

Changes in the Work Environment and Personal Quarantine Guidelines of South Korean Dental Clinics due to the COVID-19 Outbreak

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ABSTRACT

The aim of this study was to accurately identify the working environment of dental hygienists after COVID-19 and to confirm compliance with the quarantine guidelines. During the month of June 2020, 202 dental hygienists in Korea were surveyed on dental work environment and quarantine guidelines. The demographic characteristics and working environment with dental hygienists were frequency analyzed, and the comparison of the quarantine guidelines before and after COVID-19 was conducted. There has been no significant change in the welfare and salary of dental hygienists in the dental practice since COVID-19. 45.5 % of dental hygienists felt a decrease in patients, 48.0 % of dental hygienists felt a decrease in sales. In addition, 23.8 % of dental hygienists were encouraged to use their annual leave by their bosses, with 13.4 % of their colleagues leaving the dental clinics. After COVID-19, the quarantine guidelines for dental hygienists were significantly higher than before COVID-19. Dental hygienists should make efforts to ensure that patients receive dental treatment with confidence by thoroughly monitoring COVID-19 infection prevention. It should take the lead in helping the dental management by cooperating with each other with interest in the work environment changed to COVID-19.

Keywords

COVID-19, Dental clinics, Dental hygienists, Infections, Pandemics

Introduction

COVID-19 (coronavirus disease 2019) is the newly discovered emerging respiratory disease caused by a new member of the coronavirus family called “severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2)” (Epidemiology Working Group for NCIP Epidemic Response, Chinese Center for Disease Control and Prevention., 2020). Such coronavirus has a positive-sense single-stranded RNA genome, and its helical symmetry nucleocapsid is approximately 26-32 kb in size (Sexton et al., 2016). This virus is known to infect humans or to be able to spread from animals to humans (Coronaviridae Study Group of the International Committee on Taxonomy of Viruses., 2020). It is highly infectious, and the clinical symptoms of COVID-19, the disease caused by it, include fever, dry cough, myalgia, and fatigue, with the severe cases progressing to acute respiratory distress syndrome leading to bleeding and coagulation dysfunction (Giacomelli et al., 2020). The COVID-19 pandemic, which started in December 2019 in Wuhan City, China, has become one of the major public health problems of this century and is claiming thousands of lives every day across the globe (Phelan et al., 2020). On February 19, 2020, the total number of confirmed cases in China was 74,280, and that outside of China was 924 cases from 25 countries, with a total of 2,009 deaths worldwide (World Health Organization). By April 15, 2020, 1,914,916 confirmed cases and 123,010 deaths had been reported worldwide (World Health Organization). In India, according to recent reports, the number of COVID-19 cases has crossed the 30,000 mark, taking the total number of deaths to 1,583 (The New York Times).

South Korea confirmed its first COVID-19 case in late January 2020. In February, the country

experienced an exponential spike in the number of COVID-19 cases following the emergence of a “super-spreader” from a reclusive church (Korean Ministry of Health and Welfare). Therefore, a strong social distancing or physical distancing has been implemented in South Korea (Kim E.A., 2020).

Social distancing is an effective non-pharmacological way of preventing or alleviating the spread of infectious diseases with the goal of reducing the basic reproduction number (R_0) from an epidemiological point of view, but it is causing various side effects socioeconomically, such as reduced physical activity and productivity (Koh., 2020).

In the case of dentistry, as it is known that COVID-19 is transmitted directly or indirectly through the saliva, many people avoid visiting dental clinics (Belser et al., 2013). The transmission of SARS-Cov-2 in the dental environment has four main components: (1) direct exposure to respiratory secretions, including droplets, blood, saliva, or other patient materials; (2) indirect contact with a contaminated instrument; (3) inhaling the virus floating in the air; and (4) coughing and speaking without a mask, causing droplets and aerosols to spread through mucosal (nasal, oral, and conjunctival) contact (Kampf et al., 2020). In particular, dental handpieces rotate at a high speed with water and produce significant amounts of drops and aerosols mixed with the patient’s saliva or blood (Harrel et al., 2004). Therefore, if proper preventive measures are not taken, there is a possibility that the aerosol will lead to cross-contamination with the patient in the dental clinic and will contribute to the spread of COVID-19 (Peng et al., 2020).

