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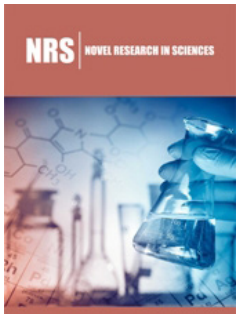
Research Article

Cross-infection Study in Dental Clinic of Dental Hygiene Students

ISSN: 2688-836X



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Submission: December 09, 2022
Published: December 19, 2022

Volume 13 - Issue 1

How to cite this article: Hee Ja NA*. Cross-infection Study in Dental Clinic of Dental Hygiene Students. Nov Res Sci. 13(1). NRS.000804. 2022.
DOI: 10.31031/NRS.2022.13.000804

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Abstract

Objective: The purpose of this study is to systematically prepare for the infection control process by minimizing infection and developing an infection control curriculum in clinical dental hospitals.

Methods: From July 1 to August 10, 2022, this study was conducted on 111 people from H University of Dentistry, S University of Dental Hygiene Department, and 56 third graders working at a dental hospital in Gwangju. To understand the general characteristics of the subjects, the mean and standard deviation were calculated, two independent samples were obtained for the difference in medical gloves exchange between dental hygiene students, and the correlation of infection control among dental hygiene clinical practice students, and infection control education The regression analysis of dental infection management was analyzed at the significance level of .05.

Result: For gender, the average and standard deviation were 1.846±.361, which was higher for female students. The average and standard deviation of age is 2.315±.774, and infection control education is 99 people (74.4%) and 12 people (9.0%) for "no". In the COVID-19 vaccination, 98 people (73.3%) said "Yes" and 13 people said "No" (9.8%). Two independent samples t-test of differences in medical glove exchanges for dental hygienic students by gender showed that female students added medical glove exchanges. Medical glove exchange and dental equipment disinfection.252, disinfection of dental equipment and exchange of medical gloves showed the lowest correlation with .252, and the disinfection sterilization and infection control program of medical institutions showed a negative correlation with -.261. The correlation between the infection control program and medical waste is high.800. As a result of the statistical significance test in the regression analysis of infection control education and dental infection control, the F statistic is 2.233, the significance probability is .001, and dental equipment disinfection is significantly explained at the significance level of 0.05 (t=-3.392, p=.001), in addition, the surface disinfection of the equipment is significant at the significance level of .005, with a significant probability of .004 (t=2.922, p=.004), the total change is described as .199% (1.10%)

Conclusion: In order to increase awareness and practice of infection control in clinical practice by identifying the infection control system, performance, and level of infection control of dental institutions, schools should prepare, distribute, and manage infection control guidelines to clinical institutions, and systematically prepare and perform the infection control process.

Keywords: Dental clinic; Infection control; Dental hygiene student; Air infection; Facility management; Safety management

Introduction

Medical-related infections refer to infections that did not exist before visiting a medical institution but were transmitted by medical personnel, employees, patients, careers, and visitors residing in the medical institution [1]. Accordingly, research [2], which identifies the status of medical-related infection management for medical workers, has been steadily conducted. Recently, COVID-19 infectious diseases have emerged, threatening the world, and changing society as a whole. In this situation, it should be noted that dental institutions have a very high risk of infection [1]. Methods of practicing infection prevention are hand washing, management of contaminated disposable devices, and management of contaminated devices that can be reprocessed. It should be able to handle prohibited behavior in the workplace,

minimize spraying phenomena, and containers for infectious waste storage. According to the basis for infection control, due to the nature of dental treatment, infectious liquids contaminated with saliva, body fluids, and blood are buried in the hands of dental workers during treatment, accompanied by bleeding in most treatments, and this blood contaminates various dental equipment. During treatment, water contaminated with blood and saliva from the patient's mouth splashes, contaminating the clinic. In addition, water can flow back from various water pipes such as handpieces and air ejectors, and microorganisms can lurk in the water pipes, and aerosols spread from water pipes such as handpieces are contaminated with microorganisms, contaminating the air and various surfaces of the entire clinic.

