

Compliance of Dental Staff and Students to Dental Guideline amidst the COVID-19 Pandemic: An Institutional Analysis

Nor Azura Ahmad Tarmidzi¹, Nor Haliza Mat-Baharin², Diana Md Zahid³, Muhammad Syafiq Alauddin⁴

¹Department of Oral & Maxillofacial Surgery, Pathology and Medicine, Faculty of Dentistry, Universiti Sains Islam Malaysia (USIM)

²Department of Periodontology & Community Oral Health, Faculty of Dentistry, Universiti Sains Islam Malaysia (USIM)

³Department of Orthodontics and Paediatric Dentistry, Faculty of Dentistry, Universiti Sains Islam Malaysia (USIM)

⁴Department of Conservative Dentistry and Prosthodontics, Faculty of Dentistry, Universiti Sains Islam Malaysia (USIM)

Nor Haliza Mat Baharin
Corresponding Author

Department of Periodontology & Community Oral Health, Faculty of Dentistry, Universiti Sains Islam Malaysia (USIM), Kuala Lumpur, Malaysia.

E-mail: halytzar@usim.edu.my

Abstract

COVID-19 can be transferred via aerosols. Amidst the COVID-19 pandemic, dental practitioners, supporting clinical staff and clinical-year dental students are directly exposed to aerosols produced during dental treatment. Thus, the Faculty of Dentistry of Universiti Sains Islam Malaysia (USIM) developed dental guidelines that included a standard operating procedure for clinical settings. This study aimed to assess the adherence of clinical staff and students to dental guidelines during the COVID-19 pandemic and investigate the nature and extent of difficulties encountered by the faculty

Manuscript Received Date: 31/12/20

Manuscript Acceptance Date: 31/05/21

Manuscript Published Date: 19/06/21

©The Author(s) (2021). Published by USIM Press on behalf of the Universiti Sains Islam Malaysia. This is an Open Access article distributed under the terms of the Creative Commons Attribution Non-Commercial License (<http://creativecommons.org/licenses/by-nc/4.0/>), which permits non-commercial re-use, distribution, and reproduction in any medium, provided the original work is properly cited. For commercial re-use, please contact usimpress@usim.edu.my

doi: <https://doi.org/10.33102/uij.vol33no3.316>



Universiti Sains Islam Malaysia
<https://uijournal.usim.edu.my>

members in complying with the guidelines. The dental guidelines were explained to all faculty members, and then an audit form was developed on the basis of the guidelines. A series of clinical audits was conducted on a weekly basis. Afterwards, a survey was conducted to investigate any problems faced by dental clinical staff and students in terms of complying with the guidelines. The percentage of noncompliance to wearing goggles and face shields during dental procedures was 7.1% and 2.1%, respectively. Amongst 128 respondents, 84.1% reported unclear vision due to the fogging of the goggles, whereas 45.2% reported blurred vision when goggles and face shields were worn together. Moreover, approximately 30.2% of the respondents claimed that KN95 masks contribute to difficulty in breathing. Nevertheless, most of the dental clinical staff and students were compliant to the dental guidelines. Noncompliance was mainly caused by the fogging issue when wearing goggles. Thus, this issue should be tackled to prevent the impairment of treatment quality.

Keywords: *clinical audits, compliance, COVID-19, personal, protective equipment*

1. Introduction

The World Health Organization (WHO) reported of series of pneumonia like cases in Wuhan, People's Republic of China in December 2019 (Zhu et al., 2020). Consequently, the causative pathogen for this atypical pneumonia-like disease was declared as a novel Coronavirus which originated from the beta-corona virus family tree (Anu Sushanth et al., 2020; Zhu et al., 2020). Initially, it was named as 2019 novel coronavirus (2019-nCoV); following further elaborate findings through multinational research, the WHO named the disease as coronavirus disease 2019 (COVID-19) and the causative pathogen as severe acute respiratory syndrome-coronavirus 2 (Tang et al., 2020; World Health Organization, 2020a). On March 2020, the WHO declared COVID-19 as a global pandemic with international concerns across the borders (Cucinotta & Vanelli, 2020). In November 2020, the cumulative confirmed cases worldwide was estimated to be nearly around 50 million, including a devastating number of 1.2 million fatalities globally (World Health Organization, 2020b). However, the actual number of infections and deaths were always believed to be reportedly higher (Baud et al., 2020). The swift outbreak of COVID-19 had become an immediate global public health concern worldwide due to the rapid potential of the spread compared with infectious diseases of similar nature, that is, two times more infectious than the common influenza virus (Liu et al., 2020).

This novel disease mainly spreads through contaminated droplets or aerosols between people in close contact or poorly ventilated indoor settings where people spend longer periods of time (World Health Organisation, 2020c). Furthermore, anecdotal and empirical evidences reveal risky transmissions, such as through vertical transmission (mother to newborn) and faecal and oral transmission routes (Chen, 2020; Cowling & Leung, 2020; Holshue et al., 2020; Meng et al., 2020; Noorimotlagh et al., 2021). If an individual is in close contact (defined as less than 1 m) with a person exhibiting clinical respiratory symptoms, such as sneezing and coughing, the individual's oral, nasal and eye mucosae may be exposed to infectious particles from droplets (Lu et al., 2020; Vukkadala et al., 2020). The reported asymptomatic incubation period of COVID-19 can be up to 14 days based on international epidemiological research findings; however, literature has shown that it can be as early as 5 to 6 days (Guan et al., 2020; Huang et al., 2020). Nevertheless, a 14-day framework was developed as a precautionary guideline adopted by multiple countries as a universal consensus for medical observation and period of isolation to decrease the susceptibility rate of COVID-19 potential cases in communities (Backer et al., 2020; Lauer et al., 2020). However, some

findings suggest that asymptomatic patients and individuals who are in the incubation period have the potential to transmit the virus, making it an almost impossible and daunting task to isolate potential personnel from large communities in a timely manner (Chan et al., 2020; Gandhi et al., 2020).

