Relationship of Work Related Factors to the Adherence of Staff Nurses of Hospitals in Marawi City, Philippines to Infection Control Protocol

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ABSTRACT

Infection control is one of the hospital policies that prevents and controls the occurrence of hospital-acquired infections. The study aimed to determine the adherence of staff nurses of hospitals in Marawi City and its relationship to the factors affecting their adherence to the said protocol. The study was conducted in the different hospitals in Marawi City. The respondents were the 60 staff nurses working in the different institutions of the city and 50 significant others who were staying with the patient for not less than 3 days of confinement. The study utilized the quantitative research design aimed at descriptive correlation analysis on the adherence of staff nurses on infection control protocol and the factors affecting their compliance to it. The tools composed of questionnaires and checklists. Frequencies, percentages, and spearman rho correlation were the statistical tools utilized. The findings of the study showed that 73.3% staff nurses were moderately adhering to infection control protocol and this is affected by some variables under the workload, work set-up, cultural practices, administration and supervision. These are also the variables having significant relationship to the adherence of staff nurses to infection control.

Keywords – Health, infection control, factors affecting adherence, quantitative research, descriptive correlation, Marawi City Philippines

INTRODUCTION

Infection control protocol is a guideline that every staff nurse should follow to prevent the occurrence of hospital-acquired infections or nosocomial infections, which is an invasion of the body by microorganisms capable of producing disease. Disease results if the pathogens multiply and cause an alteration in normal tissue function (Potter, Perry, Stockert, & Hall, 2016). It is called communicable or contagious disease if the infectious disease can be transmitted directly from one person to another. Whenever possible, the nurse implements strategies to prevent infection, (Aiken, Clarke & Sloane, 2002). If the nurse cannot prevent the infection, his goal is to hinder its spread within and between people, and to treat the existing infection.

According to Maki (2005), statistical evidence shows the increasing problems with nosocomial infections that include Gram-negative bacilli (increased to 56.8%), gram positive cocci (33.6%) and yeasts (8.4%). In addition, some other hospitals in the Philippines also revealed statistical proof on problems relating to infection control like the increasing infection rate for surgical wounds (12.5%), urinary tract infections (40%), infection of the skin and mucus membrane (10.8%), and infection on surgery site, 10% (Cuevas, 2007). In Australia, there are around 200,000 nosocomial infections in their acute healthcare facilities each year. This makes hospital acquired infection the most usual complication affecting admitted patients in hospital. As well as resulting to unnecessary pain and suffering for patients and their families, these problems lengthen hospital stays and are expensive to the health care system (Minnesota Department of Health, 2010). In the United States, there was an increase in the incidence of healthcare-related Methicillin Resistant Staphylococcus Aureus (MRSA) pneumonia from 2008 through 2012 (*Lewis et al.*, 2014).

To be diagnosed with a disease generates fear and anxiety in the individuals due to the perception of its effect and the uncertainty of the outcome of the treatment. The death of many patients that is related to hospital acquired infections continuously challenge the health care delivery system of the institution on its provision on the quality of care services by adhering to standard procedures and protocols, thereby, preventing occurrence of problems that will not only affect the patients but also family members and health care providers. The challenge is in the hospital, which is a place where people go to relieve their discomforts and pain, to submit themselves for therapeutic work up that will treat their disease condition, and to verify the presence of a disease process by undergoing

diagnostic procedures. However, this place may also predispose and threaten not only the health condition and safety of the patient but also other individuals in the hospital such as the nurses who act as 24-hour front liners who take care of their patients (Craven, Hirnle & Jensen, 2013). This has been a problem in the past, now at present and even in the future, thus, ways of preventing and controlling its occurrence must be maximized by complying with the approved protocol geared towards the attainment of our goals in minimizing nosocomial infections.

In Marawi City, the leading cause of morbidity according to Department of Health Epidemiology Center (2010) was Respiratory Tract Infection that is a communicable disease and is also known to be one of the most acquired infections in the hospital setting. Lower respiratory tract infections are the most common lethal nosocomial infections in the United States of America (Peleg & Hooper, 2011).