It is difficult to effectively sterilize and disinfect medical equipment due to various types and materials of medical equipment, and waste is easily contaminated with blood and saliva, and it is difficult to handle properly. This is because aerosols produced during dental treatment contain a combination of various microorganisms and viruses derived from patients, which can cause pathogenic infections. The risk of infection is also very high in dental treatment itself, which is done by putting your hands in close proximity to the patient's oral cavity and directly contacting blood, saliva, and respiratory secretions. It is necessary to accurately distinguish people with infectious diseases and block the route of infection, but in reality, this is almost impossible. Therefore, to prepare for all patients with infectious diseases, prevent infection throughout the treatment A system should be applied. Equipment/environmental management shall be disposed of in a container to prevent contamination of the surrounding area, cleaned and disinfected (or sterilized) by appropriate means, and the frequently contacted environmental surface shall be cleaned with disinfectant, and properly ventilated after cleaning and disinfection [3]. The Ministry of Health and Welfare of Korea announced the infection control rules in 1992, began national measures for hospital infection monitoring, and identified the incidence rate and infection control status in Korea [4,5]. Looking at studies on infection in dental institutions, in the early 2000s, when there were no dental infection management standards, prior studies were referenced to determine the recognition and practice level of infection management for dental hygienists in some regions [6-8]. Since 2000, the Ministry of Health and Welfare has announced standards for preventing infection in dental care in 2006 and continued efforts to ensure patient safety through infection control [9,10]. As for dental safety management, a certification evaluation was conducted for dental institutions, and based on certification tools, awareness and practice, medical waste and environment, and management status of other specific items such as wearing personal protective equipment were investigated [11]. Dental clinic facility management should apply the concept of infection prevention from the clinic's structural design, and it is necessary to recognize the movement path to prevent cross-infection with each patient every day [12-14]. Air infection in the dental clinic is contaminated with a large number of aerosols and dust generated by tooth deletion, prosthesis production, intraoral surgery, and scaling. Therefore, the space should be partitioned in consideration of the medical movement and the occurrence of pollution, and environmental facilities should be managed by cleaning and ventilation. It will also be necessary to investigate by occupation, gender, and career to understand the importance of infection control through unit chair management and water pipe management in dental institutions [15-17]. However, student dental hygienists are more likely to be exposed to non-infection accidents and spread infections to other patients and guardians because they lack expertise and skill in managing infections and dental hygiene, which provides direct treatment assistance such as vital signs measurement, personal hygiene, and mechanical equipment disinfection. Therefore, it seems that effective measures to promote the implementation of cross-infection management for medical-related infection management other than dental hygiene college students should be sought. In this study, we intend to find specific areas of problem and use them as basic data for infection control of dental care and improvement of medical service quality of dental hygiene university students.

Materials and Methods

This study is From July 1 to August 10, 2022, a study was conducted on 111 people from H University of Dentistry, S University of Dental Hygiene Department, and 56 third graders working at a dental clinic in Gwangju Metropolitan City. The number of students participating in the study was G. power 3.1 program, with an effect size of 0.3, a significant level of 0.05, and a power of 0.95, with 111 students. Participants in this study were student dental hygienists who conducted clinical practice in dentistry, and students who were tested negative after contacting confirmed patients with COVID-19 were surveyed. Participants in the survey agreed to understand the purpose of the study and participate in the study, and the survey was conducted in a self-written manner. This study was conducted with the consent of IRB (NO 1041223-201912-HR-18) at Honam University's Life Science Ethics Committee. The questionnaire was measured on the Likert 5-point scale, and 5 points were given to the Likert 5-point scale 'very important' and 1 point to 'not important at all', indicating that the higher the score, the higher the practice level.

Research Tool

Facilities management in the dental clinic

The survey tool [11] to understand the infection control system and implementation status of dental institutions was prepared as a guideline for infection prevention (Ministry of Health and Welfare, 2022) [18] and measured on a 5-point scale of Likert, and Cronbach's alpha was 0.761.

Dental care safety management

The questionnaire was completed using the appropriate management plan for dental equipment, infection control program for dental institutions, disinfection and sterilization guidelines for medical institutions [19], medical institution uses equipment and goods disinfection guidelines [20], and medical waste materials

[21]. It was measured on a Likert 5-point scale, and Cronbach's alpha was 0.865, with a total of 5 questions.