Dental health professionals, dental auxiliary teams and patients who visit dental offices are often exposed to numerous potential cross-contaminated diseases originating from viruses, bacteria and other microorganisms, including SARS-CoV-2 that caused COVID-19 disease. The effect had been enormous due to the ability of virus transmission via aerosols. Fundamentally, dental field personnel are at a high risk of spreading and contracting the virus within the environment through aerosol-generating procedures (AGP), such as the utilisation of high- and slow-speed handpieces, ultrasonic scalers and aspirators/suction unit (Peng et al., 2020). Alternatively, the close contact with patients through face-to-face consultations and treatments, as well as the persistent exposure to potential agents of infection, such as blood, saliva and other bodily fluids, were also a concern (Kampf et al., 2020; Luksamijarulkul et al., 2009). Recent findings have suggested that the virus particles can be suspended in the air within the environment for a certain period and has a high possibility of travelling and remaining on various objects for up to 3 days (Checchi et al., 2020; Kutter et al., 2018).

The severity of the COVID-19 pandemic has radically changed the dental practice perspective in terms of operative manners, management and infection control guidelines. Various guidelines have been suggested by various global and local professional dental bodies, with varying levels of response according to the prevalence of COVID-19 in specific areas, countries and regions. In accordance with the instructions of the local government, infection control guidelines have focused on minimising the potential risk of the contamination and spread of the disease in dental practice. The focus was on wearing personal protective equipment (PPE), such as gloves, masks and facial barriers, i.e. face shields and protective eyewear; preoperative oral rinsing with disinfectant liquids; proper disinfection and sterilisation of dental apparatus and equipment; appropriate protocols; and formulation of work and contingency plans in relevant dental practice. As of June 2020, the Faculty of Dentistry of Universiti Sains Islam Malaysia (USIM) developed a set of guidelines related to COVID-19 prevention as part of the academic institution’s protective measures (Faculty of Dentistry USIM, 2020). This step was in line with other institutions that were developing current specific protocols and guidelines for clinical and teaching practices during the pandemic (Al Kawas et al., 2020; Aldahlawi & Afifi, 2020; Anu Sushanth et al., 2020; Ghani, 2020). After the COVID-19 lockdown in Malaysia, clinical and academic practices in the Faculty of Dentistry of USIM were conducted in accordance with the clinical guidelines. Given the scarcity of data on the adherence of dental personnel and institution to COVID-19 guidelines and protocols in Malaysia, this study primarily aims to assess the adherence of clinical staff and students to clinical guidelines during the COVID-19 pandemic. It also aims to investigate the nature and extent of difficulties encountered by the faculty staff in terms of complying with the guidelines.

2. Methodology

Dental guidelines during the COVID-19 pandemic were developed and finalised by the COVID-19 Committee, which was appointed by the Faculty of Dentistry of USIM. The guidelines were endorsed in the Faculty Management Meeting and later distributed in soft copy to all clinical staff. Briefings on the guidelines were conducted at several different occasions for clinical and academic

staff and clinical students. With the approval of the dean, an audit on the compliance of clinical staff and students was planned. An audit tool was designed over a series of meetings by the same committee that developed the guidelines; the committee comprised dental specialists from various fields, including oral surgery, periodontology, orthodontics and prosthodontics. Content validation was done by the committee and the questionnaire was pretested. A proforma online checklist utilising Microsoft (MS) Forms was developed and distributed amongst the auditors/examiners to facilitate the audit process. Standardisation aimed to ensure fairness amongst the four auditors.

The audit was divided into three components based on the guidelines: (1) COVID-19 screening, (2) physical environment and (3) PPE (mask, goggles, face shield, gown). The audit was conducted once a week by a different examiner from July to August 2020, as recommended during an outbreak (Khamis & van Knippenberg-Gordebeke, 2016). A special meeting amongst the members of the COVID-19 committee was held every two weeks. The findings of the audit were presented by each auditor, and related issues and areas for improvement were discussed, followed by interventions.

After the audit, an online survey amongst all clinical staff, lecturers and students was conducted to identify the difficulties and problems faced in complying with the guidelines. The questionnaire was distributed amongst all clinical staff and students via MS Forms. It was divided into demographic profile, screening and clinical works. Data from the audit series and questionnaires were analysed descriptively.

3. Materials and Methods

The results were categorised into two parts: (1) outcome of the audit observations and (2) feedback from the online survey. The audit was conducted on any random day of the week; thus, only certain staff and students were involved. By contrast, the online survey included almost all the clinicians and clinical staff in charge of dental clinics, the registration counter and the health screening counter. Only students who were in their clinical years were included in the online survey.

Audit for compliance to the guideline's recommendations

A series of weekly audits was conducted for six weeks. Areas that were audited were the outpatient clinic, specialist clinics and students' polyclinics, making up a total of 70 dental surgeries audited throughout the six weeks. Audits were conducted through observation by the auditors during a one-off spot check session.

- i. Patient Screening and Physical Layout: Tables 1 and 2 show the results of observations conducted for patient screening and physical layout of faculty throughout the six weeks of audit. Given several pressing issues, the COVID-19 Committee members conducted a meeting after the second audit. Noncompliance was noted at a screening counter during the second-week audit. The staff on duty did not wear the recommended PPE for screening (no face shield). An intervention plan was discussed and executed. After one week of intervention, audit sessions were continued until the sixth week. The recommended physical layout, as suggested by the guidelines for dental clinics, was observed during the first two weeks of audit, and discrepancy was recognised. No poster on hand washing was displayed at a certain clinic area, and posters on social distancing, respiratory etiquette and hand hygiene were not displayed for the first three weeks of audit.

