

Analysis Of Reduced Number Of Germs Pre And Post Disinfection In The Emergency Room Of Hospital "X" Surabaya

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Abstract-Hospitals other than as a place of health services, can serve as a place of disease transmission, especially diseases caused by nosocomial infections. The objective of this research is to get real situation information regarding the analysis of the use of disinfectant type "Y" with 25 milliliter concentration in 5 liters of water to the number of germ floor in Emergency Room (ER) Hospital "X" Surabaya. The type of research is *descriptive observational* research using *Cross-Sectional Study* approach while the *descriptive* is done on the data of the intervention of cleaning the floor. The population in this study was in 3 ER rooms, at each point was conducted 6 times repetition there were on the first day of Tuesday, Wednesday and Thursday (mornings) and the following week Wednesday, Thursday and Friday (afternoon) as well as each *pre* and *post* by using *purposive sampling* method to get the sample according to the purpose of research. The results showed that there was a decrease in the number of germs on the floor after the cleaning of the floor but still not meet the standard of Health Minister Decree Number 1204/SK/X/2004. The conclusion that the number of germs on the floor in the Emergency Room (ER) has decreased yet still has not fulfilled the requirements of Health Minister Decree Number. 1204/SK/X/2004. So that require improvement on sanitation factor, conditioning factor of air physical environment, airing factor and number of visitor factor in ER room of Hospital "X" Surabaya.

Index Terms-Number of Germ floor, Disinfection, Emergency Room, Hospital of "X" Surabaya.

1. INTRODUCTION

Hospitals as health facilities also apply the principle of sanitation. One aspect of hospital sanitation is maintaining the cleanliness of the floor of the ER room. One of the hospital's sanitation efforts is disinfection of the surface by chemical means. Disinfection is done by floor adaptation using phenol disinfectant. The floor has a much bigger possibility when compared to other building surfaces such as ceilings and walls. Therefore a disinfectant is needed to kill microorganisms on the floor, surface, and environment of inanimate objects. In connection with hospital accreditation on Infection Prevention and Control (PPI) element, Surabaya Hospital "X" is obliged to make efforts to prevent disease transmission.

Based on the Aircraft System Infrastructure Technical Guidelines on Hospital Buildings Directorate of Health Efforts, ER Room is a very polluted area in hospitals as a result of many patients arriving in dirty conditions and relatively large introductory numbers accompanying them^[1].

Disinfection is an attempt to reduce / eliminate the number of disease-causing pathogenic microorganisms (excluding spores) by chemical

means. Matching using disinfectant is an attempt to clean the floor by chemical means to reduce and eliminate pathogen microorganism causes of disease.

Cleanliness of the floor is related to the hygiene of a place, the transmission of disease and the growth of microorganisms around it. In developing countries, the risk of exposure to a disease is increasing. That is why there are so many products made with various substances disinfectant (antiseptic) and various *brands* that are marketed to the public^[3].

Floor is one place that can be associated with the transmission of various diseases or the spread of microorganisms. Many ways can be done to maintain the cleanliness of the floor. For example, the habit of removing shoes before entering the home can reduce the spread of microorganisms causing eye, stomach and lung infections^[4].

According to Djasio Sanropie in 1989, the floor is likely to be larger in dirty conditions when compared to other building surfaces such as ceilings and walls. It has been proven that by killing the germs on the floor and all the surfaces, it can reduce the possibility of infection through open wounds on the surface of the body^[5].

Given that the floor of ER room at the hospital is one of the places that allows the spread of various types of microorganisms, the level of cleanliness of the floor is required by the standard of Health Minister Decree Number 1204/Menkes/SK/X/2004 on Health Requirements of hospital environment. The level of cleanliness of the floor is required with the number of germs 5-10 CFU/cm², so the floor of the ER room should be kept clean by always making sweeping and giving a certain disinfectant.