FRAMEWORK

The study is anchored on Florence's Nightingale's Environmental Theory and Betty Neumann's Theory on Health Care Delivery System.

Nightingale defined nursing as the act of utilizing the environment of the patient to assist him in his recovery which involves the nurses' initiative to configure environmental settings as appropriate for the gradual restoration of the patient's health, and that external factors associated with the patient's surroundings affect life or biologic and physiologic processes, and his development. This theory is highly related to this study, since this serves as the basis for formulating infection control protocol. The process in which patients acquire infections in the hospital setting can be attributed to contamination of environmental factors such as air, water, drainage, light and cleanliness that are mentioned in this theory. Thus, to place the patient in an environment conducive to health, manipulation of such factors through proper compliance to the infection control protocol is indeed, significant and is the best and primary step in preventing, controlling and minimizing the occurrence of nosocomial infections.

The theory of Betty Neumann on Healthcare Delivery System views the person as a dynamic composite of physiological, socio-cultural and developmental variables that functions as an open system. This theory is also applicable in this study considering that interactions between man and the environment predisposes man to stressors that can be classified as chemical, mechanical, injury

and biological stressors which may disrupt man's health, thus, causing a disease process, specially infectious diseases.

OBJECTIVE OF THE STUDY

The study aimed to determine the relationship between the personal profile of the respondents, the problems encountered in the implementation of infection control protocol and the adherence of staff nurses of hospitals in Marawi City, Philippines to infection control protocol.

METHODOLOGY

This study utilized the non-experimental research design aimed at descriptive correlation analysis on adherence of staff nurses to infection control protocol and the factors affecting their compliance to the said protocol. Factors are referring to personal profile, workload problems, work set-up, administration and supervision, cultural beliefs and practices and the perception of nurses on the problems related to the implementation of infection control in terms of patients' complications and infection transmission. It used a self-made questionnaire that was given to each respondent. A pilot testing and Cronbach Alpha analysis were utilized to ensure reliability and validity of the questionnaire. A follow up interview was also done.

Research Setting

The study was conducted in Marawi City, popularly known as Islamic City of Marawi and is the capital city of the province of Lanao del Sur, Philippines. The city has only 1 government hospital named AmaiPakPak Medical Center that has a 100-bed capacity and 11 private institutions.

Below is the table showing the bed capacity of each hospital in the City

Participants

The respondents of the study constituted of staff nurses from different hospitals in Marawi City such as Amai Pakpak Medical Center, Family Hospital, Abbas Hospital, Fatima Kids Hospital, Abdullah Hospital, Mapandi Memorial Hospital, Midtown Hospital, Mindalano Hospital, Hijra Hospital, Sohaya Hospital, Magayoong Hospital, and Salam Hospital. The study population for staff nurses was determined by simple enumeration. Nurses who were on leave from the hospital for one month were not included in the sample population.

Table 2. Number of respondents of each hospital in Marawi City

Hospitals in Marawi City	Number of Nurses as Respondents	Number of Significant Others as Respondents
1. AmaiPakPak Medical Center	30	21
2. Hijra Hospital	2	3
3. Abdullah Hospital	4	7
4. Sohaya Diagnostic and Medical Hospital	2	2
5. Fatima Kids Hospital	2	2
6. Family Hospital	3	3
7. Mapandi Memorial Hospital	4	3
8. Abbas Hospital	3	1
9. Salaam Hospital	3	2
10. Mindalano Specialist Hospital	2	3
11. Magayoong Hospital	2	2
12. Midtown Hospital	2	1
Total	60	50

The study population was determined by simple enumeration. A list of nurses in each hospital was determined and included in the sample population for staff nurses. Each of the staff nurses as was asked to answer the checklist about their adherence to infection control protocol and the questionnaire related to their demographic profile, problems encountered in their adherence to the said protocol.

The study used informed consent from the respondents and applied confidentiality of information. Permission was obtained from the administration through request letters given to the Chief of the Hospital, the Nursing Health Services and the Chief Nurses.

Lastly, the data were analyzed using descriptive statistics such as frequencies and percentage, weighted mean and Spearman Rho correlation.