Table 1: Observation on Screening Process

Checklist	1 st audit	2 nd audit	I N T E R V E N T I O N	3 rd audit	4 th audit	5 th audit	6 th audit	
Do all patients go through triage?	Yes	Yes			Yes	Yes	Yes	Yes
Is there any method to detect high-risk patients?	Yes	Yes			Yes	Yes	Yes	Yes
Do dental staff at the triage wear appropriate PPE?	Yes	No			Yes	Yes	Yes	Yes
Is temperature scanning conducted for every patient?	Yes	Yes		Yes	Yes	Yes	Yes	

Table 2: Observation for Recommended Physical Layout of Faculty Area

Checklist	1 st audit	2 nd audit	I N T E R V E N T I O N	3 rd audit	4 th audit	5 th audit	6 th audit	
Alcohol hand rub is placed at accessible areas in the clinic and waiting area.	Yes	Yes			Yes	Yes	Yes	Yes
Are posters on social distancing, respiratory etiquette and hand hygiene available at the patient waiting area?	No	No			Yes	Yes	Yes	Yes
Are there hand hygiene posters in the clinic area?	No	No			No	Yes	Yes	Yes

- ii. PPE: A total of 140 clinical staff, mainly operators and assistants in the dental surgery room, were involved during the audit, as shown in Table 3. Aerosol- and nonaerosol-generating dental procedures were performed during the audit. Although most auditees complied to the recommended PPE as per the guidelines, goggle wearing was the main noncompliance issue during the audit (7.1%), followed by double gloving (2.9%) and face shield wearing (2.1%), as presented in Table 4.

Table 3: Number of Dental Surgeries and Auditees

Clinic	n		%
	Room	Auditee	
Out-patient clinics	6	12	8.5
Specialist clinics	6	12	8.5
Students' polyclinics	58	116	83
TOTAL	70	140	100

Table 4: Compliance of Clinical Staff and Students to PPE

PPE	Compliance Level						Total Non-Compliance (N=140)
	1 (n=20)	2 (n=36)	3 (n=36)	4 (n=36)	5 (n=4)	6 (n=8)	
Goggle	1	3	2	3	0	1	10 (7.1%)
Face shield	1	2	0	0	0	0	3 (2.1%)
Mask	0	0	0	0	0	0	0 (0%)
Double glove	0	2	0	0	0	2	4 (2.9%)
Nonwoven gown	0	0	0	0	0	0	0 (0%)

Questionnaire

Regarding the online questionnaire distributed amongst clinical staff, lecturers and clinical students, 128 responses were received. Majority of the respondents were female (75.8%), whereas 24.2% were male. The mean age for staff was 36.3 years old (SD=7.92), with ages ranging between 22 and 65 years old. For students, the mean age was 23.3 years old (SD=0.67), with ages ranging between 22 and 24 years old. Most of the staff have more than 10 years of clinical experience (52.4%), as shown in Table 5.

Table 5: Sociodemographic Profile of Respondents (N=128)

Characteristics	N (%)
Gender	
Male	31 (24.2)
Female	97 (75.8)
Category	
Lecturer	24 (18.8)
Clinical staff	18 (14.0)
Student	86 (67.2)

Clinical experience (staff only)

Less than 2 years	5 (11.9)
2 to 5 years	5 (11.9)
5 to 10 years	10 (23.8)
More than 10 years	22 (52.4)

- i.* Understanding of the Guideline: Majority of the respondents (97.7%) read the guidelines, and 78.1% said that they totally understood the circulated guidelines. Amongst 25 respondents who claimed that they did not fully understand the guidelines, 36% said that they would ask their colleagues and friends for clarification, whereas 32% would refer to the lecturer in charge of the guidelines. The rest (28%) would reread until they fully understood. Three respondents (2.3%) did not read the guidelines, claiming that they were too busy with their schedule (1.6%) and unaware of the guidelines (0.8%). In addition, 45.3% of the respondents claimed that they also read guidelines prepared by other agencies, such as the Ministry of Health (MOH) and the WHO.
- ii.* Facilities Provided: All participants (100%) believed that the faculty had prepared enough PPE and related materials during the COVID-19 pandemic. For workplace disinfection before and after treatment, 3.2% claimed that they did not know the right way to perform workplace disinfection, and 2.4% said that they always forgot to perform the disinfection. The rest did not have difficulties or did not participate in workplace disinfection.
- iii.* Difficulties Faced during Screening: A total of 15 clinical staff involved in patient screening could enter the premise before the patient. Most of them did not face any difficulty during screening, except whilst using face shields. The face shields disturbed their sight (33.3%), causing communication problems with patient (13.3%) and discomfort (13.3%).
- iv.* Difficulties Faced during Clinical Work: With regard to nonwoven gowns, 87.3% of the respondents faced no difficulties using them. During the donning and doffing processes, majority had no difficulty (73.8%). However, 11.9% of them claimed that donning and doffing took some time, subsequently causing the delay in treatment time. Another 8.0% said that they were not sure about the steps for donning and doffing, whereas 6.3% claimed that they always forget to sanitise their hands in between the steps.

Double gloving was not considered a problem for the respondents as 82.5% of them said that they were able to comply. However, most of the respondents struggled with goggle wearing as 84.1% said that fogging causes impaired vision. For face shields, 45.2% claimed that it interrupted their vision. As for KN95 masks, although 35.7% had no difficulty, others claimed that it can also contribute to fogging on their goggle (29.4%), and it was too tight, causing difficulty in breathing (18.3%). Details on the difficulties during clinical work in the new norm are presented in Table 6.