Nosocomial infection or infection obtained from the hospital is an infection that is not suffered by the patient when admitted to the hospital but after \pm 72 hours in the such place. This infection occurs when a toxin or infectious agent causes a local or systemic infection^[6].

Strategic efforts are needed to control nosocomial infections that occur in hospitals, one of which is the examination of the number of germs. Examination of the number of germs per room is an important effort in the control of nosocomial infections^[7]. In accordance with the Standard Operating Procedure (SOP) of the existing floor cleaning at Hospital "X" of Surabaya, the disinfection of the floor of the ER room using a disinfectant type "Y" with a concentration of 25 milliliters in 5 liters of water which takes 15 minutes to maximize germ kills^[8].

This research purposes to analyze the decrease of the number of germs of the floor pre and post disinfection in the ER room of Surabaya Hospital "X". This study was restricted using one "Y" disinfectant product with mixing 5 liters of water and 25 cc of disinfectant solution.

2. METHOD

The research type is *descriptive observational* research using *Cross-Sectional Study* study approach. That in this research there are 3 rooms of ER, at each point done repetition 6 times that is on first week Tuesday, Wednesday and Thursday (morning) and on next week Wednesday, Thursday and Friday (afternoon) and each *pre* and *post* by using *purposive sampling* method in order to get the sample according to research purpose. Data analysis using *descriptive analysis*. Floor wipe sampling is done by Surabaya Polytechnic Health Laboratory Team.

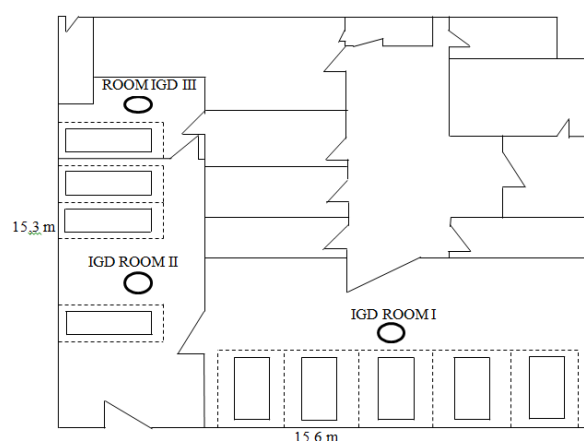
Independent variable in this research is the use of disinfectant type "Y" with concentration 25 milliliter in 5 liter water. While the dependent variable in this research is the number of germ floor. The method for

taking samples is by the floor wipe method. While How to determine the last number of the number of microorganisms from the sample with TPC (*Total Plate Count*) method.

At the sampling stage the implementer is required to wash his hands with 70% alcohol. Prior to wipes the floor is first prepared sterile cotton stalk from the bottle of cotton stalk and given an 8% NaCl solution by inserting it into a bottle containing a sterile 8% NaCl solution. After the cotton is wet, continue wipe the cotton on the tile floor diagonally and the sides of the floor edge (intermittently).

Stalk cotton that had wipeed, then simultaneously inserted into a bottle containing 50 ml of prepared 8% sterile NaCl, then cut the stalk of the cotton that handled. This activity is done aseptically.

Figure 1. Sampling Plan



Note : sampling point

From Figure 1, it can be seen that the overall plan of ER rooms in which the place is done for sampling with total building area of ER is 238,68 m² consisting of ER room I with number of beds are 5, ER room II with number of beds are 3, and ER room III with the number of beds as much as 1.

3. RESULT

The sample in this research is wipe the floor in ER service room I, II and III Hospital "X" Surabaya. The number of samples in this study was 36 samples of floor wipes. The description of floor cleaning is done 2 times a day (morning and evening).

