

Assessment of Gender, Role Model, Patient Involvement and Knowledge on Compliance Using Personal Protective Equipment (PPE) among Dental Students: A Cross-Sectional Study

Valendriyani Ningrum^{1*}, Abu Bakar²

¹ Department of Preventive and Public Health Dentistry, Faculty of Dentistry, Baiturrahmah University

² Department of Oral Medicine, Faculty of Dentistry, Baiturrahmah University

*Corresponding author. Email: valend888@gmail.com

ABSTRACT

Objective: The assessment of compliance with using personal protective equipment among a group of dental students. **Methods:** A non-participatory observation and self-administered questionnaire was distributed to a total of 72 dental student with cross sectional study design. **Results:** Of the total 72 questionnaires, the response rate was 100%. The majority of the participants were female students (76.4%). PPE compliance was also observed by 66 (91.7%) of the dentistry students, according to our findings. Only 18 (25%) of the participants had patient participation control, 56 (77.8%) had role model effect, and 60 (83.3%) had solid understanding of how to use PPE, according to the findings of this study. Gender, role model, patient involvement, and knowledge associated significantly with PPE compliance ($p < 0.05$). **Conclusion:** Dental students show good compliance with the use of personal protective equipment. To minimize the risk of cross infection in dental clinics, continual education and adequate supplies of personal protective equipment are required.

Keywords: PPE Compliance, dental student, gender, role model, patient involvement.

1. INTRODUCTION

Nosocomial infections or Healthcare Associated Infections often called (HAI's) is an important issue around the world and becomes an interesting problem to be investigated, especially concerning the prevention of infection. HAI's does not only occur in patients but occurs also in health workers or medical personnels. The dentist is one profession that is susceptible to HAI's. Transmission of HAI's that occurs at the dentist can be caused by the action of dental performed often in contact with blood, tissue and fluid secretion that could potentially transmit the infection. Infection cannot be separated by the role of pathogenic microorganisms such as viruses and bacteria¹. A study conducted at one medical school in Glasgow reported high dental clinic students epstein barr virus-infected compared with preclinic students². Other viral infections based on WHO estimates in 2002 occurred 16,000 cases of hepatitis C, 66000 cases of hepatitis B and 1000 HIV cases due to needle stick happened to health professionals throughout the world³.

HAI's impact increasing the length of time of treatment, complications and costs that were all

implicated in the pain management. Impacts can be reduced by preventive measures. Otherwise in 2003, the Centers for Disease Control and Prevention (CDC) published the Guidelines for Infection Control in Dental Health-Care Settings as a guide to dental practices in the prevention and management of infection control and personal safety in the draft. Indonesian state as part of the world also increased prevention efforts through the Ministry of Health to establish the Director General of Health Efforts Number: HK.02.04/II/1179/2012HK about "Standard Infection Prevention and control of Dental and Oral Health Care in Health Care Facilities".

Additionally, guidebook "Infection Control Update"⁵ mentions three keys of infection prevention that must be obeyed by the dentist immunization, hand hygiene and use of Personal Protective Equipment (PPE). Rules on the use of PPE standard guidelines of infection control in dental care facilities in 2012 the Ministry of Health describes personal protective equipment in health care facilities that dental and oral masks, gloves, goggles and protective clothes⁶. Dental Education Hospital, Muhammadiyah University of Yogyakarta (DEH MUY) as one facility dental health care in the province of Yogyakarta had

a role in the prevention and control of infection with the use of standard operating PPE procedures set. Prevention efforts success undertaken by management DEH will be greatly influenced by individual adherence to the rules, or better known as compliance.

Many studies show low compliance with the use of PPE. Research data Aarabi *et al.* in 2008 suggested only 33.9% of the 250 medical personnel that adhere to standard operating procedures of mask usage⁷. Ganczak research results and describe Szych in 2007 only 5% are obedient in using routinely gloves, masks, protective clothing and goggles⁸. An American study conducted by Akdukman *et al.* in 1999 found compliance glove use only 28%⁹. The data indicate the low level of compliance in the use of PPE. Low adherence to standard operating procedures for the use of PPE is a complex issue because it is influenced by multifactorial both individual factors and factors of hospital management.

