

Problems Encountered in Infection Control Practices Among Dental Students

Mykee Elaine L. Miral, John Mari B. Delgado, Mary Denn D. Onda, Ann Dominique M. Estolero, Maria Anjhyness D. Sazon, Jonnerick C. Villena, Angelica Dyann M. Peña
College of Dentistry, Lyceum of the Philippines University, Batangas City, Philippines

Asia Pacific Journal of Education, Arts and Sciences
Vol. 5 No.2, 110-118
April 2018
P-ISSN 2362-8022
E-ISSN 2362-8030
www.apjeas.apjmr.com

Date Received: November 7, 2018; Date Revised: April 7, 2018

Abstract - *This study aimed to know the problems encountered in infection control practices among dental students. The researchers engaged in this study to determine the demographic profile of the clinicians in terms of gender, year level, vaccines taken and types of operative procedure as clinical requirements and tested its significant difference or problems encountered when grouped. A proposed plan of action will be the study's output. The research method used in the study is in quantitative approach. An adapted questionnaire was distributed personally to the 75 respondents of the College of Dentistry in a private university in the Philippines. The first part showed the demographic profile and the second part is about the problems encountered in infection control. Results revealed that problems encountered categorized into PPE's, sterilization, radiograph and waste disposal were sometimes encountered. Problems encountered in PPE's varies on the year in the dispensary.*

Keywords: *infection control, dental students*

INTRODUCTION

Infection prevention and control is required to stop the transmission of communicable diseases in all health care settings. It demands a basic understanding of the epidemiology of diseases; risk factors that increase patient susceptibility to infection; and the practices, procedures and treatments that may result in infections. The risk of acquiring a healthcare-associated infection is related to the mode of transmission of the infectious agent, the type of patient-care activity or procedure being performed and the underlying patient's host defenses [1].

After a route of transmission is established, the "chain" of infection must be complete and intact for infection to occur. The chain of infection requires a pathogenic organism of sufficient virulence and in adequate numbers to cause disease, a suitable reservoir or source that allows the pathogen to survive and multiply (eg blood), a mechanism of transmission from

the source to the host, a portal of entry through which the pathogen may enter the host and a susceptible host (eg non immune individual). Infection control strategies (policies, procedures and practices) are intended to break one or more of these links in the chain, thereby preventing infection. Such strategies include immunization; hand hygiene and personal and environmental barrier techniques; effective cleaning, disinfection and sterilization procedures; and aseptic techniques and practices to reduce the risk of exposure to blood and other body fluids or infectious agents.

Dental care professionals are at high risk of cross-infection while treating patients. According to the Eastern Mediterranean Health Journal by Adel et al [2], both patients and health care workers may be exposed to a number of blood borne and upper respiratory pathogens through exposure to blood and saliva. Dentists might be occupationally exposed to infectious materials, including body substances and contaminated supplies, equipment surfaces, water or air. The major route of cross infection in the dental field is via infection through intact skin or mucosa due to accidents involving sharps, or direct inoculation or onto cuts and abrasions in the skin. This source of infection may be patients suffering from infectious diseases, who are in the prodromal stage of certain infections, and healthy carriers of pathogens. In addition, a majority or carriers of infectious disease cannot be easily identified.

According to World Health Organization [3], Infection prevention and control measures aim to ensure the protection of those who might be vulnerable to acquiring an infection both in the general community and while receiving care due to health problems, in a range of settings. The basic principle of infection prevention and control is hygiene. Failure to apply infection control measures favour the spread of pathogens, and health-care settings can act as amplifiers of disease during outbreaks, with an impact on both hospital and community health.

To achieve adequate infection control in dental practice, dental students should be fully aware and prepared to adapt necessary procedures. The responsibility of the dentist is to ensure the safety of their patient and staff. Practice procedures in infection control should be reviewed, reinforced and updated regularly [4].

According to Banda et al [5], revealed that clinicians are knowledgeable with the universal/ standard precautions in infection control in terms of pre-operative, operative and post-operative procedures.