Table 1. Examination Result of Number of Germ Floor on the Morning

Name of ER Room	Sampling Time	Number of Germ floors Morning (CFU/cm ²)		
		Pre	Post	(%)
ER	26/01/2017	870	429	50,6
Room I	27/01/2017	1115	603	45,9
	28/01/2017	145	88	39,3
ER	26/01/2017	825	366	55,6
Room II	27/01/2017	1031	594	42,4
	28/01/2017	132	65	50,7
ER	26/01/2017	941	473	49,7
Room III	27/01/2017	1326	709	46,5
	28/01/2017	182	97	46,7
		626,3	380,1	47,5

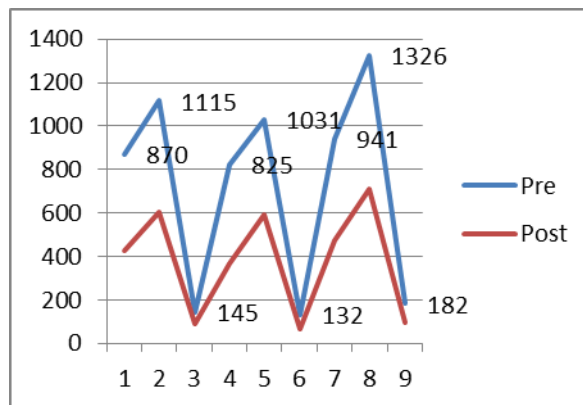
From Table 1 it can be seen that the average number of germs on the morning pre disinfecting is 626,3 CFU/cm² and post disinfecting is 380,1 CFU/cm².

Table 2. Examination Result of Number of Germ Floor on the Evening

Name of ER Room	Sample Time	Number of Germ floors Evening (CFU/cm ²)		
		Pre	Post	(%)
ER	08/02/2017	146	59	59,9
Room I	09/02/2017	328	137	58,2
	10/02/2017	98	42	57,1
ER	08/02/2017	162	68	58,0
Room II	09/02/2017	354	143	59,6
	10/02/2017	84	36	57,1
ER	08/02/2017	204	85	58,3
Room III	09/02/2017	389	161	58,6
	10/02/2017	117	72	38,5
		198	89,2	56,1

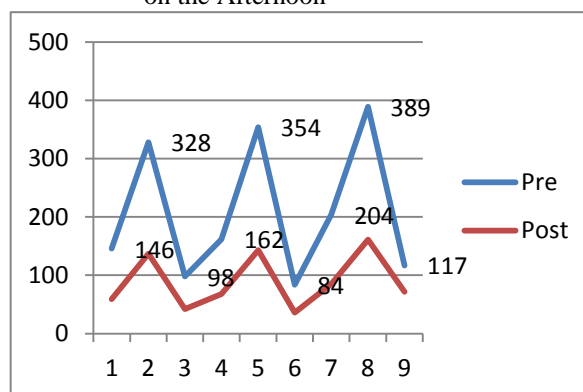
From Table 2 can be seen that the average number of germs on the floor in the afternoon pre before disinfection was 198 CFU/cm² and post the disinfection was 89,2 CFU/cm².

Figure 2. Examination Result of Number of Germ on the Morning



From Figure 2 of sampling point that the number of germ floors is equal to the Figure 1. So that can be seen there is a decrease in the number of germ floor.

Figure 3. Examination Result of Number of Germ on the Afternoon



From Figure 3 of sampling point that the number of germ floors is equal to the Figure 1. So that can be seen there is a decrease in the number of germ floor.

4. DISCUSSION

Nosocomial is an infection acquired and developed in which a person is in a hospital environment. One of the causes of nosocomial occurrence is nosocomial infection occurs when patients in a hospital transmitted an infection from bacteria. The bacteria can infect the patient due to the neglect of the hospital staff and the lack of proper hygiene procedures. So that the cleaning of the floor activity is one of the cleanliness procedures that must be prioritized in the implementation of cleanliness activities.

To prevent the occurrence of infection or contamination of microorganisms such as bacteria and viruses, also to kill or reduce the number of microorganisms or other germs, one of them by using disinfectant.

So that the cleaning of the floor is one mean to prevent the occurrence of nosocomial. Then the use of disinfectant must be in accordance with the requirements of Health Minister Decree Number 1204/SK/ MENKES/SK/X/2004 on the health of the hospital environment.