Analysis Method

The data collected in this study were analyzed using the SPSS 21.0 program. The mean and standard deviation were calculated to understand the general characteristics of the subjects, two independent samples t-test were calculated for the difference in medical gloves exchange by gender, and the correlation of infection control education and dental infection management was analyzed at the significance level of .05.

Conclusion

Demographic analysis

Table 1 the average and standard deviation of gender were 1.846±.361, indicating that female students were higher. The average and standard deviation of age is 2.315±.774, and infection control education is 99 people (74.4%) and 12 people (9.0%) for "no". In the COVID-19 vaccination, 98 people (73.3%) said "Yes" and 13 people said "No" (9.8%) (Table 2). In the two independent samples t-test for differences in medical glove exchange by gender, the mean and standard deviation of 94 women is 3.329±1.370 and the mean and standard deviation of 17 men is 2.588±1.325, t=-5.423, p=.000. In Table 3, the correlation between gender and medical gloves is .289, medical gloves exchange and gloves disposal is .389, and medical gloves exchange and dental equipment disinfection are 252, Disinfection of dental equipment and exchange of medical gloves is .252, Disinfection of dental equipment and surface disinfection of equipment is .368, disinfection of dental equipment and exchange of masks for each patient .559, exchange of masks for each patient and disinfecting dental equipment .502, The disinfection sterilization and infection control program of medical institutions shows a negative correlation of -.261. Infection control program and medical institution disinfection and sterilization -.258, The correlation between the infection control program and medical waste is high .800 (Table 3). As a result of the statistical significance test in the regression analysis of infection control education and dental infection control, the F statistic is 2.233, and the significance probability is .001, and dental equipment disinfection is significantly explained at the significance level of 0.05 (t=-3.392, p=).001), in addition, the surface disinfection of the equipment is significant at the significance level of .005, with a significant probability of .004 (t=2.922, p=).004), the total amount of change is explained as .199% (1.10%) (Table 4).

Table 1: Demographic analysis----(n=111).

Item	Subitem	Frequency	Percentage	Mean	Sd
Gender	Woman	17	12.8	1.846	0.361
	Man	94	70.7		
Age	21s	9	6.8	2.315	0.774
	23s	67	50.4		
	25s	29	21.8		
	27s	3	2.3		
	29s	3	2.3		
Infection control education status	yes	99	74.4	1.108	0.311
	no	12	9		
COVID-19 Prevention Vaccination status	Yes	98	73.7	1.117	0.323
	no	13	9.8		

Table 2: Two independent samples t-test----(n=111) for differences in exchange of medical gloves for dental hygiene students by gender.

Item	Subitem	N	Mean	SD	T	P
Gender	Woman	94	3.329	1.37	-5.423	0
	man	17	2.588	1.325		

Table 3: Correlation of infection control in dental hygiene clinical practice students----(n=111) Level of correlation is 0.001 (both sides) p<.001.

	Gender	Medical Gloves Exchange	Equipment Surface Disinfection	Disposal of Gloves	Disinfection of Dental Equipment	Replacement of the Mask for Each Patient	Sterilization of Medical Institutions	Infection Control Program	Medical Waste
Gender	1								

Medical Gloves Exchange	.289**	1		.389**	.252**				
Equipment surface disinfection			1		.368**	.559**			
Disposal of gloves		.389**		1					
Disinfection of dental equipment		.252**			1	.502**			
Replacement of the mask for each patient					.559**	1			
Sterilization of medical institutions							1	-.258**	
Infection control program							-.261**	1	.800**
medical waste								.800**	1

Table 4: Regression analysis of infection control education and dental infection control---(n=111).

Calculation A						
Model		Non-Standardization Coefficient		Standardization Coefficient		
		B	Standardization Error	ß	t	p
1	(Constant)	1.13	0.198		5.709	0
	Hand washing	0.017	0.032	0.05	0.523	0.602
	Equipment surface disinfection	0.098	0.034	0.332	2.922	0.004
	Medical gloves	-0.04	0.028	-0.156	-1.44	0.153
	Disposal of gloves	0.027	0.025	0.115	1.075	0.285
	Replacement of the mask for each patient	0.041	0.041	0.124	1.006	0.317
	A suction disinfectant	0.014	0.022	0.059	0.621	0.536
	Infection management system of dental institutions	0.011	0.022	0.047	0.5	0.618
	Dental equipment	-0.195	0.057	-0.374	-3.392	0.001
	Infection control program	-0.005	0.036	-0.021	-0.129	0.897
	Sterilization of medical institutions	-0.032	0.037	-0.086	-0.863	0.39
	Medical waste	-0.003	0.036	-0.014	-0.088	0.93
A. Dependent variables: Infection control education R2(adj, R2) =0.199(.110), F=2.233						