Table 6: Difficulties Faced Related to PPE

Difficulties faced during clinical works	N (%)
Nonwoven gown	
No difficulty	110 (87.3)
Excessive sweating	7 (5.6)
Movement difficulties	7 (5.6)
Others	2 (1.5)
Goggle wearing (AGP)	
No difficulty	11 (8.7)
Fogging on goggle	106 (84.1)
Uncomfortable	4 (3.2)
Others	5 (4.0)
Face shield	
No difficulty	50 (39.7)
Impaired vision	57 (45.2)
Too tight	11 (8.7)
Not suitable for clinical work	6 (4.8)
Others	2 (1.6)
KN95 mask (AGP)	
No difficulty	45 (35.7)
Breathing difficulty	38 (30.2)
Too tight	23 (18.2)
Caused fogging on goggle	5 (4.0)
Unsure of the right method	5 (4.0)
Others	10 (7.9)
Double gloving	
No difficulty	104 (82.5)
Forgetfulness	10 (7.9)
Difficult to perform treatment	3 (2.4)
Not necessary	4 (3.2)
Lack of glove	4 (3.2)
Others	1 (0.8)

4. Discussion

During the emergence of the COVID-19 pandemic, many dental clinics were forced to close due to fear of contracting and spreading the disease. Little information was known regarding the disease. Contemporarily, additional knowledge and understanding on the nature of the virus and ways to prevent infection were available as many guidelines were published by professional bodies and organisations (American Dental Association, 2020; Malaysian Association of Paediatric Dentistry, 2020; Ministry of Health Malaysia, 2020). In Malaysia, the Dental Division, Ministry of Health

published a national guideline for dentists to resume their practices as aggressive infection prevention and control measures have been adopted to prevent healthcare-associated transmission of COVID-19 (Ministry of Health Malaysia, 2020).

Several factors must be considered before dental organisations, especially an academic centre, such as the Faculty of Dentistry of USIM (which involves the management of a large staff), could reopen. Amongst the factors to consider were facilities, human resources, PPE stock and budget status. On these bases, the Faculty of Dentistry of USIM developed guidelines, which are consistent with the national guidelines and recommendations (Faculty of Dentistry USIM, 2020).

The success of guidelines depends on how it is translated into clinical work. Clinical guidelines are developed from a series of evidence-based literature; thus, compliance to guidelines may result in good clinical outcomes, especially during a pandemic (Wee et al., 2020). In this audit report, we observed the compliance of dental staff and students to PPE recommendations and facility preparedness in facing the new norm.

Patient screening is considered the most important process in reducing the risk of virus transmission. The main goal is to ensure that all patients and their companions who attend the dental clinic are screened to protect the safety of other patients and the dental staff on duty. In this study, a designated entrance with proper screening triage with the appointed staff members were set up to control the incoming patients. Patients without companions, except for paediatric and geriatric patients, could enter the premise. All who enter the clinic must fill in the declaration form (adapted from MOH), scan the MySejahtera QR code and be screened for body temperature (Ministry of Health Malaysia, 2020). A tag would be placed at the patient's and the accompanying person's wrist as a method of identification to indicate that one has undergone the screening process.

From the observation during the audit, the screening process fully complied with the recommendations from the guidelines, except for one occurrence when the person in charge of screening failed to wear a face shield, as suggested in the guidelines (Faculty of Dentistry USIM, 2020; Ministry of Health Malaysia, 2020). Face shields are recommended whenever no physical barrier is provided. In our facilities, no barrier was provided at the screening booth; thus, wearing the face shield is needed because data have shown the possibility of airborne virus transmission (Peng et al., 2020; World Health Organisation, 2020c). Face shields are useful as respiratory protection for healthcare workers because it can substantially reduce the short-term exposure of health care workers to large infectious aerosol particles and can reduce the contamination of their respirators (Lindsley et al., 2014).

Displaying alcohol hand rub and posters on social distancing, respiratory etiquette and hand hygiene at appropriate areas is recommended as a reminder for all to comply with the recommendations in preventing the spread of COVID-19 (Thomé et al., 2020). These visual alerts are designated to offer patients and visitors proper instruction on the correct procedures. However, the recommended poster was not available during the first two weeks of audit. This matter was brought up during the committee meeting where the result of the audit was presented; the person in charge was directed to display the poster as soon as possible.

The questionnaires revealed that a few clinical staff did not read the guidelines provided, whereas majority of those who read the guidelines found them to be understandable. All clinical staff are responsible to update themselves on the latest issues in healthcare especially that we are dealing

with a pandemic like COVID-19. Previous studies have shown a high understanding and preparedness of dental practitioners in handling dental practice during a pandemic (Arora et al., 2020; Khader et al., 2020). Moreover, the institution/faculty is also responsible for addressing the knowledge gap to improve understanding amongst the staff in the future. As in our centre, the faculty and the COVID-19 committee were responsible for preparing the clinic and facilities and ensuring that the equipment is enough and current information is conveyed through briefing, continuous dental education sessions and feedback channels.

Enhanced infection control and compliance to recommended PPE have been proven to be efficient in controlling the spread of the virus at hospitals and dental settings (Ge et al., 2020; Gimenez et al., 2015; Nardone et al., 2020; Zheng et al., 2020). During the audit, a small percentage of clinical staff and students were found not wearing goggles and face shields during dental treatment. Nevertheless, all of them wore surgical masks or KN95 as suggested in the guidelines. Given the proximity of the operator to the patient, protective eyewear and face shields are required during dental treatment/procedure to protect the eyes from aerosols and splatter (Ge et al., 2020).