Despite the considerable emphasis placed on standardized infection control procedures, it appears that few dentists have adhered to these procedures in their clinical practice, including the dental unit waterlines, water quality, vaccination prior to work, sterilization of instruments, proper waste disposal, isolation of work area, infection control regarding radiograph, environmental infection control and changing of complete PPE in every patient. Even in dental schools, future dentists have not always adhered to these procedures. Dental education can play an important role in the training of dentists, helping them to adopt adequate knowledge and attitudes related to infection control measures [6].

New learning or insights will be contributed by conducting this study. It is an offshoot for providing guidance to dental health care worker for preventing disease transmission in dental health-care settings, for promoting a safe working environment, and for assisting dental practices in developing and implementing infection-control programs that are ignored are the main concerns of this study. Specifically, improvement in cleanliness and safe working area of dental chair units for implementing the quality control standards of dental dispensary in dental unit waterlines should be given attention while treating patients.

OBJECTIVE OF THE STUDY

This study aimed to determine the problems encountered with regards to infection control practices among dental health students working in dental dispensary in LPU-Batangas.

More specifically it presented the demographic profile of dental practitioners in health-care settings in terms of gender, year level, vaccines taken and types of operative procedure as clinical requirements; test the significant difference or the problems encountered when grouped according to the profile of the respondents and proposed a plan of action to address the problems encountered.

METHODS

Research Design

The researchers used descriptive method in order to find out the problems encountered in Infection Control Practices among dental students. The researchers seek to describe the profile of the dental students at LPU that may be affected, the level of awareness on infection control practices, consequences related to the poor awareness, and the action that can be done through the study.

Participants of the Study

Seventy-five (75) Dentistry students working in the dental dispensary were the participants of the study. They were the 35 Senior Clinicians, and the 40 Junior Clinicians. All these students comprise 27.27% of the total number of Dentistry students. Each level was distributed proportionally using stratified proportional allocation and each student was selected at random.

Instrument

The researchers used a self-made questionnaire based from commonly encountered problems in the practice of infection control in the Dental Dispensary of LPU Batangas. It was validated by the panelists and the Dean of the College of Dentistry. The questionnaire has two parts: Part I includes the demographic profile of the respondents while Part II includes the problems encountered in infection control.

Procedure

The researchers forwarded a letter to the Dean, of College of Dentistry asking for permission to distribute the questionnaire to his clinician students and permission was granted. The questionnaires were distributed personally to the respondents and later retrieved for analysis. Data extracted from the results were discussed based on the information provided by the respondents.

Data Analysis

In this study, the data gathered were analyzed and interpreted. Descriptive statistics was applied to the quantitative analysis of the data obtained. Data obtained on the questionnaire was subjected to frequency distribution as to profile of the respondents in terms of age, year level, gender, vaccines taken and types of operative procedure as clinical requirements.

To determine the problems encountered in the practice, a four-point likert scale was used. In addition, Analysis of Variance (ANOVA) was used to test the hypothesis of the study using 0.05 alpha levels. All data

were treated using statistical software, PASW version 18 to further analyze the results of the study.

The given scale was used to interpret the result of the data gathered: 3.50 – 4.00 = Always (A); 2.50 – 3.49 = Often (O); 1.50 – 2.49 = Sometimes (S); 1.00 – 1.49 = Never (N)

RESULTS AND DISCUSSION

Table 1. Percentage Distribution of the Respondents' Personal Profile

Profile Variables	f	%
Gender		
Male	18	24.00
Female	57	76.00
Years Working in the dental dispensary		
1 year	35	46.70
2 years	32	42.70
3 years	3	4.00
4 years	1	1.30
5 years	4	5.30
Types of Operative Procedures as clinical requirements		
Restoration	75	100.00
Complete Denture	73	97.30
Removable Partial Denture	66	88.00
Fixed Bridge	27	36.00
Porcelain Jacket Crown	38	50.70
Extraction	34	45.30
Endodontics	34	45.30
Periodontics	61	81.30
Odontectomy	18	24.00
Pedo-dontics	33	44.00
Vaccines taken		
Hepatitis A	47	62.70
Hepatitis B	72	96.00
Anti Tetanus	38	50.70
Others	9	12.00