Discussion

Dental clinics, which account for the majority of dental institutions, were very insufficient, and urgent action was required. In order to properly implement infection control, rules or guidelines centered on evidence should be followed. The U.S. Centers for Disease Control and Prevention [21] said that designating infection control personnel and actively operating the program reduced medical infections by 32%, and otherwise increased by 18%. In Korea, infection control has regulations [22], and the level of practice [23] has increased when there is educational experience. Therefore, in order to realize medical infection management, the establishment of a management system should be premised [24]. Since the main factor of hospital infection is indoor air and air pollution is proportional to the level of infection, The concept of infection prevention should be applied from the structural design of the clinic, 73.2% of dental hospitals, 57.1% of university and general hospitals, and 30.6% of dentists. As a transmission factor

for cross-infection, the source of infection is an infected patient or dental worker, and the medium through which the source of infection is transmitted is an instrument contaminated with blood, saliva, or tissue debris. In addition, the route through which the source of infection spreads is inhalation, ingestion, and contact. Direct contact with blood, body fluids, and patient contaminants When an infected person's body fluid (sprout, runny nose) pops out during coughing, sneezing, or conversation and comes into contact with mucous membranes of another person's conjunctiva, nose, or oral cavity, it inhales microorganisms that can stay in the air for a long time. Cross-infection routes are infections from patients to dental workers, and dental workers are very likely to be infected by direct or indirect exposure to various microorganisms contained in the patient's blood or oral and respiratory secretions.

In addition, the surface of the unit chair's bracket table, switch, and light handle may cause contact infection, but it is difficult to clean, so it should be disinfected, or a protective cover should be used after each patient's treatment. Infection from a dentist to a patient may be caused by a pathogen in the leaked blood entering the patient's mucous membrane or open tissue if the dentist's hand has a wound or damaged skin, or if the hand is injured in the patient's mouth. The point of infection from patient to patient can be transmitted from patient to patient by direct contact if a pathogen is attached to the treatment instrument, handpiece, calibration device, treatment table surface, and hand [25]. In this study, Batting management is expected to reflect the overall surface management level, and in fact, there was a high correlation between the batting surface contamination and the bacterial contamination of handpiece water [26]. Therefore, it is necessary to guide the surface management method suitable for each equipment characteristic in detail. Medical personnel must wear thorough hand hygiene and personal protection equipment to protect patients and themselves from potential infection risk factors. However, in the practice item, 72.7~85.7%, which was different from Kim, who reported the effect of hand hygiene education because there was no difference by institution type. In this study, in the two independent samples t-test on the difference in medical glove exchange by gender, the average and standard deviation of 94 women was 3.329±1.370 and the average and standard deviation of 17 men was 2.588±1.325 and t=-5.423, p=. It is OOO. The Ministry of Health and Welfare's comprehensive medical measures pointed out the possibility of infection due to reuse of medical devices, improper disinfection and sterilization, and insufficient management and use of equipment as problems. In particular, dental devices are frequently exposed to patients' body fluids and respiratory secretions during the treatment process, so sterilization is recommended rather than disinfection Infections from local residents to patients can spread microorganisms related to the supply of contaminated water when using dental equipment such as air water ejectors, high-speed handpieces, and ultrasonic tartar remover. Compliance to prevent cross-infection posts a notice at the entrance to the reception room to inform the patient of the disease's morbidity and accurately assess the patient's health at reception [26]. In Table 3 of this study, the correlation between gender and medical gloves is .289, medical gloves exchange and gloves disposal is .389, and medical gloves exchange and dental equipment disinfection are .252, Disinfection of dental equipment and exchange of medical gloves is .252, Disinfection of dental equipment and surface disinfection of equipment is .368, disinfection of dental equipment and exchange of masks for each patient .559, exchange of masks for each patient and disinfecting dental equipment .502, The disinfection sterilization and infection control program of medical institutions shows a negative correlation of -.261. Infection control program and medical institution disinfection and sterilization -.258, The correlation between the infection control program and medical waste is high .800. In order to prevent infection throughout dental treatment, complex infection control of the environment and facilities such as air and surface management, and operating rooms should be implemented. In addition, a thorough sterilization management system should be applied for safe use of equipment, and medical infections sources should not be leaked to the outside by properly disposing of medical waste and laundry. The Infection from dentistry to local residents occurs when microbial-contaminated medical equipment is discarded or moved from dentistry to other places. It occurs when an appropriate container is not used or properly transported when treating infectious waste from a dental clinic. Dental personnel should carry out hand hygiene, wear personal protective gear, and engage in medical treatment to protect both patients and practitioners from all these risk factors of infection. As a result of testing statistical significance in regression analysis of infection control education and dental infection control in this study, the F statistic was 2.233, and the significance probability was .001, and dental equipment disinfection was significantly explained at the significance level of 0.05 (t=-3.392, p=).001), in addition, the surface disinfection of the equipment is significant at the significance level of .005, with a significant probability of .004 (t=2.922, p=).004), the total amount of change is explained as .199% (1.10%). It is intended to provide basic data for preventing coronavirus by suggesting that the system is necessary to block air infection in the clinic, manage facilities, and manage the safety of dental workers.