In Israel, on March 17, 2020, the Ministry of Health and Welfare permitted the dental clinics to operate on a limited basis, but only for dental emergency treatment (Shacham et al., 2020). In the UK, NHS England’s chief dental officer announced the suspension of all routine and non-urgent dental care services until further notice. This prompted most dentists to hold remote consultations and to offer triage and advice services by guiding the patients to the local urgent-dental-care centers (UDCs) or to secondary-care centers, where appropriate. The current aim of dental care in the UK is to defer dental treatment for as long as possible. As a result, many patients are given only two treatment options: taking analgesics and/or antibiotics (NHS England and NHS Improvement). Therefore, patients cannot avail of oral-disease treatment, which can make their oral disease serious. Thus, to ensure that patients receive dental treatment with confidence, both patients and practitioners should do their best to prevent COVID-19 from spreading during treatment by following the prescribed personal quarantine guidelines. The people in South Korea, however, are still avoiding dental treatment, and if this situation is prolonged, dental hospitals and clinics will have serious financial problems. Therefore, it is necessary to accurately identify the work environment of dental hygienists working in dental clinics, and to investigate the damages caused by the COVID-19 outbreak to dental hygienists.

As the understanding of the new disease develops, dental hygienists should be better prepared to identify COVID-19 infections and to refer suspected or confirmed patients or patients with a medical history of COVID-19 infections to appropriate treatment centers. Therefore, all patients should be considered capable of being infected with the virus, and all dental clinics must have an infection control policy and effective sterilization and self-defense products. In addition, dental hygienists should be able to provide dental services while responding to the need to stem new infections by knowing the latest information on diseases and providing appropriate training to their employees in terms of performing various levels of screening and preventive measures (Ather et al., 2020). For dental practitioners, increased exposure to COVID-19 infection may be another factor that increases the risk of infection, but detailed studies on this have not been conducted. To date, most of the studies on COVID-19 in South Korea have focused on health

care finance.¹⁵ Internationally, there has been a study that compared South Korea and the UK in terms of primary care prevention (Noh et al., 2020), a study that confirmed dentists' knowledge and recognition of COVID-19 (Singh Gambhir et al., 2020), and a study that confirmed the psychological distress suffered by dentists and dental hygienists (Shacham et al., 2020). This study aimed to accurately identify the work environment of the dental hygienists in the South Korean dental clinics after the COVID-19 outbreak, and to confirm whether the dental hospitals and clinics implement the COVID-19 personal quarantine guidelines issued by the Ministry of Health and Welfare and Korean Dental Association.

Materials and Methods

Study subjects and method

For about one month from June 2020, the purpose of this study was explained to dental hygienists, and a questionnaire was distributed to the dental hygienists who decided to participate in the study as subjects. The subjects accomplished the self-administered questionnaire, and the accomplished questionnaires were retrieved. Of the 80 online questionnaires collected via Google and the 125 collected written questionnaires, 202 questionnaires, excluding those with non-uniform and unfaithful responses, were included in the final analysis. To verify the adequacy of the sample size, the G*power 3.1.9.7 program was used. Considering a 0.3 median effect size, 0.95 power ($1-\beta$ error probability), and a 0.05 significance level (α), at least 147 subjects were needed. The study was conducted after the review by the Institutional Review Board of OO University (No. 1041449-202006-HR-003).

Study tool

For the study tool that was used, a questionnaire consisting of two sections was prepared. One section consisted of 6 questions on general characteristics and 22 questions on the work environment, prepared by correcting and supplementing the questionnaire that was used for the 2006 Survey on Dental Hygienists' Work Environment (Moon et al., 2007). As for the questionnaire section on the COVID-19 personal quarantine guidelines for dental hospitals and clinics, it consisted of 21 questions related to the purpose of this study based on the standard manual for dental infection management provided by Centers for Disease Control and Prevention (Centers for Disease Control and Prevention). The reliability of the evaluation tool in Cronbach's α was 0.943 for the work environment and 0.452 for the COVID-19 personal quarantine guidelines for dental hospitals and clinics.

Data analysis

For data analysis, IBM SPSS ver. 21.0 (IBM Co., Armonk, NY, USA) was used, and testing was conducted based on a 0.05 significance level (α). For the demographic characteristics and work environment of dental hygienists, frequency analyses were conducted, and paired t-tests were carried out to compare the COVID-19 personal quarantine guidelines for dental hospitals and clinics before and after the COVID-19 outbreak.

