaender S, Steinmann E. Persistence of coronaviruses on inanimate surfaces and their inactivation with biocidal agents. *J Hosp Infect.* 2020;104(3):246-251.
12. Chen N, Zhou M, Dong X, et al. Epidemiological and clinical characteristics of 99 cases of 2019 novel coronavirus pneumonia in Wuhan, China: a descriptive study. *Lancet.* 2020;395(10223):507-513.
13. WHO Global Infection Prevention and Control Network. Infection prevention and control during health care when COVID-19 is suspected. WHO. 2020;(i):1-5. [https://www.who.int/publications-detail/infection-prevention-and-control-during-health-care-when-novel-coronavirus-\(ncov\)-infection-is-suspected-20200125](https://www.who.int/publications-detail/infection-prevention-and-control-during-health-care-when-novel-coronavirus-(ncov)-infection-is-suspected-20200125).
14. ADA Coronavirus (COVID-19) Center for Dentists. <https://success.ada.org/en/practice-management/patients/infectious-diseases-2019-novel-coronavirus>
15. Dental Settings | CDC. <https://www.cdc.gov/coronavirus/2019-ncov/hcp/dental-settings.html>.
16. Journal of Dental Research publishes COVID-19 guidelines from researchers based in Wuhan, China | FDI World Dental Federation. <https://www.fdiworlddental.org/news/20200317/journal-of-dental-research-publishes-covid-19-guidelines-from-researchers-based-in>.
17. Blankson PK, Parkins G, Boamah MO, et al. Severe odontogenic infections: a 5-year review of a major referral hospital in Ghana. *Pan Afr Med J.* 2019;32:71.