During the intervention week, rebriefing was conducted to all clinical staff and dental students. The briefing emphasised on the importance of wearing full PPE. However, despite intervention, a few staff members still failed to comply to the wearing of face shields and goggles.

During the follow-up survey, 84.1% of the respondents claimed that fogging occurs on their goggles, leading to noncompliance. In addition, 45.2% of them claimed that wearing a goggle and a face shield at the same time impairs their vision due to fogging. A clinician's vision is important in disease detection and in the quality of dental treatment (Gimenez et al., 2015). Low vision reduces the quality of the treatment and increases the stress level of clinicians (Sabel et al., 2018). Without a pandemic, all dental personnel wear face shields as part of their PPE. However, adding goggles in the PPE list is the new norm that needs to be accepted by all clinicians. The quality of the goggles and face shields is important in dental work as good visibility is needed in performing dental treatments, such as tooth restorations, scaling and administration of local anaesthesia. Compliance to these equipment depends on the perceived necessity for wearing the protective equipment and on the level of comfort whilst using them (Prakash et al., 2020).

Other PPE recommendations during the COVID-19 pandemic include the wearing of nonwoven gowns and KN95 masks and double gloving; these requirements did not raise much concern in this audit and survey. Gloves, surgical masks and isolation gowns are part of PPE during the no pandemic period. Nevertheless, it was enhanced during the pandemic to reduce the risk of cross infection. Double gloving was introduced during this pandemic as there is greater risk of self-contamination during doffing, especially with a single pair of gloves (Chughtai et al., 2018; Suen et al., 2018). Majority of the clinical staff and students (97.1%) complied with the suggestion and did not face any difficulty (82.5%) for double gloving. However, some difficulties were reported (e.g. difficulty in performing treatments and forgetfulness of the new norm); nevertheless, the practice should be continued for as long as the faculty has enough PPE.

According to the MOH guideline, N95 masks should be worn when providing treatment to COVID-19-positive patients (Ministry of Health Malaysia, 2020). However, according to the suggestion by the Malaysian Deans' Council, N95 or KN95 masks are recommended to be worn whenever AGPs are involved to reduce the risk of cross infection (Dental Deans' Caucus of Malaysia, 2020). All clinical staff and students involved in AGP wore KN95 masks. However, a few difficulties were

identified when KN95 masks were worn with other PPE (e.g. breathing difficulty, too tight and fogging of the goggle). Although the problems related to KN95 masks is not prominent amongst the clinical staff and students, the consideration of KN95 mask usage is indispensable in terms of cost, benefit and disadvantages if any.

Regarding the nonwoven isolation gown, the material used should be water repellent to protect the wearer from potentially infectious liquids and aerosols (Karim et al., 2020). Although all clinical staff and students complied with the guideline for nonwoven gown, some of them faced difficulties wearing the gown. Given that the material is thicker and more water resistant than the previous isolation gown worn in clinical settings, some respondents claimed that it caused excessive sweating (5.6%), and it restricted their movement (5.6%). Furthermore, they needed to wear a full-coverage gown, including head and boot covers for AGP, thus increasing the discomfort amongst the wearers. Other studies reported on excessive sweating, skin rashes and itchiness after wearing the gown for a long time (Atay & Cura, 2020; Soraganvi et al., 2020). In addition, the donning and doffing of the gown require extra effort, thus consuming considerable time, as reported by the respondents. Some even forgot the steps. Thus, posters about the donning and doffing process were displayed at the donning/doffing area to assist the staff and students with the right steps. These guidelines are part of the new norm that all the clinical staff and students need to adapt with, and it will take some time for them to get used to.

5. Conclusion

Generally, the clinical staff and students complied with the dental guidelines prepared by the faculty. The health screening that serves as the first precautionary/preventive measure complemented the faculty's physical environment, supporting and maintaining awareness through posters and hand rub access. Most of the clinical guidelines and the use of PPE were also well adopted. However, a few instances of noncompliance were observed, mainly caused by the fogging issue in goggle wearing. Unfortunately, treatment quality will be impaired if this issue is not addressed. Guidelines and briefings that were provided to the staff and students helped in giving insights into the importance of the prevention and control of COVID-19. Being informed and knowing what to do could minimise the effect of the pandemic to the dental faculty. The high level of compliance proved that the guidelines are not just mere theory.

6. Acknowledgement

We would like to express our gratitude to the Faculty of Dentistry of USIM for the support and approval of conducting the audit and survey.