2. METHODS

The method of this study was quantitative with cross sectional design. In this study, the first phase analyzed the level of adherence to the use of PPE students through non-participatory observation and self-administrated survey using a structured questionnaire. Sampling in this study used a total sampling technique.

Observations on the pilot study were conducted for 2 weeks to assess compliance in the students' use of PPE, performed by 2 numerators and 1 researcher. The results of observations made by the numerator and the researchers then conducted to test the common perception Interrater reliability through Kappa statistic analysis. The results of the analysis obtained Kappa coefficient of 0.91 and a p value of 0.00 ($p < 0.05$) showed significant Kappa test results, there was no difference in perception between the numerator and the researchers observed aspects.

Distribution of the questionnaire of a pilot study conducted at the student clinic to then be filled at one time. A total of 15 questionnaires were returned completed. Data were collected and then tested the validity. All 21 questions were for r results > r table (0.488). Validity test results followed by a reliability test. Reliability test results Alpha value of r (0.990) is greater than r table (0.488), the 17 questions above stated reliable. Subsequent studies followed by 72 students in the two wards DEH MUY, Multazam ward and Arafah room of the whole first year clinical/clerkship students.

Statistical analysis was performed with Fisher's Exact Test that showed the relationship between the gender, role model, patient involvement and knowledge with adherence to the use of PPE.

3. RESULTS

Total sample of 72 dental students responded to the questionnaire. Data regarding gender, PPE compliance, role model, patient involvement, and knowledge are presented in Table I, which shows that the majority of the participants were female students. Our results also show that the PPE compliance was recorded by 66 (91.7%) of the dental students. The results of this study also show that only 18 (25%) participants had patient involvement control, 56 (77.8%) participants had role model effect and 60 (83.3%) had good knowledge regarding use PPE.

Table 1. Distribution of participants regarding their gender, ppe compliance, role model, patient involvement, and knowledge.

Variable	Total	
	N	%
Gender		
Female	55	76,4
Male	17	23,6
PPE Compliance		
Yes	66	91,7
No	6	8,3
Role Model		
Yes	56	77,8
No	16	22,2
Patient Involvement		
Yes	18	25
No	54	75
Knowledge		
Good	60	83,3
Moderate	12	16,7
Poor	0	0

The results revealed that the PPE compliance differences of participants regarding gender, role model, patient involvement and knowledge statically significant with p value less than 0.05.

Table 2. The PPE Compliance differences of Gender, Role Model, Patient Involvement and Knowledge.

Variable		p value
Gender	Female	0.002**
	Male	
Role Model	Yes	0.002**

	No	
Patient Involvement	Yes	0.031*
	No	
Knowledge	Good	0.000***
	Moderate	
	Poor	

Fisher's exact test Analysis * $p < 0.05$, ** $p < 0.005$, *** $p < 0.001$

4. DISCUSSIONS

Observations indicated a high level of compliance (91.7% of the 72 total subjects). Small amounts of the non-compliance due to reasons "in a hurry", "forget", and felt that the action was not a problem without the use of PPE in full. Use of PPE noncompliance in this study that some students did not use a mask and look there are students who do not wear gloves, while the use of protective clothing for all students at the time of observation always use it, it is associated DEH policy that requires each student to wear any protective clothing are wards in DEH.

The level of compliance of PPE use in high MUY DEH can reduce the impact of nosocomial infection. This is supported by no evidence of nosocomial infections in the hospital. High levels of adherence in hospitals is influenced by multifactorial. The factors identified in this study are gender, role models, patient involvement, and knowledge towards the use of PPE is a variable in this study.

Availability had a positive impact on the use of PPE. Availability means is the role of management in DEH MUY. The ingredients are always very easy to access of the availabilities and that there is every ward entrance PPE storage space and are close to their workspace facilitates operators to acquire and use PPE. The availability of appropriate PPE and provide comfort is a factor that can potentially affect compliance. Availability of PPE covers the number and the size and quality in accordance with facilities need. That need to be considered not only for the doctor or clinical students but a means of patient protection is also in a concern.

