ORIGINAL ARTICLE

The Correlation Knowledge, Attitude, and Compliance of Infection Control Guidelines at Dental Hospital Hasanuddin University

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ABSTRACT

Introduction: Infection control is a precautionary measure that must be followed to curb the spread of infection, which must be carried out at all dental hospital. This study aimed to investigate the correlations between knowledge, attitudes and compliance to infection control guidelines amongst resident physicians, and dental students at Hasanuddin University Dental Hospital. **Methods:** This was a cross-sectional study conducted at Hasanuddin University Dental Hospital, Indonesia. Sample (n = 112) consisted of 32 resident physicians and 80 students. Independent variables: knowledge, attitude, and compliance; dependent variable: Infection control guidelines. Questionnaires used in this study comprised of 25 questions, and was designed to obtain data regarding knowledge, attitude, and compliance to infection control measures. Statistical analysis was performed using student t-test and ANOVA, and a 5% ($p<0.05$) significance level was set. **Results:** Data collected demonstrated that in the information variable, there were significant differences among resident physicians and students in sterilization method ($p=0.008$), the minimum time for sterilization ($p=0.000$) and temperature for sterilization ($p=0.000$), for the attitude variable, there were significant differences among resident physicians and students for "have you ever got pricked by a sharp tool" ($p=0.048$), and visited the hospital for HBV testing ($p=0.000$). **Conclusion:** There were significant differences in knowledge and attitude among resident physicians and students at the Hasanuddin University Dental Hospital. The implication of the study therefore encourages the said healthcare service facility to provide health security guarantees for both health workers and the community. The implementation of education and training programs among medical students for Infection control guidelines is very much obligatory to increase knowledge, attitudes, and compliance to infection control measures.

Keywords: Knowledge, Attitude, Infection Control, Compliance

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INTRODUCTION

Dentists and other related dentistry workers in Indonesia are required to meet one very important requirement in dental care delivery standard, namely Infection control and prevention. Implementation of procedures regarding Infection control and prevention must be carried out in all dental and oral health service facilities throughout Indonesia, surveillance and infection control measures in dental health care facilities is regulated by Regulation of the Minister of Health number 27 of 2017. Dentists must provide health services in every possible way to ensure that the students has adequate knowledge and training in Infection Control and Prevention (1). The aforementioned infection control measures include hand washing, cleaning, usage of personal protective equipment (PPE), disinfection and sterilization of instruments as well as materials. Infection control itself is defined as a series of preventive measures or practical steps that can be taken to eliminate the spread of infection. The main purpose of infection prevention in dental settings is to avoid transmissions of infectious agents such as viruses, gram-negative or gram-positive bacteria, fungi, virus, etc. from patient-to-patient, from patient-to-dentist or vice versa. In fact, hand hygiene procedure is the most prominent component among all infection control and prevention programs (2,3,4).

Sterilization is a procedure that eliminates or destroys

all forms of microbes or organism, both in pathogenic and nonpathogenic state, also in vegetative form such as spores, which adhere on the surface of the material to be sterilized. Substances that are free of all form of living microorganisms are defined as sterile items. Sterilization aims to inhibit the transmission of microorganism and/or pathogens (5,6,7).

Beside sterilizing medical instruments and/or materials, infection also includes the usage of Personal Protective Equipment (PPE). PPE acts as a physical barrier between microorganism and health worker. PPEs comprised of gloves, eye protection (goggles), masks, aprons, gowns, boots/shoes cover, and head cap. All health care workers, supporting staff (i.e. laboratory), even family members coming into close contact with patient's bodily fluids, bloods, secretions and/or excretions must use an appropriate set of PPE (8,9).

Dental health workers including resident doctors and dentistry students have a high risk of cross-infection with pathogenic blood due to the constant exposure to blood and blood-containing saliva. They also have a high likelihood of experiencing accidents such as being pricked by a needle. Dental practitioners had a three times higher likelihood of being infected with Hepatitis B compared to general population (10). Moreover hepatitis, dental practitioners also had a high risk of being infected with the herpes virus. Several studies stated that many dentists had not understood the significance of adhering to infection control guidelines, nonetheless dentists had sufficient knowledge regarding personal protective measures to prevent cross-infection, but only a small amount of dentists addresses patient's HIV/AIDS history during history taking (2,11,9).

The purpose of this research was to investigate the knowledge, attitudes and compliance to infection control guidelines amongst resident physicians and dentistry students at Hasanuddin University.