Table 1 shows the percentage distribution of the Respondent's personal profile. In terms of gender, there is greater number of female respondents than male respondents. In terms of years working in the dental dispensary, the result shows a great percentage in 1 year, meaning most of the respondents are novice practitioners and the least in 4 years. In the category of Types of operative procedures, most of the respondents are doing restoration, complete denture and oral prophylaxis because those procedures are the framework or basic capabilities that a clinician must

have before entering the dental dispensary. On the otherhand, they least do the Odontectomy, Fixed Bridge and Pedodontics because those procedures require a more knowledgeable and skilled clinician. In vaccines taken, Hepatitis B shows a great percentage because it is a requirement of a clinician before entering the dental dispensary to prevent cross infection from the patients to health worker and vice versa, there are also clinicians that have took other vaccines to ensure their security while treating patients.

Table 2. Problems Encountered in the Practice of Infection Control With Regards to PPEs

Indicators	WM	VI	Rank
1. Disregard on the importance of wearing over gloves when touching unsterile objects or roaming around the clinic	1.81	S	4
2. Lacking in using protective barriers i.e. the use of personal protective clothing, e.g. gloves, surgical masks, eye protection	1.75	S	5
3. Inappropriate use of protective barriers e.g over gloves, eye shield, while working at the prosthodontics section	1.83	S	3
4. Retaining surgery clothing for use within the surgery room	2.00	S	2
5. Keeping disposable personal protective barriers such as surgical masks and head caps after every patient	2.11	S	1
Composite Mean	1.90	S	

Table 2 presents the problems encountered in the practice of infection control with regards to PPEs. It was observed that they sometimes encountered a problem with a composite mean of 1.90. It means that the clinicians are aware in using PPEs, as said by Banda [5]. Among the items enumerated, keeping disposable personal protective barriers such as surgical masks and head caps after every patient ranked first with a weighted mean score of 2.11. This is due to the cost of the PPE's. Clinicians prefer to save the money for more important things. According to Abhinav Singh [6], few dentists have adhered to the standard infection control proceedings including the changing of complete PPE in every patient. It was followed by retaining surgery clothing for use within the surgery room and inappropriate use of protective barriers e.g over gloves, eye shield, while working at the prosthodontics section.

Even though all "sometimes" were experienced in response to, disregard on the importance of wearing over gloves when touching unsterile objects or roaming

around the clinic and lacking in using protective barriers i.e. the use of personal protective clothing, e.g. gloves, surgical masks, eye protection got the lowest mean value of 1.81 and 1.75 respectively. Most of the clinicians are aware in the importance of using overgloves, surgical masks and gloves and eye protection while treating patient. According to Banda [5], clinicians are knowledgeable with the use of PPE's in terms of preoperative, operative and post-operative procedures.

Table 3. Problems Encountered in the Practice of Infection Control With Regards to Sterilization

Indicators	WM	VI	Rank
1. Reusing of materials that fall down to the floor	1.64	S	14
2. Failure to clean and disinfect the cuspidors and other parts of the dental chair after each patient	1.83	S	10
3. Failure to flush dental unit waterlines at the start of the clinical day	2.09	S	3
4. Failure to wash the hands before and after the procedure	1.80	S	11
5. Using unsterilized instruments for every patient	1.69	S	13
6. Using tap water in all of the procedures	2.37	S	1
7. Negligence in sterilizing the burs (e.g white stones, carbide burs, Diamond burs)	2.05	S	4
8. Using unsterilized handpieces	2.04	S	5
9. Using contaminated mortar and pestle during restorative procedures e.g, mercury, alloy residues	1.96	S	7
10. Negligence in using disinfected rubber bowl and spatula	2.15	S	2
11. Failure to wrap the areas of the dental chair frequently touched and changing it after every patient	1.85	S	9
12. Failure in using rubber dam	2.04	S	5
13. Inappropriate segregation of contaminated materials from non- contaminated materials during procedure	1.88	S	8
14. Inappropriate segregation of sterile and non-sterile Instruments before the procedure	1.80	S	11
Composite Mean	1.94	S	