5.CONCLUSIONS

All variables associated with the use of PPE, although from observation, it is still a temporary nature of compliance due to these factors. Efforts need to be improved in the future is how to instill a sense of responsibility to wear PPE are derived from self-efficacy, so that each individual wherever they are felt to be using PPE. DEH as an education-based health care providers can work together in a comprehensive section on undergraduate education in curriculum design related control and prevention of nosocomial infections in a comprehensive and

structured. In addition, support organizations and a culture of safety regulation are emphasized also very necessary.

AUTHORS' CONTRIBUTIONS

V.N conceived of the presented idea and developed the theory and performed the computations. A.B verified the analytical methods. V.N and A.B discussed the results and contributed to the final manuscript.

ACKNOWLEDGMENTS

This publication was funded by Baiturrahmah University of Indonesia.

REFERENCES

- [1] Centers for Disease Control and Prevention. Guidelines for infection Control in Dental Health Care Setting. US: MMWR CDC, 2003.
- [2] Creedon, A. Infection control: behavioural issues for healthcare worker. *An International Journal* 2006;11(4):16-325.
- [3] Herbet, AM., Bagg., Walker., Davies and Westmoreland. Seroepidemiology of herpes virus infections among dental personnel. *Journal of Dentistry* 1995;23:339-342.
- [4] Rosenthal, V., Bijie, H., Maki, D and INICC members. International Nosocomial Infection Control Consortium (INICC) report, data summary of 36 countries. *American Journal of Infection Control* 2012.
- [5] Sudhakar, C. Infection control update. Europe: In Tech, 2012.
- [6] Kemenkes, 2012. Standar upaya pencegahan dan pengendalian infeksi pada fasilitas pelayanan kesehatan gigi dan mulut. Jakarta: Dirjen Bina Upaya Kesehatan KEMENKES RI, 2012.
- [7] Aarabi, A., Effat, K., Hassan., Gholami. Health care personnel compliance with standards of eye and face protection and mask usage in operating room. Spring 2008.
- [8] Akdukman, D., Kim, E., Parks., Mutha, Jeffe, B., and Fraser, J. Use of personal protective equipment and operating room behavior in four surgical subspecialties: personal protect tive equipment and behaviors in surgery. *Journal of infection control and hospital epidemiology* 1999:110-114.
- [9] Creswell, J. W. and Clark, V. L. P. Designing and conducting mixed methode research. New Delhi : Sage, 2007.

- [10] Mitchell, B. Compliance theory : compliance, effectiveness and behavior change. Oxford: University press, 2007.
- [11] Tivolacci, P., Ladner, J., Bailly., Merley., Pitrou,S and Czernichow, P. Prevention of Nosocomial Infection and Standar Precaution : Knowledge and Source of Information Among Healthcare Student. *Journal of Infection Control and Hospital Epidemiology* 2008;29(7).
- [12] Singh, A., Purohit, B., Bhambal, A., Saxena, S and Gupta, A. Knowledge, Atitude, and Practice Regarding Infection Control Measures Among Dental Students in Central India. *Journal of Dental Education* 2011.
- [13] Randle, J., Clarke, M and Storr, J. Hand hygiene compliance in health workers. *Journal of Hospital Infection* 2006;64:205-209.
- [14] Tiel, FH., Elenbaas., Vaskuilen., Herczeg. Plan-do-study-act cycles as an instrument for improvement of compliance with infection control measures in care of patients after cardiothoracic surgery. *Journal of hospital Infection* 2006;62:64-70.
- [15] Vaz, K., Growder, Mc., Lindo, A., Gordo, .L., Brown, P and Irving, R. Knowledge, Awareness and Compliance with Universal Precautions Among Health Care Workers at The University Hospital of West Indies, Jamaica. *IJOEM* 2010.
- [16] Whitby, M., Silva, C., McLaws, M., Sax, H., Donalson, L and Pittet, D. Behavioural considerations for hand hygiene practices: the basic building blocks. *Journal of Hospital Infection* 2011;65:1-8.