RESULTS AND DISCUSSION

The results revealed that many of the staff nurses were new graduates who had 1-2 years of hospital experience, which implies that practice of infection control was not that observed adequately due to their years of experience. Novice nurses

frequently work with few clinical assistance and mentoring activities/supports while handling complex patient situations that demand decision-making skills (Gillespie & Paterson, 2009). Most of the nurses were single, and there is a greater chance for them to transfer to other institution or to work abroad. According to the Philippine Overseas Employment Administration (POEA) (2001), there was a reported departure of 13, 536 Filipino nurses to 31 countries, which is due to the salary scales in these foreign countries. Among the forty-five staff nurses, 10 of them were non-licensed who were working in the private hospitals and receiving a salary of not more than five thousand pesos. This low salary can be attributed in part to the requirement of the Philippine Nursing Law (2002) which states that: "all nursing graduates are required to pass a written examination, which shall be given by the Board before they can practice nursing in the Philippines."

It was also found out that 15% of the respondents were midwifery graduate who did not even pass the midwifery board examination and also functioning as staff nurses in the private hospitals, this could be the reason why some protocols were not strictly followed, they lack further training provided to Nursing graduates. Nursing education is designed to prepare students to administer holistic care to the diverse patient by widening students' knowledge, improving their clinical skills, and molding their ethical principles (Kelly & Courts, 2007).

It further revealed that half of the participants (50%) were employed less than a year in the particular hospitals. This fast turn-over of nurses is attributed to the earlier findings that nurses preferred to work abroad because of higher salary. Other than salary, nurses change jobs due to benefits, convenience, and work schedule, offered by other hospitals or job-related stress (Cangelosi, Markham & Bounds, 1998). Regarding training, there were only 3 (5%) staff nurses who attended training and seminar about infection control protocol. Evidences indicate that appropriate training of Health Care workers (HCWs) could be effective in changing HCW behavior, particularly, if appropriate follow-up is applied (Moore, Gamage, Bryce, Copes, Yassi, & BC Interdisciplinary Respiratory Protection Study Group, 2005). Midwifery graduates who are working as staff nurses in the private hospital were not able to receive any information and motivation from the hospital administrator regarding training and seminar about infection control, this can be in part, due to their qualification, they are not qualified to attend such training and seminars because these are for licensed professionals. Trainings are part of education programs for infection control in the critical care unit and can lead to significant decrease in hospital expenditures and patient's complications that are related to hospital-acquired infections (Zack, et.al 2002).

Infection control guideline is implemented by various hospitals to minimize, control and prevent the occurrence of nosocomial or hospital acquired infections. Standard precautions are some of the guidelines under infection control adopted by many institutions to reduce the possibility of transmission of blood-borne and other microorganisms from both recognized and unrecognized sources (Center for Disease Control, 2011) Nurses being the front liners in the care of the patients play a vital role in the implementation of this protocol, thus, their adherence to the said guideline is determined. Out of sixty participants, more than half of the them (73.3%) are moderately adhering to the infection control protocol. Adherence to clinical guidelines has an impact on preventing patient complications (Johansson, Pilhammar, Khalaf, & Willman, 2008). Their adherence level is related to other factors such as their workload, cultural practices of their patient, work set-up, support from the administration, and the supervision by their senior nurses or nurse managers.

The most common condition cited in the workload factor is the nurse patient ratio, in which only 1-2 nurses were assigned to the hospital department especially in the ward area. In this case, one nurse is attending to more than 20 patients mostly, in the government hospitals. Nurses usually complain of overwork by attending to many patients and underpay (Ming-Yi, 2006). In Orlando, United States they developed what it calls a triad – a team composed of nurses, doctors and quality assurance personnel to work together on infection prevention (Aston, 2013). Poor adherence to hand washing was associated with the number of shifts per hemodialysis unit per day and with higher patient-to-nurse ratios (Arenas *et al.*, 2005). With that number of patients, it is expected that quality care is not properly observed. With regard to the work set- up, lack of cabinets intended for proper storage of equipment and supplies also affect their compliance to the said protocol. The absence of lavatory in some of the departments of the hospital affects the frequency and proper hand washing among nurses.