Results

Demographic characteristics of dental hygienists

All the subject dental hygienists were female, and 32.2% of them were employed in Seoul, Gyeonggi, or Incheon, 2.5% in Gangwon, 2.0% in Chungcheong, and 63.4% in Busan, Ulsan, or Gyeongnam. In terms of the dental office type, 76.2% were dental clinics; 5.4% were dental, university, and general hospitals; and 7.4% were public hospitals. As for the career duration, 6.4% of the subjects had been dental hygienists for <1 year, 11.9% for ≥ 1 year to <3 years, 26.7% for ≥ 3 years to <5 years, 19.3% for ≥ 5 years to <8 years, 9.9% for ≥ 8 years to <10 years, and 25.7% for ≥ 10 years. For the main work task, it was treatment cooperation for 68.8% of the subjects, preventive care for 6.9%, consultation and reception for 21.3%, and management and public relations for 3.0%. As for the work position, 69.3% were treatment room staff, 14.9% were team leaders, and 15.8% were assistant directors or directors (Table 1).

Table 1. Demographic characteristics of the subject dental hygienists [obtained via frequency analysis, N(%)]

Characteristics	Division	
Gender	Male	0 (0.0)
	Female	202 (100.0)
Work area	Seoul, Gyeonggi, Incheon	65 (32.2)
	Gangwon	5 (2.5)
	Chungcheong	4 (2.0)
	Busan, Ulsan, Gyeongnam	128 (63.4)
Dental office type	Dental clinic	154 (76.2)
	Dental hospital	11 (5.4)
	General hospital	22 (10.9)
	Public hospital	15 (7.4)
Career duration	<1 year	13 (6.4)
	≥ 1 year – <3 years	24 (11.9)
	≥ 3 years – <5 years	54 (26.7)
	≥ 5 years – <8 years	39 (19.3)
	≥ 8 years – <10 years	20 (9.9)
	≥ 10 years	52 (25.7)
Main work task	Cooperation	139 (68.8)
	Prevention	14 (6.9)
	Consultation service	43 (21.3)
	Management business	6 (3.0)
Work position	Staff	140 (69.3)
	Team leader	30 (14.9)
	Director/assistant director	32 (15.8)

Work environment of dental hygienists

The examination of the subject dental hygienists' work environment revealed that with regard to the annual and monthly leaves, 10.4% of the institutions did not have both annual and monthly leaves, 41.1% had only annual leaves, 13.9% had only monthly leaves, 33.7% had both annual and monthly leaves, and 1.0% removed the leaves due to the COVID-19 outbreak. As for the maternity and childcare leaves, 18.3% of the institutions did not have both maternity and childcare leaves, 17.3% had only maternity leaves, 5.4% had only childcare leaves, 58.9% had both maternity and childcare leaves, and 0.0% removed the leaves due to the COVID-19 outbreak. With regard to the giving of incentives for goal attainment or number of scaling work performed, such incentives were given in 26.7% of the institutions, no such incentives were given in 58.3% of the institutions, and such incentives were removed due to the COVID-19 outbreak in 5% of the institutions. As for incentives like rewards or travel packages, 60.4% of the institutions gave them, 39.6% did not, and 0.0% removed them due to the COVID-19 outbreak. As for the long-term work and promotion systems, 34.2% of the institutions did not have both, 30.2% had only a long-term work system, 5.4% had only a promotion system, 30.2% had both, and 0.0% removed both due to the COVID-19 outbreak. As for overtime and night work allowances, 53.0% did not offer both, 12.4% offered only overtime work allowance, 9.9% offered only night work allowance, 24.8% offered both, and 0.0% removed both due to the COVID-19 outbreak. As for the monthly salary, 2.5% of the institutions offered US\$835-1,252, 12.4% offered US\$1,253-1,671, 49.5% offered US\$1,672-2,088, 21.8% offered US\$2,089-2,506, 8.4% offered US\$2,507-2,924, and 5.4% offered >US\$2,925. As for the annual wage increase amount, 26.7% had <US\$83 and 73.3% had ≥US\$83 (Table 2).