References

- Al Kawas, S., Al-Rawi, N., Talaat, W., Hamdoon, Z., Salman, B., Al Bayatti, S., Jerjes, W., & Samsudin, A. B. R. (2020). Post COVID-19 lockdown: measures and practices for dental institutes. *BMC Oral Health*, 20(1), 1–7. <https://doi.org/10.1186/s12903-020-01281-6>
- Aldahlawi, S. A., & Afifi, I. K. (2020). COVID-19 in Dental Practice: Transmission Risk, Infection Control Challenge, and Clinical Implications. *The Open Dentistry Journal*, 14(1), 348–354. <https://doi.org/10.2174/1874210602014010348>
- American Dental Association. (2020). Summary of ADA guidance during the COVID-19 crisis. *Ada*, 19–20. https://www.ada.org/en/press-room/news-releases/2020-archives/april/summary-of-ada-guidance-during-the-covid-19-crisis?utm_source=mouthhealthy&utm_medium=covid-19-mh&utm_content=cv-gov—interim-statement&utm_campaign=covid-19
- Anu Sushanth, A., Srivastava, K. C., Shrivastava, D., Hosni, H. A., Khan, Z. A., Al-Johani, K., Alzoubi, I. A., Sasirekha, B., Sghaireen, M. G., & Alam, M. K. (2020). Recommendations, practices and infrastructural model for the dental radiology set-up in clinical and academic institutions in the COVID-19 era. *Biology*, 9(10), 1–14. <https://doi.org/10.3390/biology9100334>
- Arora, S., Saquib, S. A., Attar, N., Pimpale, S., Zafar, K. S., Saluja, P., Abdulla, A. M., & Shamsuddin, S. (2020). Evaluation of knowledge and preparedness among indian dentists during the current covid-19 pandemic: A cross-sectional study. *Journal of Multidisciplinary Healthcare*, 13, 841–854. <https://doi.org/10.2147/JMDH.S268891>
- Atay, S., & Cura, Ş. Ü. (2020). Problems Encountered by Nurses Due to the Use of Personal Protective Equipment During the Coronavirus Pandemic: Results of a Survey. *Wound Management & Prevention*, 66(10), 12–16. <https://doi.org/10.25270/wmp.2020.10.1216>
- Backer, J. A., Klinkenberg, D., & Wallinga, J. (2020). Incubation period of 2019 novel coronavirus (2019-nCoV) infections among travellers from Wuhan, China, 20 28 January 2020. *Eurosurveillance*, 25(5), 1–6. <https://doi.org/10.2807/1560-7917.ES.2020.25.5.2000062>
- Baud, D., Qi, X., Nielsen-Saines, K., Musso, D., Pomar, L., & Favre, G. (2020). Real estimates of mortality following COVID-19 infection. *The Lancet Infectious Diseases*, 20(7), 773. [https://doi.org/10.1016/S1473-3099\(20\)30195-X](https://doi.org/10.1016/S1473-3099(20)30195-X)
- Chan, J. F. W., Yuan, S., Kok, K. H., To, K. K. W., Chu, H., Yang, J., Xing, F., Liu, J., Yip, C. C. Y., Poon, R. W. S., Tsoi, H. W., Lo, S. K. F., Chan, K. H., Poon, V. K. M., Chan, W. M., Ip, J. D., Cai, J. P., Cheng, V. C. C., Chen, H., ... Yuen, K. Y. (2020). A familial cluster of pneumonia associated with the 2019 novel coronavirus indicating person-to-person transmission: a study of a family cluster. *The Lancet*, 395(10223), 514–523. [https://doi.org/10.1016/S0140-6736\(20\)30154-9](https://doi.org/10.1016/S0140-6736(20)30154-9)
- Checchi, V., Bellini, P., Bencivenni, D., & Consolo, U. (2020). COVID-19 dentistry-related aspects: a literature overview. *International Dental Journal*, 0, 1–6. <https://doi.org/10.1111/idj.12601>

Chen, H., Guo, J., Wang, C., Luo, F., Yu, X., Zhang, W., Li, J., Zhao, D., Xu, D., Gong, Q., Liao, J., Yang, H., Hou, W., & Zhang, Y. (2020). Clinical characteristics and intrauterine vertical transmission potential of COVID-19 infection in nine pregnant women: a retrospective review of medical records. *The Lancet*, 395(10226), 809–815. [https://doi.org/10.1016/S0140-6736\(20\)30360-3](https://doi.org/10.1016/S0140-6736(20)30360-3)

Chughtai, A. A., Chen, X., & Macintyre, C. R. (2018). Risk of self-contamination during doffing of personal protective equipment. *American Journal of Infection Control*, 46(12), 1329–1334. <https://doi.org/10.1016/j.ajic.2018.06.003>

Cowling, B. J., & Leung, G. M. (2020). Epidemiological research priorities for public health control of the ongoing global novel coronavirus (2019-nCoV) outbreak. *Eurosurveillance*, 25(6), 1–5. <https://doi.org/10.2807/1560-7917.ES.2020.25.6.2000110>

Cucinotta, D., & Vanelli, M. (2020). WHO declares COVID-19 a pandemic. *Acta Biomedica*, 91(1), 157–160. <https://doi.org/10.23750/abm.v91i1.9397>

Dental Deans’ Caucus of Malaysia. (2020). *Post COVID-19 RMO-Malaysian University Guideline for Clinical Dental Practice*. Unpublished manuscript.

Faculty of Dentistry USIM. (2020). *Dental Guideline Post COVID-19*. Unpublished manuscript.

Gandhi, M., Yokoe, D. S., & Havlir, D. V. (2020). Asymptomatic Transmission, the Achilles’ Heel of Current Strategies to Control COVID-19. *The COVID-19 Reader*, 36–39. <https://doi.org/10.4324/9781003141402-4>

Ge, Z., Yang, L., Xia, J., Fu, X., & Zhang, Y. (2020). *Ge2020_Article_PossibleAerosolTransmissionOfC.pdf*. 21(5), 361–368.

Ghani, F. (2020). COVID-19 Outbreak and Dentistry: Guidelines and Recommendations for the Provision of Dental Healthcare Services. *Journal of the College of Physicians and Surgeons Pakistan*, 30(2), S101–S105. <https://doi.org/10.29271/JCPSP.2020.SUPP2.101>

Gimenez, T., Piovesan, C., Braga, M. M., Raggio, D. P., Deery, C., Ricketts, D. N., Ekstrand, K. R., & Mendes, F. M. (2015). Visual inspection for caries detection: A systematic review and meta-analysis. *Journal of Dental Research*, 94(7), 895–904. <https://doi.org/10.1177/0022034515586763>