The presence of more than two watchers for every patient and the larger number of relatives visiting the patients make every room crowded, thus increasing the risk of infection transmission. The problem on supplies such as gloves, masks, and syringes also affect the adherence to infection control protocol. According to Nichol, McGeer, Bigelow, O'Brien-Pallas, Scott, and Holness (2013), the use of facial protective equipment (FPE), one form of mask, is an important strategy to prevent occupational transmission of respiratory infection to health care workers.

One syringe is intended for one medication, as observed, nurses used that syringe to patients receiving the same medication. Though the needle is changed

every after use, the syringe remains, which could have been already contaminated. According to Kozier, Erb, Blais and Wilkinson (2007), needles and syringes need to be used once and will be discarded in a puncture-proof container.

Hand washing, which is the primary step and is the best method of infection control serves as the number one guideline of the aforementioned protocol. Nearly half of the respondents (41.7%) were observing strictly proper hand washing techniques because of their fear of acquiring infection and their concern of transmitting microorganisms to patients. Most health care workers (HCWs) are aware of the rationale for hand hygiene procedures, yet failure to adhere to guidelines is common (O'boyle, Henly, & Larson, 2001). Friction, which is a very important component of hand washing, is also observed but the frequency of doing the procedure is performed two to three times per shift only. The promotion of bedside, antiseptic hand rubs largely contributed to the increase in compliance (Pittet *et al.*, 2000).

The staff nurses who were strictly adhering to aseptic technique during special procedures were the nurses assigned to the special areas that include the Operating Room, Recovery Room, Delivery Room, Neonatal Intensive Care Unit, and the Emergency Department, which has something to do with the usual invasive procedures performed in these areas. The benefits of preventing surgical site infections are preventing patient mortality and decreasing the hospital expenses (Spruce, 2014). Surveillance plays a vital role part in the control of infection. This will determine the extent, the number of nosocomial infection occurring in the hospital and will even serve as a basis for formulating measures that may solve the problem. However, based on the findings of this study, 41.7% of the respondents were slightly adhering to the surveillance and even not adhering to the protocol about reporting of diseases.

According to Pittet (2005), early infection control committee showed that surveillance and prevention programs could be successful in minimizing infection control. Fumigation, the use of smoke in destroying microorganisms is also adopted by public hospital as one of the guidelines in infection control. This procedure was associated with control of a nosocomial outbreak and elimination of persistent environmental contamination (Falagas, Thomaidis, Kotsantis, Sgouros, Samonis, & Karageorgopoulos, 2011). All of the respondents, including those in the private hospitals, were not adhering to fumigation since it is usually performed in special areas only and other agencies like the Sanitary Office of the Local government performs this activity. Based on the study of Murthy (2001), there is a need for a close collaboration among the disciplines

of infectious diseases, like microbiology, hospital epidemiology, pharmacy, and nursing, with particular emphasis in critical care units, and with strong support from administrators. Supplies in the different areas of the hospital such as minor sets, cotton balls, and distilled water need to be autoclaved before use to maximize sterility, thus, will prevent infection. There are only two hospitals in Marawi City that are performing autoclaving with their supplies and these include AmaiPakPak Medical Center, the only public hospital in the City and Mindalano hospital, the largest private hospital with 50- bed capacity.

Most of the nurses in other private hospitals were not adhering to autoclaving due to unavailability of machine. Soaking equipment in a solution for 24 hours and exposing it to heat are some of the measures they performed as a substitute for autoclaving. Regarding proper ventilation, the nurses who answered that they were strictly adhering to the procedure were the nurses from the special areas such as the emergency room; neonatal care intensive unit, delivery room, and operating room. Since cases handled in these areas require intensive management, environmental manipulation such as the provision of proper ventilation and exhaust fans. Many nurses who were moderately adhering to proper ventilation mentioned the absence of exhaust fan even in private rooms and other departments, their reason for such level of adherence

Other nurses who answered slight adherence to the protocol were the ward nurses who attributed the situation to the absence of proper covering and the closeness of beds, thereby, increasing the risk of transmitting airborne and even droplet microorganisms to patients admitted in that area. Out of sixty participants, more than half of them were slightly adhering to ultraviolet rays claiming that this is only performed in the special areas and is only observed in private rooms when a severely infected patient was admitted. Cleaning, a major intervention in removing microorganisms from different surfaces is indeed vital in the prevention of infection. Twenty-four nurses claim that they were slightly adhering to daily cleaning process because of scarcity of cleansing solution such as Lysol or Chlorox.