Table 2. Dental hygienists' work environment [obtained via frequency analysis, N(%)]

Variable		
<i>Annual and monthly leaves</i>	Neither	21 (10.4)
	Only annual leaves	83 (41.1)
	Only monthly leaves	28 (13.9)
	Both	68 (33.7)
	Removed after COVID-19 outbreak	2 (1.0)
<i>Maternity and paternity leaves</i>	Neither	37 (18.3)
	Maternity leave	35 (17.3)
	Paternity leave	11 (5.4)
	Both	119 (58.9)
	Removed after COVID-19 outbreak	0 (0.0)
<i>Bonus (goal attainment, number of scaling work performed)</i>	No bonus	138 (58.3)
	With bonus	54 (26.7)
	Removed after COVID-19 outbreak	10 (5.0)

<i>Bonus (rewards, travel packages)</i>	No bonus	80 (39.6)
	With bonus	122 (60.4)
	Removed after COVID-19 outbreak	0 (0.0)
<i>Long-term work and promotion systems</i>	Neither	69 (34.2)
	Only a long-term work system	61 (30.2)
	Only a promotion system	11 (5.4)
	Both	61 (30.2)
	Removed after COVID-19 outbreak	0 (0.0)
<i>Overtime and night work allowances</i>	Neither	107 (53.0)
	Only overtime work allowance	25 (12.4)
	Only night work allowance	20 (9.9)
	Both	50 (24.8)
	Removed after COVID-19 outbreak	0 (0.0)
<i>Monthly salary</i>	US\$835-1,252	5 (2.5)
	US\$1,253-1,671	25 (12.4)
	US\$1,672-2,088	100 (49.5)
	US\$2,089-2,506	44 (21.8)
	US\$2,507-2,924	17 (8.4)
	>US\$2,925	11 (5.4)
<i>Annual wage increase amount</i>	<US\$83	54 (26.7)
	≥US\$83	148 (73.3)

Dental hygienists' work statuses after the COVID-19 outbreak

The examination of the work statuses of the subject dental hygienists after the COVID-19 outbreak revealed that 14.9% were working for shorter times, with the most common shortened working time being ≥ 3 hours (6.4%). No less than 45.5% of the subjects indicated that they seemed to have a reduced number of patients, and 48.0% indicated that their sales seemed to have been reduced. Also, 23.8% were asked to use their annual leave credits, 3.5% were asked to leave the institution, 15.8% heard of their colleagues' resignation, and 13.4% had actual knowledge of their colleagues' resignation. In terms of the work positions of the subjects' colleagues who left the institutions they were connected with, most of them (7.4%) were treatment room staff, and 5.9% were assistant directors or directors. Of all the subjects, 12.9% experienced being asked to go on an unpaid leave. As for the recommended period of unpaid leave, one month to two months was the most frequent (5.4%), followed by one week to two weeks (5.0%). The wages of 5.9% of the subjects were frozen and the wages of 3.5% were cut, with the most common wage cut

amount (1.5%) being >US\$250 (Table 3).

Table 3. Statuses of the subject dental hygienists who were still working after the COVID-19 outbreak [obtained via frequency analysis, N(%)]

Variable		
<i>Has your work been shortened in your current job?</i>	No	172 (85.1)
	Yes	30 (14.9)
<i>For how short a time have you worked? (N=30)</i>	<1 hour	10 (5.0)
	>1 hour – 2 hours	5 (2.5)
	>2 hours – 3 hours	2 (1.0)
	>3 hours	13 (6.4)
<i>Do you feel that the number of your patients has decreased?</i>	No	110 (54.5)
	Yes	92 (45.5)
<i>Do you feel that your sales have decreased?</i>	No	105 (52.0)
	Yes	97 (48.0)
<i>Were you encouraged to use your annual leave credits?</i>	No	154 (76.2)
	Yes	48 (23.8)
<i>Have you been asked to leave the company where you work?</i>	No	195 (96.5)
	Yes	7 (3.5)
<i>Have you heard of the resignation of any of your colleagues?</i>	No	170 (84.2)
	Yes	32 (15.8)
<i>Have any of your colleagues actually quit their jobs?</i>	No	175 (86.6)
	Yes	27 (13.4)
<i>What was the rank of your colleague who left the company? (N=27)</i>	Treatment room staff	15 (7.4)
	Team leader	0 (0.0)
	Director/assistant director	12 (5.9)
<i>Have you been asked to take a leave of absence without pay?</i>	No	176 (87.1)
	Yes	26 (12.9)
<i>How many unpaid leave credits have you taken? (N=26)</i>	<1 week	0 (0.0)