MATERIALS AND METHODS

Study Design
This was a cross-sectional research designed to obtain information regarding resident physicians' and students' knowledge, attitudes, and compliance to infection control guidelines. Independent variables were knowledge, attitude, and compliance and dependent variable were guidelines for infection control.

Population, samples, and sampling
The sample (n=112) consisted of 32 resident doctors and 80 students. Inclusion criteria: willing to fill the research questionnaires, filling the questionnaire completely, exclusion criteria: did not complete the questionnaire, did not return the filled questionnaire.

Instrument
This study used a questionnaire specifically made to collect data regarding knowledge, attitude, and compliance to infection control. Sself-administered questionnaire consisted of 25 closed questions were employed to collect data. This questionnaire comprised of three parts, namely knowledge (consisting of seven questions), attitude (consisting of 7 statements), and compliance (consisting of 11 statements). The questionnaire collected data regarding knowledge on infection control, sterilization, instruments disinfection, occupational hazards, and immunizations. Questionnaires were handed out to subjects from various departments. Informed consent was stated in first page of the consent form in the questionnaire. The consent form took statement of consent from the study participant by signing the consent form.

Location and Time
This study was conducted between October 7th-12th 2019 at Hasanuddin University Dental Hospital.

Procedure
1. Socialization regarding the aims and objectives of the study and guidance to fill out questionnaire.
2. Subjects were given a questionnaire booklet and were instructed to fill in all the questions and the respondents were expected to provide information honestly.
3. After tabulating the research data, then data analysis was done and conclusions were derived.

Data Analysis
The data obtained were then analyzed using multiple analyses. The first one was variance analysis using ANOVA to compare mean score value of knowledge, attitude, and compliance. The second analysis was independent t-test, which was used to compare mean values between two sample groups to see if a significant difference in mean values existed. Significant level was set at $p<0.05$ for all analysis.

Ethical Clearance
Clearance for this study was obtained from Hasanuddin University Faculty of Dentistry Dental Hospital and Oral Health Research Ethics Committee. Number: 0262/KEPK FKG-RSGM UNHAS/2019

RESULTS

Table I showed that based on gender, there were more female dental students (80%) as well as female resident physicians (53.12%). Based on the year of admission, most of the students were admitted in 2019 (72.5%), same case was with the residents, most subjects were admitted in 2019 (71.87%). Based on department, among students, most participants were in conservative dentistry department (21.25%), whilst among resident

Table I. Demographic data of participant students and resident physician (n = 112)

Gender		
Female	64 (80%)	17 (53.12%)
Male	16 (20%)	15 (46.87%)
Year of Students Admission/Resident Physician		
2013	1 (1.25%)	
2014	2 (2.5%)	
2015	0 (0.00%)	
2016	4 (5%)	
2017	4 (5%)	3 (9.37%)
2018	11 (13.75%)	6 (18.75%)
2019	58 (72.5%)	23 (71.87%)
Department		
Orthodontia	0 (0.00%)	
Prosthodontics	11 (13.75%)	2 (6.25%)
Oral Medicine	6 (7.5%)	
Oral Surgery	4 (5%)	7 (21.87%)
Periodontia	12 (15%)	14 (43.75%)
Conservation	17 (21.25%)	9 (28.12%)
Pedodontia	11 (13.75%)	
Dental Public Health	8 (10%)	
Radiology	4 (5%)	
Integration	7 (8.75%)	

physicians most subjects were in periodontology department (43.75%).

Based on Table II, which showed results of independent t-test, comparison of all 7 items were shown. It was demonstrated that for the knowledge variable there were significant differences among resident physicians and student for sterilization method (*p*=0.008), the minimum time for sterilization (*p*=0.000) and temperature for sterilization (*p*=0.000) items.

According to Table III , which showed results of independent t-test, comparison of all 7 items were shown. The said table showed that in the attitudes variable there were significant differences among resident and students for "have you ever got pricked by a sharp tool" (*p*=0.048), and "did you go to the hospital to test for HBV (Hepatitis B Virus) infection" (*p*=0.000) items.

Table IV showed values of answers to each 11 questions in compliance level category. It showed that for the "always" category, the highest frequency for students were found in questions 2 and 3 about wearing gloves during treatment and changing gloves during patient turnover, whilst the highest frequency for residents was seen in question 3 about changing gloves during patient turnover. In the "never" category, the highest frequency for students were found in the use of rubber dental dams, the same results were shown for residents, with highest frequency in question 11.