Table 3 presents the problems encountered in the practice of infection control with regards to sterilization. It was observed that sometimes they encountered a problem with a composite mean of 1.94. The clinicians perform sterilization in the clinic within 2-hour cut-off time. Thus, it needs discipline when the instruments needed to be sterilized. Among the items enumerated, using tap water in all of the procedures ranked first with a weighted mean score of 2.37. The clinicians use tap water that is their major and only source of water for it is readily available and have no choice but to use it because it is installed in their dental chairs. According to Hatland [7], DDS, the positive sides of using tap water are cheaper, basically safe and easily available, on negative side, it can be polluted with many individual chemicals that are not totally removed by water purification systems. And on occasion may be contaminated with bacteria and waste products from occasional flooding. It was followed by negligence in using disinfected rubber bowl and spatula and failure in flushing dental unit waterlines at the start of the clinical day with a mean value of 2.15 and 2.09 respectively.

Even though all "sometimes" were experienced in response to, inappropriate segregation of sterile and non-sterile instruments before the procedure, failure to wash hands before and after the procedure and using unsterilized instruments for every patient got the lowest mean value 1.80 and 1.69. As clinicians, we are aware about cross contamination because we know the possible risks that we might encounter if infection control is not being practiced.

According to the Eastern Mediterranean Health Journal by Adel et al [2], both patients and health care workers may be exposed to a number of blood borne and upper respiratory pathogens through exposure to blood and saliva. Dentists might be occupationally exposed to infectious materials, including body substances and contaminated supplies, equipment surfaces, water or air.

The major route of cross infection in the dental field is via infection through intact skin or mucosa due to accidents involving sharps, or direct inoculation or onto cuts and abrasions in the skin. This source of infection may be patients suffering from infectious diseases, who are in the prodromal stage of certain infections, and healthy carriers of pathogens. In addition, a majority or carriers of infectious disease cannot be easily identified.

Table 4 presents the problems encountered in the practice of infection control with regards to radiograph. It was observed that "sometimes" they encountered a

problem with a composite mean of 2.18. Due to insufficient clinic hours, infection control practice regarding radiograph is neglected or not given much importance.

Table 4. Problems Encountered in the Practice of Infection Control With Regards to Radiograph

Indicators	WM	VI	Rank
1. Negligence in disinfecting the tube head surfaces of the x-ray machine before use	2.31	S	1
2. Failure to use protective film barrier (e.g plastic, cling wrap,etc) on x-ray films before placing In the patient's mouth	2.23	S	2
3. Disregard on the importance of disinfecting all surfaces	2.09	S	4
4. Segregation of x-ray wastes e.g., proper disposal of Led Foil backing from the X-Ray Film	2.07	S	5
5. Failure in using protective Led Aprons	2.19	S	3
Composite Mean	2.18	S	

Among the items enumerated, negligence in disinfecting the tube head surfaces of the x-ray machine before use ranked first with a weighted mean score 2.31. Tube head surfaces are covered with protective barrier (eg. Cling wrap) to avoid cross contamination. Disinfection of the tube surfaces are not given importance due to placement of this protective barrier. According to Katz et al., [8] U.S. and Canadian dental schools were surveyed concerning infection control practices in dental radiology. The majority of respondents reported surface disinfection of intraoral projection operatories (55 percent) and panoramic operatories (61 percent) before or after each patient. The most frequently used surface disinfectant was iodophor. Most schools routinely disinfected the x-ray cone (89 percent) and tubehead (87 percent) of intraoral x-ray machines; however, many did not disinfect the control panel (44 percent) or the exposure button (27 percent). Although 100 percent of respondents reported student use of disposable latex gloves when exposing intraoral radiographs, 27 percent did not use gloves when processing radiographs. Fifty-six percent did not routinely disinfect countertops in the darkroom.