	≥1 week – <2 weeks	10 (5.0)
	≥2 weeks – <3 weeks	2 (1.0)
	≥3 weeks – <1 month	0 (0.0)
	≥1 month – <2 months	11 (5.4)
	≥2 months	3 (1.5)
<i>Has your salary been maintained?</i>	No	190 (94.1)
	Yes	12 (5.9)
<i>Has your salary been cut?</i>	No	195 (96.5)
	Yes	7 (3.5)
<i>By how much has your salary decreased? (N=7)</i>	<US\$41	2 (1.0)
	US\$41-83	0 (0.0)
	US\$84-167	0 (0.0)
	US\$168-250	2 (1.0)
	>US\$250	3 (1.5)

Comparison of dental hygienists' compliance with the personal quarantine guidelines before and after the COVID-19 outbreak

The comparison of the dental hygienists' compliance with the personal quarantine guidelines before and after the COVID-19 outbreak revealed that the scores given by the subjects for their compliance with the personal quarantine guidelines were all significantly higher after the COVID-19 outbreak than before it. Before the COVID-19 outbreak, the dental hygienists' compliance with the quarantine guideline of obliging their patients to wear a mask during consultation got the lowest score, and the compliance with the quarantine guideline of wearing gloves for treatment with a large splash spread in the treatment room got the highest score. After the COVID-19 outbreak, compliance with the quarantine guideline of wearing a facial guard for treatment with a small splash spread in the treatment room got the lowest score, and compliance with the quarantine guideline of wearing gloves for treatment with a large splash spread in the treatment room got the highest score (Table 4).

Table 4. Differences between the dental hygienists' compliance with the personal quarantine guidelines before and after the COVID-19 outbreak (obtained via by paired t-test, M±SD)

Variable	Pre-COVID-19	Post-COVID-19	t	p
<i>Wearing a KF94 mask for treatment with a large splash spread</i>	1.83±1.24	2.70±1.55	-11.099	.000

<i>Wearing a latex glove for treatment with a large splash spread</i>	4.09±1.01	4.25±0.81	-3.920	.000
<i>Wearing a facial guard for treatment with a large splash spread</i>	2.68±1.22	3.46±1.14	-11.515	.000
<i>Wearing a KF94 mask for treatment with a small splash spread</i>	1.99±1.30	2.79±1.59	-9.798	.000
<i>Using a hand disinfectant for treatment with a small splash spread</i>	2.50±1.38	3.19±1.31	-10.024	.000
<i>Wearing a facial guard for treatment with a small splash spread</i>	2.05±1.31	2.68±1.48	-8.845	.000
<i>Wearing a latex or poly glove for treatment with a small splash spread</i>	3.58±1.26	3.94±1.06	-6.717	.000
<i>Ventilating the dental radiation room</i>	2.98±1.39	3.23±1.35	-5.831	.000
<i>Wearing a KF94 mask in the dental radiation room</i>	2.07±1.31	2.84±1.58	-9.206	.000
<i>Using a hand disinfectant in the dental radiation room</i>	2.24±1.23	2.83±1.38	-8.808	.000
<i>Wearing a dental mask upon patient reception</i>	2.75±1.46	4.04±1.07	-12.799	.000
<i>Using a hand disinfectant upon patient reception</i>	2.49±1.22	3.51±1.15	-11.352	.000
<i>Wearing a KF94 mask or dental mask in the counseling office (open type)</i>	2.76±1.34	3.99±0.88	-12.657	.000
<i>Using a hand disinfectant in the counseling office (open type)</i>	2.30±1.13	3.14±1.24	-10.454	.000
<i>Wearing a KF94 mask in the counseling office (unopened type)</i>	1.96±1.21	2.84±1.47	-9.872	.000
<i>Using a hand disinfectant in the counseling office (unopened type)</i>	2.19±1.19	3.00±1.26	-11.266	.000
<i>Wearing a KF94 or dental mask during maintenance work</i>	3.12±1.32	3.83±1.08	-9.099	.000
<i>Using a hand disinfectant during maintenance work</i>	2.36±1.13	3.08±1.29	-9.764	.000
<i>Requiring the visiting patient to accomplish a COVID-19 questionnaire, and measuring the patient's body temperature</i>	1.97±1.32	3.87±1.20	-17.062	.000
<i>It is mandatory for patients to wear a mask.</i>	1.82±1.20	3.60±1.26	-16.282	.000
<i>Patients should be made to gargle with an antibacterial solution before treatment.</i>	1.84±1.05	2.75±1.47	-11.040	.000

Total	2.46±0.76	3.31±0.79	-17.224	.000
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Discussions