The limitations of this study were limited to some regions in domestic studies conducted on dental institutions and dental workers and were limited to the relationship between recognition and performance of infection control recommendations in specific areas. Therefore, it was limited to grasp the overall status of infection control, find specific problem areas, and take fundamental measures. In the future, follow-up studies will be conducted on dental workers at dental institutions nationwide to prevent infection in the overall COVID-19 infection control and dental treatment. In conclusion, student dental hygienists thoroughly wear personal protective equipment because they believe that all patients visiting the hospital are likely to be infected based on the standard prevention policy. Before and after contact with the patient, before and after performing aseptic surgery, after exposure to body fluids, and after contact with the patient's surrounding environment, hand

hygiene is thoroughly washed. Items used for medical treatment are opened in front of the patient at the time of use and for all medical treatment in contact with the patient The apparatus complies with the cleaning, disinfection, and sterilization methods and complies with the sterilization validity period. The peripheral surface in contact with the patient Disinfect with a low level of disinfectant after the patient has moved, and the patient is expected to spread the infection If you receive urgent dental treatment, isolate it from other patients. Medical clothing is only worn in the clinic and is contaminated. In cases, replace it immediately, and use separate household and medical refrigerators in the dentist. Separate the instrument washing sink and dishwashing sink in the dentist's office Dispose of waste separately (general medical waste and damaged medical waste). Dental workers always come into contact with patients, so they maintain their health through regular health checkups (vaccinations). I got a need to comply with my back.

Conclusion

From July 1 to August 10, 2022, a study was conducted on 111 people from H University of Dentistry, S University of Dental Hygiene Department, and 56 third graders working at a dental clinic in Gwangju Metropolitan City. Participants in this study were student dental hygienists who conducted clinical practice in dentistry, and students who were tested negative after contacting confirmed patients with COVID-19 were surveyed.

A. For gender, the mean and standard deviation were 1.846±.361, which was higher for female students. The average and standard deviation of age is 2.315±.774, and infection control education is 99 people (74.4%) and 12 people (9.0%) for "no". In the COVID-19 vaccination, 98 people (73.3%) said "Yes" and 13 people said "No" (9.8%).

B. The two independent samples t-test on the difference in medical gloves exchange between dental hygiene students according to gender showed that female students added medical gloves exchange.

C. Medical glove exchange and dental equipment disinfection .252, disinfection of dental equipment and exchange of medical gloves showed the lowest correlation with .252, and the disinfection sterilization and infection control program of medical institutions showed a negative correlation with -.261. The correlation between the infection control program and medical waste is high .800.

D. As a result of the statistical significance test in the regression analysis of infection control education and dental infection control, the F statistic is 2.233, and the significance probability is .001, and dental equipment disinfection is significantly explained at the significance level of 0.05 (t=-3.392, p=).001), in addition, the surface disinfection of the equipment is significant at the significance level of .005, with a significant probability of .004 (t=2.922, p=).004), the total change is described as .199% (1.10%).