According to table V, the highest average of correct answers for knowledge category were obtained by resident doctors, with an average of 5.8. This score showed that the residents' knowledge of infection control was higher than that of students. For attitude category, the highest average of "yes" answers was obtained by students with an average of 4.95. Lastly, for compliance category, the highest average "always" answers were obtained by residents with an average of 5.68

Table II. Knowledge of Infection Control Guidelines

Knowledge	Students				Resident Physician				Total				
	Correct		Wrong		Correct		Wrong		Correct		Wrong		*p*-value
Question	n	%	n	%	n	%	n	%	n	%	n	%	
Purpose of sterilization	76	95.00%	4	5.00%	31	96.88%	1	3.13%	107	95.54%	5	4.46%	0.668
The most reliable sterilization method	61	76.25%	19	23.75%	30	93.75%	2	6.25%	91	81.25%	21	18.75%	**0.008***
The minimum time required for sterilization in an autoclave	16	20.00%	64	80.00%	26	81.25%	6	18.75%	42	37.50%	70	62.50%	**0.000***
Temperature for sterilization in an autoclave	18	22.50%	62	77.50%	23	71.88%	9	28.13%	41	36.61%	71	63.39%	**0.000***

CONTINUE

Table II. Knowledge of Infection Control Guidelines (CONT.)

Knowledge	Students				Resident Physician				Total				
	Correct		Wrong		Correct		Wrong		Correct		Wrong		p-value
Question	n	%	n	%	n	%	n	%	n	%	n	%	
Temperature for sterilization in an autoclave	18	22.50%	62	77.50%	23	71.88%	9	28.13%	41	36.61%	71	63.39%	**0.000***
Disease with the highest level of transmission through saliva	51	63.75%	29	36.25%	17	53.13%	15	46.88%	68	60.71%	44	39.29%	0.303
What actions must be taken to maintain direct blood contact with HIV patients	75	93.75%	5	6.25%	30	93.75%	2	6.25%	105	93.75%	7	6.25%	1.000
What do you use to wash your hands	80	100.00%	0	0.00%	30	93.75%	2	6.25%	110	98.21%	2	1.79%	0.161

Independent t-test, *significant p <0.05

Table III. Attitudes of Infection Control Guidelines

Attitudes	Students				Resident Physician				Total				
	Yes		No		Yes		No		Yes		No		p-value
Question	n	%	N	%	n	%	n	%	N	%	n	%	
Do you prefer patients to rinse before starting every treatment procedure	78	97.50%	2	2.50%	32	100.00%	0	0.00%	110	98.21%	2	1.79%	0.371
Do you prefer patients to rinse before starting every treatment procedure	79	98.75%	1	1.25%	32	100.00%	0	0.00%	111	99.11%	1	0.89%	0.53
Do you wash your hands after inspection	79	98.75%	1	1.25%	32	100.00%	0	0.00%	111	99.11%	1	0.89%	0.53
Whether disinfection of dental chairs, clinics and dental offices, is needed every turn of the patient	74	92.50%	6	7.50%	30	93.75%	2	6.25%	104	92.86%	8	7.14%	0.819
Did you receive the HBV (Hepatitis B Virus) Vaccine	49	61.25%	31	38.75%	20	62.50%	12	37.50%	69	61.61%	43	38.39%	0.903
Have you got a sharp tool while treating a patient	26	32.50%	54	67.50%	5	15.63%	27	84.38%	31	27.68%	81	72.32%	**0.048***
If so, did you go to the hospital and be tested for HBV (Hepatitis B Virus)?	16	20.00%	64	80.00%	0	0.00%	32	100.00%	16	14.29%	96	85.71%	**0.000***