With the prolonged COVID-19 outbreak, many patients with potential oral diseases avoid visiting dental clinics due to the strictly required social distancing, and the damages caused by this to the patients and dental institutions are increasing (Coulthard., 2020). Overseas dental institutions have been locked down because they are most vulnerable to COVID-19 (NHS England and NHS Improvement), and consequently, the financial situations of dental institutions have worsened. On the other hand, although the dental institutions in South Korea comply with Korean Dental Association's quarantine guidelines and strive to promote their patients' oral health (Peng et al., 2020), they are experiencing operation difficulties due to the patients' avoidance of hospital visits (Noh et al., 2020). Therefore, the actual changes in the work environment of the dental hygienists working in the South Korean dental clinics must be accurately identified. It was found in this study that with regard to the welfare systems offered by dental clinics after the COVID-19 outbreak, the annual and monthly leaves were removed in 1.0% of the dental clinics, only 5.0% of the clinics still offer incentives for goal attainment or number of scaling work performed, and there have been no significant changes in the number of clinics that offer maternity and childcare leaves and rewards or travel packages as well as in the number of clinics that have long-term work and promotion systems and that offer overtime and night work allowances. It is also worth noting that dental clinics are trying to preserve the welfare benefits and salaries of their employees despite their current financial difficulties, with 73.3% of the study subjects reporting that they even received an annual wage increase amount of >US\$83, which is high. Based on the study results, however, as the number of dental patients rapidly decreased with the COVID-19 outbreak, 14.9% of the subject dental hygienists worked for shorter times, and the most common shortened working time was ≥ 3 hours. In addition, 45.5% of the subjects responded that the number of their patients seemed to have been reduced while 48.0% responded that their sales seemed to have been reduced. The fact that about half of the dental hygienists across the country felt that the number of their patients and their sales have been reduced means that they are personally experiencing the adverse financial effects of the COVID-19 outbreak on dental institutions. In particular, 23.8% of the subjects were asked to use their annual leave credits, 3.5% were asked to leave the institution they were connected with, 15.8% heard that their colleagues were asked to leave the dental institutions they were connected with, and 13.4% had actual knowledge of their colleagues' resignation. For the work positions of the subjects' colleagues who left the institution they were connected with, they were either treatment room staff or assistant directors/directors. Of all the subjects, 12.9% had experienced being asked to go on an unpaid leave due to the COVID-19 outbreak. As for the recommended period of unpaid leave, one month to two months was the most frequent, indirectly indicating the financial difficulties of dental institutions.

The first known cases of COVID-19 were found in Wuhan, China in December 2019, and in South Korea, the first known cases occurred in January 2020, just six months ago as of this writing. As most of the annual salary negotiations in South Korea take place at the end of the year, however, it was difficult to confirm the changes in salary for this study. Therefore, the changes in salary from December 2020 (the start of the COVID-19 outbreak) to March 2021 will have to be investigated to obtain more accurate data.

To solve the problems being experienced by dental institutions complaining of financial difficulties amid the COVID-19 outbreak and to prevent the progress of oral diseases in patients, it is necessary to create an environment in which patients can receive dental treatment with confidence. Toward this end, Korean Dental Association recommends that the COVID-19 personal quarantine guidelines be followed. Thus, personal quarantine measures are implemented in many dental clinics in accordance with the guidelines, and efforts are actively being made to safely treat patients or to treat them while protecting them from COVID-19. The UK also recommends that medical personnel use personal protective equipment (PPE) such as N95 masks, gloves, and gowns to protect themselves from COVID-19-infected blood, skin, mucous membranes, and respiratory secretions (Cook., 2020). According to the standards of the COVID-19 personal quarantine guidelines for dental hospitals and clinics provided by Centers for Disease Control and Prevention (Centers for Disease Control and Prevention), the quarantine guidelines are divided into those for the zones with a high potential for contamination in dental clinics (dental treatment and radiation rooms, unopened counseling office) and those for the zones with a low potential for contamination in dental clinics (desks for management and open counseling office) (Centers for Disease Control and Prevention). Also, more accurate guidelines were prepared by dividing the existing guidelines into the mandatory and recommended wearing or use of KF94 masks, dental masks, general masks, hand sanitizers, facial guards, and latex or poly gloves depending on the potential of contamination, by dividing the subjects of the guidelines into practitioners, medical assistants, employees, and patients (Centers for Disease Control and Prevention).