Castellanos [9] revealed that during exposure of radiographs, the potential to cross-contaminate equipment and environmental surfaces with blood and saliva is high if aseptic techniques are not practiced.

Radiographic equipment also requires complete coverage with disposable, single-use plastic barriers in order to prevent cross-contamination—with special attention taken during the processing stage. Receptors must be carefully removed from the disposable plastic barrier to avoid cross-contamination, and they must be cleaned and disinfected after use. Clinicians should continue to seek out the most current research and products to provide the most aseptic techniques in dental radiography.

It was followed by failure to use protective film barrier (e.g plastic, cling wrap,etc) on x-ray films before placing In the patient's mouth with a weighted mean score 2.23. Dental practitioners working on the dental dispensary are time conscious. They tend to work faster with any procedure that's why the use of protective film barrier is neglected by most of the dental practitioners. According to Hokett et al, [10] in his study entitled Assessing the Effectiveness of Radiography Barrier Sheaths and Finger Cots concluded that In film-based imaging, cross-contamination is prevented by complete plastic coverage of the film. Studies have shown that failure to use protective film barrier remain a potential source of contamination occurring in 44% to 51%.

It was followed by failure in using protective Led Aprons with a weighted mean score of 2.19. Clinicians are working on a limited time given, some tend to overlook the usage of led apron. According to Geist et al., [11] in his investigation about the radiation protection on dental schools using materials and equipment revealed that quality assurance protocols that reduce radiation exposure are low. Other dose-reducing techniques include long source-film distances, rectangular beam limitation and leaded aprons are not practiced and often neglected on schools due to poor guidance of the professionals and availability of equipment. Some dose-reducing strategies are commonly used in dental schools, while others have not gained wide acceptance.

Even though all were sometimes experienced, disregard on the importance of disinfecting all surfaces and segregation of x-ray wastes e.g., proper disposal of Led Foil backing from the X-Ray Film got the lowest mean value of 2.09 and 2.07 respectively. The x-ray machine surfaces are the common area prone to cross contaminations which are protected by a barrier (eg. Cling wrap). Due to the protection barrier, surfaces are not disinfected anymore by the dental practitioners. According to Rahmatulla et al., [12] in his study in determining the extent of cross-infection present in the dental radiology clinics with and without the use of

surface disinfectants revealed that disinfection and sterilization have received considerable attention due to spread of AIDS and HIV. The study revealed, almost all high touch areas in dental radiology clinic had bacterial contamination in the absence of surface disinfection. "Webcol" and "Superficial" disinfectants showed minimum or no contamination. To remove risk of cross-infection, disinfection of high-touch areas of dental x-ray equipment is mandatory.

Portable manual chairside darkroom xray film developer is provided on the x ray room for processing the film. Inside the box, it contains three containers for the chemicals used for the processing. The led foil that was removed was left inside the box scattered. It is not removed by the dental practitioner after developing the film which should dispose on the proper led foil disposal. This is also due to the negligence of the dental practitioners upon the proper disposal of led foil. It may also be the clinicians' responsibility to segregate and provide another container within the box that will serve as the led foil disposal. It is also their responsibility to provide the proper label of each containers. According to Sood et al., [13] in his study that aims to obtain information about the knowledge, attitude, and practices of dental institutions and dental practitioners in the disposal of waste revealed that many dentists have knowledge about the waste management but they lack in the attitude and practice. There is need for education regarding hazards associated with improper waste disposal at all levels of dental personnel. It is imperative that waste should be segregated and disposed-off in a safe manner to protect the environment as well as human health.