Independent t-test, * significant p <0.05

Table IV. Compliance of Infection Control Guidelines

Que-stion	Always		Often		Sometimes		Rarely		Never	
	Students	Resident Physician	Students	Resident Physician	Students	Resident Physician	Students	Resident Physician	Students	Resident Physician
	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)
1	30 (37.5%)	20 (62.50%)	18 (22.50%)	9 (28.12%)	25 (31.25%)	3 (9.37%)	6 (7.50%)	0(0.00%)	1 (1.25%)	0 (0.00%)
2	75 (93.75%)	31 (96.87%)	5 (6.25%)	1 (3.12%)	0 (0.00%)	0 (0.00%)	0 (0.00%)	0 (0.00%)	0 (0.00%)	0 (0.00%)
3	75 (93.75%)	32 (100%)	5 (6.25%)	0 (0.00%)	0 (0.00%)	0 (0.00%)	0 (0.00%)	0 (0.00%)	0 (0.00%)	0 (0.00%)
4	74 (92.50%)	31 (96.87%)	6 (7.50%)	1 (3.12%)	0 (0.00%)	0 (0.00%)	0(0.00%)	0 (0.00%)	0 (0.00%)	0 (0.00%)
5	34 (42.50%)	10 (31.25%)	16 (20%)	5 (15.62%)	20 (25%)	15 (46.87%)	5 (6.25%)	2 (6.25%)	5 (6.25%)	0 (0.00%)
6	8 (10%)	14 (43.75%)	5 (6.25%)	4 (12.50%)	18 (22.50%)	7 (21.87%)	15 (18.75%)	5 (15.62%)	34 (42.50%)	2 (6.25%)
7	11 (13.75%)	9 (28.12%)	4 (5%)	8 (25%)	10 (12.50%)	8 (25%)	14 (17.50%)	6 (18.75%)	41 (51.25%)	1 (3.12%)
8	72 (90%)	20 (62.50%)	4 (5%)	8 (25%)	1 (1.25%)	0 (0.00%)	1 (1.25%)	3 (9.37%)	2 (2.50%)	1 (3.12%)
9	8 (10%)	6 (18.75%)	1 (1.25%)	2 (6.25%)	18 (22.50%)	13 (40.62%)	12 (15%)	10 (31.25%)	41 (51.25%)	1 (3.12%)
10	1 (1.25%)	5 (15.62%)	0 (0.00%)	3 (9.37%)	7 (8.75%)	9 (28.12%)	11 (13.75%)	8 (25%)	61 (76.25%)	7 (21.87%)
11	2 (2.50%)	4 (12.50%)	0 (0.00%)	1 (3.12%)	4 (5%)	6 (18.75%)	5 (6.25%)	13 (40.62%)	69 (86.25%)	8 (25%)

Table V. Average correct, "yes" answers, and "always" answers between profession students and resident physician in each questionnaire

Item		Mean
Knowledge	Students	4.71
	Residents physician	5.84
Attitudes	Students	4.95
	Residents physician	4.71
Compliance	Students	4.87
	Residents physician	5.68

ANOVA test

DISCUSSION

This study demonstrated a good level of knowledge on infection control guidelines between students and resident physicians at Hasanuddin University Dental Hospital compared to attitude and compliance to infection control guidelines. Attitude and compliance deficits are likely to be caused by lack of materials and practice regarding infection control during their study period. Results obtained showed similarity with a study by Alharbi *et al.,* (2019) which performed a similar study in Saudi Arabia using dental faculty members and dental students. 4th and 5th year students demonstrated a good level of knowledge on infection control when compared to 3rd year students and faculty staff. Another study

yielded similar results is from Sachdeva, who scouted 300 dentistry students in India, the aforementioned study demonstrated that dentistry students' have good knowledge about infection guidelines (11,12).

Research conducted among dental students in India using samples from 3rd year, final year student and postgraduate students, showed that postgraduate students have a better level of knowledge and practice than 3rd year, final years students, and students. As for attitudes towards infection control, no such difference was found between 3rd year, final year, and postgraduate students (13).

In a study conducted in Pakistan, the said study showed that samples appeared to have a good overall knowledge regarding infection control guidelines, owing to the fact that the students knew well about universal precautions, as evident from the study study (14).

Research conducted in India on knowledge of infection control conducted on dental practices, showed that knowledge about infection control in dental practitioners was good but attitudes about infection control were lacking (14). This is in line with another research conducted in Saudi Arabia regarding knowledge and attitudes towards infection control in dentistry students, which also showed that dentistry students' knowledge of cross infection control was good but their attitude towards infection control was lacking (15). On the

other hand, another study in Iran showed relatively low levels of knowledge, attitude as well as compliance to infection control protocol in both dentists and dental students (16). In addition, the data showed that the use of self-rolling equipment is not in accordance with global standards (12).

Similar research conducted in Turkey regarding the knowledge and attitudes of dentists towards infection control using samples of 135 dentists also showed that dentists have moderate knowledge on infection control procedures (17).

CONCLUSION

There were significant differences in knowledge and attitude regarding infection control and prevention among resident physicians and students at Hasanuddin University Dental Hospital. The implication of the study therefore encourages the said healthcare service facility to provide health security guarantees for both health workers and the community. The implementation of education and training programs for Infection control guidelines is a very much necessary to increase knowledge, attitudes, and compliance to infection control measures.

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