Moreover, busy days during duty hours, demands of patients and significant others hinder their plan of doing the process. Nurses who were strictly adhering to cleaning process were the nurses from operating room, and other special areas, since invasive procedures and critical patients are handled in these areas. Daily cleaning of lavatories in every room and departments is also very important in the prevention and control of infection. More than half of the nurses claim that they were slightly adhering to the procedure considering that it is not part of their duty. The use of color coded-waste bag in every hospital setting classifies

the different types of waste such as non-infectious, or hazardous waste. Dealing with waste products also varies. For example, infectious and hazardous waste requires treatment before discarding in appropriate places. However, a majority of the nurses confirm that they were slightly adhering to the protocol of using a color-coded waste bag.

To prevent accidental puncture that may cause the transmission of blood borne infection such as Hepatitis, Acquired Immuno Deficiency Syndrome and other infections, all sharp materials including needles, scalpels and ampules need to be placed in a puncture-proof container. Concerning this, majority of the nurses answered that they were slightly adhering to the procedure since they were only using used IV bottles where they placed needles and other used sharp objects. Also, more than half of the respondents were slightly adhering to the changing of linens every day since patients were bringing their own bed sheets and it is their watchers who perform the procedure. The curtain may also serve as reservoirs of microorganisms since it screens air in and out of the room. This needs to be changed weekly.

But most of the nurses answered slight adherence to the protocol because of the limited number of curtains in the hospitals. Segregation of cases is also a precaution technique that may prevent infection transmission. More than half of the nurses were slightly adhering to proper segregation of patients due to insufficiency of rooms and beds. According to 36.7% nurses who answered slight adherence to the proper distancing of beds claim that due to many patients that they were admitting at the ward area, they have difficulty in the proper distancing of beds because they add beds to accommodate more patients, thus, making the area crowded. The cultural practices of watching or visiting the patient among the Meranao also affect the implementation of infection control protocol. It was observed that while the patient was confined in the hospital, there were more watchers and visitors coming to patients from time to time. Thus, 61.7% claim that it would be impossible to adhere to this guideline because of cultural practices among patients.

Changing of hospital equipment and supplies such as intravenous cannula, scalp vein, nasogastric tube, Foley bag catheter, endotracheal tube, suction tip were strictly observed by the majority of the respondents. Regarding bathing, 31.7% of the nurses mentioned that they were slightly encouraging their patient to bathe everyday since this may seem to offend them or because of the patients' belief that bathing will result to many complications. Eating inside the Emergency Room is prohibited, but because watchers do not leave their patients, they even eat with them in the Emergency Room. There are times that nurses were too

busy in the Emergency Room, they could not even go outside for their meals, their only choice was to eat within the area.

Table 2. Nonparametric Correlation, Respondents' Demographic Data with Their Adherence to Infection Control Protocol

Respondents' Demographic Data	Spearman Rho Correlation	P Value	Interpretation
Age	.267*	.039	Significant at the .05 level
Marital Status	.319*	.103	Significant at the .05 level
Years in Service	-.283*	.028	Significant at the .05 level
Area of Assignment	.271*	.036	Significant at the .05 level
Position	.388*	.002	Significant at the .05 level
Monthly Salary	.313*	.015	Significant at the .05 level
Trainings	-.285*	.027	Significant at the .05 level
Seminars	-.285*	.027	Significant at the .05 level

** Correlation is significant at the .01 level (2 tailed)
*Correlation is significant at thee .05 level (2 tailed)

Results imply that nurses having trainings and seminars on infection control tend to adhere strictly on the implementation of the protocol. As nurses age, their experiences and learning increased, they are more vigilant in their compliance with the different protocol like infection control. The civil status, the being Single of most of the respondents was found to have a relationship with their level of adherence to infection control protocol. Years in service as hospital nurses reveal that the longer the years of experience, the more they become competent in performing nursing care utilizing infection control. With this, years in service are significantly related to the adherence of staff nurses to infection control protocol. Given with their experiences, they learned lessons from problems encountered regarding nosocomial infection which will result to their becoming more vigilant in the coming years in service. They tend to be skillful in maximizing compliance to infection control protocol. The area of assignment is also related to the adherence to the said protocol.