Table 5 presents the problems encountered in the practice of infection control with regards to waste disposal. It was observed that sometimes they encountered a problem with a composite mean of 2.27. The clinicians are provided by a single container of wastes for biodegradable and non-biodegradable and one for hazardous materials (e.g, needles,files, carpules) which is not a leak proof container. Among the items enumerated, proper disposal of used personal protective barriers ranked first with a weighted mean score of 2.44.

In connection to retaining of used PPE's, the materials that should be disposed are reused to another patient excluding gloves and over gloves. All PPE should be removed before dental healthcare practitioner leave patient-care areas. Reusable PPE (e.g., clinician or patient protective eyewear and face shields) should be cleaned with soap and water, and when visibly soiled, disinfected between patients,

according to the manufacturer's directions. Wearing gloves, surgical masks, protective eyewear, and protective clothing in specified circumstances to reduce the risk of exposures to bloodborne pathogens is mandated by OSHA. General work clothes (e.g., uniforms, scrubs, pants, and shirts) are neither intended to protect against a hazard nor considered PPE [14].

Table 5. Problems Encountered in the Practice of Infection Control with Regards to Waste Disposal

Indicators	WM	VI	Rank
1. Segregation of waste: contaminated material and non-contaminated material; biodegradable and non-biodegradable	2.23	S	4
2. Using color-coded container for waste	2.17	S	5
3. Disposal of sharps in a leak proof container	2.41	S	2
4. Disinfecting the extracted tooth before disposal	2.11	S	7
5. Proper collection of wastes based on its category e.g, contaminated, non-contaminated, sharps, etc.	2.16	S	6
6. Proper disposal of mercury-contaminated objects	2.39	S	3
7. Proper disposal of used personal protective barriers	2.44	S	1
Composite Mean	2.27	S	

Even though all were "sometimes" experienced, disinfecting extracted tooth before disposal got the lowest mean value of 2.11. In connection to the profile of the respondents, senior clinicians are less in number, thus tooth disposal is not being practiced only if the tooth will be used as a requirement. According to Kumar [15], since extracted human teeth may harbour potential pathogens, disinfection/sterilization of extracted human teeth in the teaching laboratory is important for educators and students. Further, bacteria can remain viable within the root canal of tooth for extended period of time.

Table 6 presents the summary table on the problems encountered in the practice of infection control with regards to PPE's, Sterilization, Radiograph and waste disposal as indicators. It was observed that sometimes they encountered a problem with a composite mean of 2.07. Even the licensed dentists, neglect the importance of the proper infection control according to an observational study conducted by Smith [16], found that the training staff in infection control and its documentation is poorly managed and consideration

should be given to development of quality management systems for use in dental practice.

Table 6. Summary Table on the Problems Encountered in the Practice of Infection Control

Indicators	WM	VI	Rank
1. PPEs	1.90	Sometimes	4
2. Sterilization	1.94	Sometimes	3
3. Radiograph	2.18	Sometimes	2
4. Waste Disposal	2.27	Sometimes	1
Composite Mean	2.07	Sometimes	

Among the items enumerated, waste disposal ranked first with a weighted mean score of 2.27. It was followed by the radiograph, and sterilization respectively. The clinicians observed that waste disposal is one of the biggest problem that was encountered in dental dispensary. The utility workers are not well oriented in terms of proper disposal of biodegradable and non-biodegradable from hazardous materials. Infection control therefore is not only applicable to dental students, but also to the utility workers because we must work hand in hand to provide quality service and to ensure the safety of the patients as well as the dental practitioners.

PPE's got the lowest mean value of 1.90 thus, placing it to the last position. The clinicians are obliged to follow the rules and regulations as implemented by the department, more specifically at the dental dispensary. This includes the use of PPE's e.g gloves, masks, head caps, etc. before treating the patient. It is a general rule that in order to treat a patient well, the clinician should be in proper attire for their good.

As seen from the result of Table 7, all computed p-values were all greater than 0.05 alpha level, thus the null hypothesis of no significant difference on the problems encountered in the practice of infection control when grouped according to gender is not significant. This only means that the problems encountered by male and female are the same.