Guan, W., Ni, Z., Hu, Y., Liang, W., Ou, C., He, J., Liu, L., Shan, H., Lei, C., Hui, D. S. C., Du, B., Li, L., Zeng, G., Yuen, K.-Y., Chen, R., Tang, C., Wang, T., Chen, P., Xiang, J., ... Zhong, N. (2020). Clinical Characteristics of Coronavirus Disease 2019 in China. *New England Journal of Medicine*, 382(18), 1708–1720. <https://doi.org/10.1056/nejmoa2002032>

Holshue, M. L., DeBolt, C., Lindquist, S., Lofy, K. H., Wiesman, J., Bruce, H., Spitters, C., Ericson, K., Wilkerson, S., Tural, A., Diaz, G., Cohn, A., Fox, L., Patel, A., Gerber, S. I., Kim, L., Tong, S., Lu, X., Lindstrom, S., ... Pillai, S. K. (2020). First Case of 2019 Novel Coronavirus in the United States. *New England Journal of Medicine*, 382(10), 929–936. <https://doi.org/10.1056/nejmoa2001191>

Huang, C., Wang, Y., Li, X., Ren, L., Zhao, J., Hu, Y., Zhang, L., Fan, G., Xu, J., Gu, X., Cheng, Z., Yu, T., Xia, J., Wei, Y., Wu, W., Xie, X., Yin, W., Li, H., Liu, M., ... Cao, B. (2020). Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China. *The Lancet*, *395*(10223), 497–506. [https://doi.org/10.1016/S0140-6736\(20\)30183-5](https://doi.org/10.1016/S0140-6736(20)30183-5)

Kampf, G., Todt, D., Pfaender, S., & Steinmann, E. (2020). Persistence of coronaviruses on inanimate surfaces and their inactivation with biocidal agents. *Journal of Hospital Infection*, *104*(3), 246–251. <https://doi.org/10.1016/j.jhin.2020.01.022>

Karim, N., Afroj, S., Lloyd, K., Oaten, L. C., Andreeva, D. V., Carr, C., Farmery, A. D., Kim, I. D., & Novoselov, K. S. (2020). Sustainable personal protective clothing for healthcare applications: A review. *ACS Nano*, *14*(10), 12313–12340. <https://doi.org/10.1021/acsnano.0c05537>

Khader, Y., Al Nsour, M., Al-Batayneh, O. B., Saadeh, R., Bashier, H., Alfaqih, M., Al-Azzam, S., & AlShurman, B. A. (2020). Dentists' awareness, perception, and attitude regarding COVID-19 and infection control: Cross-sectional study among Jordanian dentists. *JMIR Public Health and Surveillance*, *6*(2). <https://doi.org/10.2196/18798>

Khamis, N., & van Knippenberg-Gordebeke, G. (2016). Audits in Infection Prevention and Control. In *Basic Concepts of Infection Control* (pp. 71–80). www.theifc.org

Kutter, J. S., Spronken, M. I., Fraaij, P. L., Fouchier, R. A., & Herfst, S. (2018). Transmission routes of respiratory viruses among humans. *Current Opinion in Virology*, *28*, 142–151. <https://doi.org/10.1016/j.coviro.2018.01.001>

Lauer, S. A., Grantz, K. H., Bi, Q., Jones, F. K., Zheng, Q., Meredith, H. R., Azman, A. S., Reich, N. G., & Lessler, J. (2020). The incubation period of coronavirus disease 2019 (CoVID-19) from publicly reported confirmed cases: Estimation and application. *Annals of Internal Medicine*, *172*(9), 577–582. <https://doi.org/10.7326/M20-0504>

Lindsley, W. G., Noti, J. D., Blachere, F. M., Szalajda, J. V., & Beezhold, D. H. (2014). Efficacy of face shields against cough aerosol droplets from a cough simulator. *Journal of Occupational and Environmental Hygiene*, *11*(8), 509–518. <https://doi.org/10.1080/15459624.2013.877591>

Liu, Y., Gayle, A. A., Wilder-Smith, A., & Rocklöv, J. (2020). The reproductive number of COVID-19 is higher compared to SARS coronavirus. *Journal of Travel Medicine*, *27*(2), 1–4. <https://doi.org/10.1093/jtm/taaa021>

Lu, C., Liu, X., & Jia, Z. (2020). 2019-nCoV Transmission Through the Ocular Surface Must Not Be Ignored. *The Lancet*, *395*(10224), e39. [http://dx.doi.org/10.1016/S0140-6736\(20\)30313-5](http://dx.doi.org/10.1016/S0140-6736(20)30313-5)

Luksamijarulkul, P., Panya, N., Sujirarat, D., & Thaweboon, S. (2009). Microbial air quality and standard precaution practice in a hospital dental clinic. *Journal of the Medical Association of Thailand*, *92 Suppl 7*(Cdc), 2009.

Malaysian Association of Paediatric Dentistry. (2020). *COVID-19: Guideline to Resume Paediatric Dental Services in Malaysia*. <http://mapd.my/wp-content/uploads/2019/02/COVID-19-Guideline-to-resume-paediatric-dental-services-in-Malaysia.pdf>

Meng, L., Hua, F., & Bian, Z. (2020). Coronavirus Disease 2019 (COVID-19): Emerging and Future

Challenges for Dental and Oral Medicine. *Journal of Dental Research*, 99(5), 481–487. <https://doi.org/10.1177/0022034520914246>

Ministry of Health Malaysia. (2020, March 25). *Garis Panduan Pengendalian Isu-Isu Berhubung Penularan Jangkitan Wabak COVID-19 Di Perkhidmatan Kesihatan Pergigian Bil. 3/2020* [Press release]. http://ohd.moh.gov.my/images/pdf/GP_COVID19_DENTAL_BIL2_2020.pdf

Nardone, M., Cordone, A., & Petti, S. (2020). Occupational COVID-19 risk to dental staff working in a public dental unit in the outbreak epicenter. *Oral Diseases*, August, 1–13. <https://doi.org/10.1111/odi.13632>