For the practitioners working in the treatment room, which has a high potential for contamination, the wearing of KF94 masks is mandatory regardless of the extent of the spread of droplets. The wearing of facial guards and latex gloves is also mandatory if the spread of droplets is large, but it is only recommended if the spread of droplets is low, and poly gloves can also be used. However, hand sanitizers must be used. In addition, even in the case of a medical assistant, wearing a KF94 mask is mandatory regardless of the extent of the spread of droplets when working in the treatment room, which has a high potential for contamination, and the use of a hand sanitizer is also mandatory. However, if the spread of droplets is large, a facial guard must also be worn, but if the spread of droplets is small, the wearing of a facial guard is not required. As for gloves, latex and poly gloves can be used regardless of the extent of the spread of droplets. KF94 masks must be worn and hand sanitizers must be used when taking pictures in the dental radiation room, which has a high potential for contamination. A KF94 mask must be worn only in the unopened counseling office during reception, when receiving payment, during consultation, and while doing management work, and a dental mask can also be worn when working at a desk and in an open counseling office. However, hand sanitizers must be used, and the patients visiting the clinic or hospital should accomplish the COVID-19 pre-questionnaire and should undergo a fever check. Also, wearing a mask is compulsory, but in the dental radiation room and the treatment room, non-mask-wearing is allowed. However, the closed space should be ventilated for each patient, and it is recommended that the patients be made to gargle with 1% hydrogen peroxide or 0.2% povidone before treatment (Centers for Disease Control and Prevention).

The mediators of SARS-Cov-2 transmission are the saliva and respiratory secretions, so dental employees and patients may feel anxious about treatment. Thus, care and protection are required when treating patients. It is about time that effective strategies of minimizing the risk of transmission to the medical workers in hospitals and the loss of dental resources be established. In this study, it was found that although treatment rooms, dental radiation rooms, and unopened

counseling offices are all areas with a high potential of contamination, the wearing of KF94 masks in such areas is low. This is thought to be due to the fact that dentists usually wear dental masks instead of KF94 masks. In fact, according to this study, after the COVID-19 outbreak, the use of dental masks at the desk and in open counseling offices increased significantly, along with the use of hand sanitizers. The comparison of the differences in the dental hygienists' compliance with the personal quarantine guidelines before and after the COVID-19 outbreak in this study revealed that the personal quarantine guideline compliance scores were all significantly higher after the COVID-19 outbreak. The average score of the dental hygienists' compliance with the personal quarantine guidelines before the COVID-19 outbreak increased significantly after the COVID-19 outbreak, from 2.46 to 3.31, but this is a very low score compared to the perfect score of 5. Considering the special environment of a medical/dental institution, the employees of dental institutions should try to observe personal quarantine measures with the goal of reaching the perfect score. The items with the highest difference before and after the COVID-19 outbreak were the compliance with the guidelines of requiring the visiting patient to accomplish a COVID-19 questionnaire and measuring the visiting patient's body temperature, followed by obliging the patients to wear a mask during consultation. The item with the lowest difference before and after the COVID-19 outbreak was wearing latex gloves in the treatment room, followed by ventilating the dental radiation room. A significant difference was found in these items because requiring the visiting patient to accomplish a COVID-19 questionnaire, measuring the visiting patient's body temperature, and requiring the patients to wear a mask were not mandatory before the COVID-19 outbreak. On the other hand, the reason that the lowest difference was found in wearing gloves is that gloves must be worn during treatment regardless of the COVID-19 outbreak.

Peng et al. recommended the use of goggles and masks, the oral rinsing of patients prior to dental treatment, the strict disinfection of the clinic environment, and infection control for proper dental care (Peng et al., 2020). In addition, with the interest in the work environment changed due to the COVID-19 outbreak, dental patients will have to cooperate in terms of dental management. As there has been no study that investigated the changes in the work environment and in the degree of compliance with the personal quarantine guidelines for dental hygienists working in dental hospitals and clinics after the COVID-19 outbreak, there is a limitation in comparing this study with other parallel studies, and comparative research on COVID-19-related quarantine guidelines for dental hospitals and clinics by country is considered necessary in the future.

Conclusion

Dental hygienists will have to thoroughly observe the COVID-19-related quarantine guidelines to ensure that their patients can receive dental treatment with confidence. Therefore, patients should visit the dental clinics for dental treatment, and dental finances should be normalized.

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