Table 7. Difference of Responses on the Problems Encountered in the Practice of Infection Control Grouped According to Gender

Problems Encountered in the Practice of Infection Control	t-value	p-value
PPEs	0.701	0.486
Sterilization	1.110	0.271
Radiograph	0.183	0.856
Waste Disposal	1.445	0.153

Legend: Significant at p-value < 0.05

Gender differences with regards to infection control practices regarding PPE's, sterilization, radiograph and waste disposal are not significant since we received the same training and share the same information that we obtained from our lectures with regards to the dental infection control practices.

According to the article Gender differences in characteristics, occupational exposure, and infection control practices among dental professionals in Edo State, Nigeria (June 2012), There were gender differences in age and professional categories among oral health workers. However, there appear to be no gender differences in terms of general infection control guidelines, except for three infection control measures: hand hygiene (favoured by women), eye protection (preferred by women) and protective clothing (favoured by men). The clinicians follow the guidelines provided by the school.

Table 8. Difference of Responses on the Problems Encountered in the Practice of Infection Control Grouped According to Year in the Dispensary

Problems Encountered in the Practice of Infection Control	F-value	P-value
PPEs	3.153*	0.019
Sterilization	1.249	0.298
Radiograph	2.228	0.075
Waste Disposal	1.421	0.236

Legend: Significant at p-value < 0.05

It can be gleaned from Table 8 that only problem with regards to PPEs shows significant difference when grouped according to the years in the dispensary. This was observed since the obtained p-value of 0.019 is less than 0.05 alpha level, therefore the null hypothesis of infection control when group according to year under these variables is rejected. This indicates that the respondents on different level encountered problem.

The Junior clinicians tend to comply and strictly follow the regulations and guidelines compared to the Seniors because clinical instructors assume that Seniors can be independent and can handle themselves in dealing with patients due to the number of years working at the dental dispensary. In the x-ray room we do not use disinfectants rather we use cling wrap on tube heads and we do not also prepare the chemicals in developing x-ray films. In terms of waste disposal, sterilization, radiograph, the use of PPE's still depends on the attitude of the students whether he or she will follow the proper guidelines, because it is the duty of the utility workers in sterilizing for they know how to operate it and we are not allowed to use it and regarding

on disposing wastes they are the one who collect and dispose. And in Radiograph, we are not the one who prepares the chemicals in developing x-rays films.

According to the study sample of Santhosh Kumar et al. [17] in his Infection control practices among undergraduate students from a private dental school in India, revealed that the dental undergraduate students at this private dental institution in India reported poor infection control practices, which require changes in organizational and administrative factors to enable students to follow a strict infection control protocol. Moreover, as the senior students reported low compliance to infection control guidelines, the dental curriculum and grade system should be revised to evaluate overall quality of care and not only quantity of patients treated per student.

Table 9. Proposed Plan of Action to Minimize the Problems Encountered in the Practice of Infection Control

Key result area	Strategies/methods	Person/s responsible
Minimize the reusing of PPEs	The clinicians must wear the stamped PPE's (dated or coded)	COD of the day; Clinician
Proper attire	The COD should check the clinicians' attire before they (clinicians) go out the dental dispensary	COD of the day; Clinician
Proper use of protective barriers	The COD should strictly implement the use of protective barriers in the prosthodontics section	COD of the day; Clinician
Use of over-gloves	The COD must distribute over-gloves that are funded by each clinician to assure that everyone is using it	COD of the day; Clinician
Complete PPE's	The clinician must present his/her complete PPE's before the start of every procedure. Each clinician must provide a checklist that is signed by the COD	COD of the day; Clinician
Minimize the use of tap water	Use of "drinking-water" standard in most of the procedure	Clinician
Disinfected surfaces of the x-ray tube head	The COD assigned in the x-ray room must assist every clinician working in the x-ray room	COD of the day; Clinician
Proper segregation of wastes	Use of color-coded container	College of Dentistry
More efficient clinician with the help of CODs	Providing rewards for deserving CODs (e.g less clinical requirement)	Clinicians

CONCLUSION AND RECOMMENDATION

Most of the clinicians in the dental dispensary are females working in a range of one year and most of them have hepatitis B vaccine which is a requirement before a clinician can enter the dental dispensary and perform restoration, complete denture and oral prophylaxis. Problems encountered categorized into PPE's, sterilization, radiograph, and waste disposal were "sometimes" encountered. The problems encountered on PPE varies on the year in the dispensary. A proposed plan of action was formulated to minimize the problems encountered in the practice of infection control.