References

1. Kim Y, Lee H, Lee KJ (2013) Contamination of the hospital environment by pathogenic bacteria and infection control. Korean Journal of Nosocomial Infection Control 20(1): 1-6.
2. Hong S, Kwon Y, Park YS (2012) Nursing students' awareness and performance on standard precautions of infection control in the hospital. The Journal of Korean Academic Society of Nursing Education 18(2): 293-302.
3. Yoo SM (2013) Knowledge, attitudes, and performance of handwashing by college students in the health industry. Journal of the Korean Society of Industrial Technology 14(8): 3916-3924.
4. (2022) Korea centers for disease control and prevention and prevention and prevention guidelines for infection prevention and management of COVID-19 dental medical institutions.
5. (1992) A study on the health of Moon Hyuk-Soo and dentist. Journal of the Korean Oral Health Association 16(1): 53-73.
6. Jeong HJ, Lee JH (2015) Factors influencing the recognition and practice of infection control by some local dental hygienists. Journal of Korean Dental Hygiene15(3): 363-369.
7. Lee YH (2015) A survey on the recognition and practice of dental infection management according to the type of workplace. Journal of the Korean Radiological Society 9(6): 409-416.
8. Jen JS, Choi SM, Lee YH (2018) A comparative study based on dental hygienists' awareness and practice of infection control. Artistic Humanities Convergence Multimedia Paper 8(12): 597-606.
9. (2022) Korea centers for disease control and prevention and the korean medical-related infectious disease control association. Guidelines for the Prevention of Medical-Related Infectious Diseases.
10. (2008) Ministry of Environment, Medical Waste Management System Guide.
11. (2020) The National Legal Information Center Article 2.5. of the Waste Management Act.
12. (1999) American Dental Association Council on Scientific Affairs. Dental unit waterlines: Approaching the year 2000, ADA Council on Scientific Affairs, J Am Dent Assoc 130(11): 1653-1664.
13. Lee SS, Kim DE, Song SY (2016) Perception and practice of dental hygienists in the management of dental unit water pipes. Journal of Korean Dental Hygiene16(4): 507-516.
14. (2022) NA,H,J, Infection control by dental hygienists: A comparative study on the performance of standard. Sun Text Review of Dental Sciences Open Access (1): 155-165.
15. (2017) Ministry of health and welfare Revision of guidelines for disinfection of medical institutions and equipment.
16. Son YK, Cho IY, Jong HY, (2016) Survey of dental hygienists' uniform management. Journal of the Korean Dental Hygiene Association 16(4): 517-523.
17. (2022) Centers for disease control and prevention and guidelines for the prevention and management of infections in dental medical institutions.
18. (2022) Korea centers for disease control and prevention, korea medical-related infection management association. Guidelines for the Prevention of Medical-Related Infections.
19. Haley RW, Morgan WM, Culver DH, White JW, Emori TG, et al. (1985) Hospital infection control: Recent progress and opportunities under prospective payment. Am J Infect Control 13(3): 97-108.
20. Jeong HJ, Lee JH (2016) A survey on infection control status of the dental care institution. AJMAHS 6(6): 51-58.
21. Nam YS, Yoo JS, Park MS (2007) A study on actual conditions for prevention of infections by dental hygienists. J Den Hyg Sci 7(1): 1-7.

22. Min DW, (2020) The effect of ambiguity of information on Covid19 patients' contact trace on intention to visit the commercial district: Comparison of residents in Gangnamgu and Seochogu Associate Professor. Journal of Digital Convergence 18(8): 179-184.

23. Korean society for healthcare-associated infection control and prevention. Standard preventive guidelines for medical related infections. Korea Disease Control and Prevention Agency:2017.

24. Yun KO, Park HJ, Son BS (2014) Study on bacterial concentrations in dental offices. Journal of Environmental Health Sciences 40(6): 469-476.

25. Kim EG (2017) The development and effect of the education program on hand hygiene and use of personal protective equipment [Doctoral dissertation]. Univ of Busan, Busan, South Korea.

26. (2018) Ministry of Health and Welfare, Korea Institute for Healthcare Accreditation, Dental hospital certification standards Ver.2.0.