Nurses assigned to special areas such as operating room, recovery room, intensive care unit and emergency room were more compliant to the protocol because they know they were handling more critical patients requiring intense and invasive procedures that place patients at risk of acquiring nosocomial infections. Nurses who possess administrative functions were more compliant

to the said protocol, thus, a relationship between position and the adherence to infection control protocol was shown. Compensation referring to monthly salary highly motivated employees to work harder and take more appropriate actions. This is also true among hospital staff nurses working, data revealed significant relationship between salary and their adherence to infection control protocol. Trainings and seminars will further uplift nurses' knowledge and skills in different concept and protocol. The study shows that nurses who attended trainings and seminars were more compliant to the said protocol compared to nurses who did not attend any training and seminar pertaining to infection control.

Table 3. Nonparametric Correlation, Problems Encountered by the Staff Nurses with Their Adherence to Infection Control Protocol

Respondents' Demographic Data	Spearman Rho Correlation	P Value	Interpretation
Age	.267*	.039	Significant
Marital Status	.319*	.103	Significant
Years in Service	-.283*	.028	Significant
Area of Assignment	.271*	.036	Significant
Position	.388*	.002	Significant
Monthly Salary	.313*	.015	Significant
Trainings	-.285*	.027	Significant
Seminars	-.285*	.027	Significant

** Correlation is significant at the .01 level (2 tailed)
*Correlation is significant at the .05 level (2 tailed)

There are some specific conditions which fall under factors like workload, work set-up, administration and supervision that have a significant relationship with the adherence of staff nurses to infection control protocol. Carrying out many doctors' orders is significantly related to the adherence of staff nurses to infection control protocol. This staff nurses' workload range from 2-5 patients in the private hospital to more than 30 patients in public or government hospitals. There is a growing evidence that low nurse staffing jeopardizes the quality of patient care (Hugonet, 2007). Also , it shows that lack of facilities like cabinets and the absence of lavatory in the medication room are set-up work conditions that have a significant relationship with the adherence of staff nurses to infection control protocol. Regarding administration and supervision, the absence of color- coded waste bag, failure of the guards to stop the entrance of children

below 8 years of age, as well as the failure to screen the visitors during the non visiting hours are significantly related to the adherence of staff nurses to the said protocol. Color coded waste bags are necessary for waste classification as either non-infectious or infectious.

CONCLUSION

Staff nurses of hospitals in Marawi City, Philippines are moderately adhering to infection control protocol. This adherence level is related to the specific conditions like workload, work set-up, administration and supervision, and cultural practices of patients. There are some guidelines like fumigation, radioactive light, pretreatment of linens, color-coded waste bags which are not implemented in the hospital but are part of the protocol. An interesting finding of this study is that 33% of the staff nurses in the private hospitals are non-licensed midwifery graduates who do not have adequate knowledge of the different nursing procedures performed in the hospital like maintaining asepsis, and some specific guideline in the protocol like fumigation. The hypotheses of the study are rejected considering that there are some variables found to have significant relationship with the adherence of staff nurses to infection control protocol.

TRANSLATIONAL RESEARCH

Health care providers can translate the results of this study to the development of enhancement programs geared towards improving their health care practices. This can also be utilized as a basis for the Department of Health (DOH) in their review of current infection protocol to align it with international standards on the prevention and control of the occurrence and transmission of infection to patients, significant others and to members of health care team. Institutions should also comply with the standards regarding nurse-patient ratio, training and seminars, supplies and work set-up. Researchers can also use this study in the development of a quality assurance monitoring team that will be responsible for regular monitoring of the protocol and policies that must be implemented in the hospital. An infection control team also needs to be established to monitor the proper implementation of infection control protocol, the occurrence of hospital acquired infections and to plan and implement strategies to prevent and control infections in the hospital.

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