College of Dentistry should require additional vaccines such as Anti Tetanus and flu vaccines to provide additional protection to the clinicians. There should be a stricter implementation of complete PPE's in all the procedures to be done. The clinical instructors provide an annual seminar to clinicians about proper infection control practices in the dental dispensary. The COD must check the clinicians' attire with stamped (dated or coded) PPE's before and after the treatment in every section of the dental dispensary specifically the prosthodontics section.

REFERENCES

- [1] Minnesota Department of Health (2014) retrieved from <https://goo.gl/rBs4JH>
- [2] Adel AM, Nadia MM, Azza MT. (2000) Knowledge and Attitudes of Dental Patients Towards Cross-infection Control Measures in Dental Practice. East Mediterranean Health Journal, Vol 3, No.2.
- [3] WHO (2015) retrieved from http://www.who.int/topics/infection_control/en/
- [4] Canadian Dental Association. (1988). Recommendations for infection control procedures. *J Can Dent Assoc*, 54, 383-4.
- [5] Banda, C., Adlawan, M. K., De Chavez, A., Pascual, A. (2014). Infection Control Practices of Dental Dispensary Clinic at LPU-Batangas. Unpublished Undergraduate Thesis.
- [6] Singh, A., Purohit, B. M., Bhambal, A., Saxena, S., Singh, A., & Gupta, A. (2011). Knowledge, attitudes, and practice regarding infection control measures among dental students in Central India. *Journal of dental education*, 75(3), 421-427.
- [7] Hatland, Roland, DDS (2015) Water Quality Differences
- [8] Katz, JA Cottone, PK Hardman and TS Taylor. (2004) Infection control in dental school radiology
- [9] Castellanos AAS, RDH, BS, MA, Ches. (2015) Ensure the safe use of digital radiography
- [10] Hokett SD, Honey JR, Ruiz F, Baisden MK, Hoen MM. (2000) Assessing the effectiveness of radiography

- barrier sheaths and finger cots. *J Am Dent Assoc.*;131:463–437.
- [11] Geist, DDS, MS a, Katz, DMD, MS b. (2001) Radiation dose-reduction techniques in North American dental schools
- [12] Rahmatulla, M., Almas, K., & Al-Bagieh, N. (1996). Cross infection in the high-touch areas of dental radiology clinics. *Indian journal of dental research: official publication of Indian Society for Dental Research*, 7(3), 97-102.
- [13] Sood, Abhinav Sood. (2011) Dental perspective on biomedical waste and mercury management: A knowledge, attitude, and practice survey
- [14] Kohn, W. G., Collins, A. S., Cleveland, J. L., Harte, J. A., Eklund, K. J., & Malvitz, D. M. (2003). Guidelines for infection control in dental health-care settings-2003.
- [15] Kumar, M., Sequeira, P. S., Peter, S., & Bhat, G. K. (2005). Sterilisation of extracted human teeth for educational use. *Indian journal of medical microbiology*, 23(4), 256.
- [16] Smith, A., Creanor, S., Hurrell, D., Bagg, J., & McCowan, M. (2009). Management of infection control in dental practice. *The Journal of hospital infection*, 71(4), 353-358
- [17] Kumar, S., Sharma, J., Duraiswamy, P., & Kulkarni, S. (2009). Infection control practices among undergraduate students from a private dental school in India. *Revista Odonto Ciência*, 24(2), 124-128.