Noorimotlagh, Z., Jaafarzadeh, N., Martínez, S. S., & Mirzaee, S. A. (2021). A systematic review of possible airborne transmission of the COVID-19 virus (SARS-CoV-2) in the indoor air environment. *Environmental Research*, 193(September 2020), 110612. <https://doi.org/10.1016/j.envres.2020.110612>

Peng, X., Xu, X., Li, Y., Cheng, L., Zhou, X., & Ren, B. (2020). Transmission routes of 2019-nCoV and controls in dental practice. *International Journal of Oral Science*, 12(1), 1–6. <https://doi.org/10.1038/s41368-020-0075-9>

Prakash, G., Shetty, P., Thiagarajan, S., Gulia, A., Pandrowala, S., Singh, L., Thorat, V., Patil, V., Divatia, J. V., Puri, A., & Pramesh, C. S. (2020). Compliance and perception about personal protective equipment among health care workers involved in the surgery of COVID-19 negative cancer patients during the pandemic. *Journal of Surgical Oncology*, 122(6), 1013–1019. <https://doi.org/10.1002/jso.26151>

Sabel, B. A., Wang, J., Cárdenas-Morales, L., Faiq, M., & Heim, C. (2018). Mental stress as consequence and cause of vision loss: the dawn of psychosomatic ophthalmology for preventive and personalized medicine. *EPMA Journal*, 9(2), 133–160. <https://doi.org/10.1007/s13167-018-0136-8>

Soraganvi, S. M., Hiremath, R. S., Hiremath, P. S., Marad, M. D., Jadhav, E. P., & Hadimani, G. A. (2020). Adverse skin reactions of personal protective equipment on health care workers against COVID -19 I. *South East Asia Journal of Medical Sciences*, 4(4), 16–19.

Suen, L. K. P., Guo, Y. P., Tong, D. W. K., Leung, P. H. M., Lung, D., Ng, M. S. P., Lai, T. K. H., Lo, K. Y. K., Au-Yeung, C. H., & Yu, W. (2018). Self-contamination during doffing of personal protective equipment by healthcare workers to prevent Ebola transmission. *Antimicrobial Resistance and Infection Control*, 7(1), 1–9. <https://doi.org/10.1186/s13756-018-0433-y>

Tang, X., Wu, C., Li, X., Song, Y., Yao, X., Wu, X., Duan, Y., Zhang, H., Wang, Y., Qian, Z., Cui, J., & Lu, J. (2020). On the origin and continuing evolution of SARS-CoV-2. *National Science Review*, 7(6), 1012–1023. <https://doi.org/10.1093/nsr/nwaa036>

Thomé, G., Bernardes, S., Guandalini, S., & Guimarães, M. C. V. (2020). *Guidelines for Best Practice in Biosafety at the Dental Clinic*.

Vukkadala, N., Qian, Z. J., Holsinger, F. C., Patel, Z. M., & Rosenthal, E. (2020). COVID-19 and

Compliance of Dental Staff and Students to Dental Guideline amidst the COVID-19 Pandemic: An Institutional Analysis

the Otolaryngologist: Preliminary Evidence-Based Review. *Laryngoscope*, 130(11), 2537–2543. <https://doi.org/10.1002/lary.28672>

Wee, L. E. I., Conceicao, E. P., Tan, J. Y., Magesparan, K. D., Amin, I. B. M., Ismail, B. B. S., Toh, H. X., Jin, P., Zhang, J., Wee, E. G. L., Ong, S. J. M., Lee, G. L. X., Wang, A. E. min, How, M. K. B., Tan, K. Y., Lee, L. C., Phoon, P. C., Yang, Y., Aung, M. K., ... Ling, M. L. (2020). Unintended consequences of infection prevention and control measures during COVID-19 pandemic. *American Journal of Infection Control*, 000, 1–9. <https://doi.org/10.1016/j.ajic.2020.10.019>

World Health Organization. (2020a). *Naming the coronavirus disease (COVID-19) and the virus that causes it*. [https://www.who.int/emergencies/diseases/novel-coronavirus-2019/technical-guidance/naming-the-coronavirus-disease-\(covid-2019\)-and-the-virus-that-causes-it](https://www.who.int/emergencies/diseases/novel-coronavirus-2019/technical-guidance/naming-the-coronavirus-disease-(covid-2019)-and-the-virus-that-causes-it)

World Health Organization. (2020b). *WHO Coronavirus Disease (COVID-19) Dashboard*. WHO COVID-19 Dashboard. <https://covid19.who.int>

World Health Organization. (2020c). Modes of transmission of virus causing COVID-19: implications for IPC precaution recommendations. *Geneva: World Health Organization*; Available(March), 19–21. <https://doi.org/10.1056/NEJMc2004973>

Zheng, C., Hafezi-Bakhtiari, N., Cooper, V., Davidson, H., Habibi, M., Riley, P., & Breathnach, A. (2020). Characteristics and transmission dynamics of COVID-19 in healthcare workers at a London teaching hospital. *Journal of Hospital Infection*, 106(2), 325–329. <https://doi.org/10.1016/j.jhin.2020.07.025>

Zhu, N., Zhang, D., Wang, W., Li, X., Yang, B., Song, J., Zhao, X., Huang, B., Shi, W., Lu, R., Niu, P., Zhan, F., Ma, X., Wang, D., Xu, W., Wu, G., Gao, G. F., & Tan, W. (2020). A Novel Coronavirus from Patients with Pneumonia in China, 2019. *New England Journal of Medicine*, 382(8), 727–733. <https://doi.org/10.1056/nejmoa2001017>