Matters relating to the use of disinfectants listed in the Health Minister Decree Decree Number 1204/SK/MENKES/SK/X/2004 on the health of the hospital environment there are :

The first is at the end of the disinfection process of germs on the 5-10 CFU/cm² floor, and the second is the use of disinfectants should follow the manufacturer's instructions. And the third is the type of disinfectant used must be established and provided by the hospital.

From the measurement result of floor wipe sample of ER room of Hospital "X" Surabaya which done on the morning of 24-26 January 2017 and afternoon of 8-10 February 2017 that is at service room of ER I, II, and III for 3 (three) days pre and post the cleaning of the floor of the room, it is evidence that all did not meet the standards of Health Minister Decree Number 1204/Menkes/SK/X/2004 on the environmental health requirements of hospitals states that the standard number of germs in the floor space ER is 5-10 CFU/cm².

According to the results of observations indicate a decrease in the number of germs of the floor but not yet meet the requirements Health Minister Decree Number 1204/MENKES/SK/X/2004 on the health of the hospital environment.

For cleaning the floor of ER room of Hospital "X" Surabaya using disinfectant type "Y" with the composition is N - (3 - aminopropyl) - N - dodecylpropane - 1,3 - diammine, dideyld methylammonium chloride and excipients active in 15 minutes. While the concentration used in the mixing of disinfectant in the ER space of Hospital "X" Surabaya 25 cc = 25 ml = 0.025 liter disinfectant dissolved with 5 liters of clean water. And so the comparison of disinfectant with water used Hospital "X" Surabaya is $1: 5 \times 10^{-3} = 1 \times 0.0005$ ml.

This is due to several factors, that are: disinfectant concentration, *stick* mop, the behavior of *cleaning service* officers, temperature, humidity, air and room

visitors. To improve more in terms of floor cleaning system that are: *trolley* used must use *double bucket* if still using *single bucket* have to change water every 4-5 hour, *stick* cleaning of floor is distinguished based on zones of zone level of risk of disease transmission so have to use *stick* cleaning of red floor for Emergency Room (ER) due to including in high risk zones and after cleaning the floor should be cleaned again using a *vacuum cleaner* as the *finishing*. So the *cleaning service* officers are advised to work in accordance with the SOP that has been set by the hospital and mastering the technique of cleaning the floor.

Behavioral factor of *cleaning service* officer who does not master operational of *pengepelan* according to *Standard Operational Procedure* (SOP) of floor cleaning in mixing disinfectant concentration which exceeds standard concentration formed by disinfectant product brochure so that cause germs become more resistant to disinfectant concentration, incorrect means of swab SOP, or water used to mix the disinfectant is a clean water.

Temperature and humidity factors also cause high number of floor germs due to after the examination of the physical environment of air temperature, humidity and lighting that does not meet the requirements Health Minister Decree Number 1204/MENKES/SK/X/2004 on the health of the hospital environment. With the physical condition of the environment has the potential to cause germs to grow and multiply better. So conditioning room is needed in the ER room of Hospital "X" Surabaya. So it is necessary to control the condition of the physical environment of the air periodically and continuously such as temperature and humidity, then be conditioned to conform to the specified standard.

Airing factors include; AC, *exhaust fan*, windows and fans that do not meet the requirements of Health Minister Decree Number 1204/MENKES/SK/X/2004 on the health of the hospital environment. So that affect the condition of air physical environment in ER room of Hospital "X" Surabaya.

And the factor of the number of visitors ER room of Hospital "X" Surabaya that can cause the number of germs in the floor in ER room of Hospital "X" Surabaya due to the footwear used by visitors bring dirt and dust from outside the room to enter the ER room of Hospital "X" Surabaya so that the floor becomes dirty. As well as the large number of visitors in the ER room causes the room to become hot and cause disease.

According to the manufacturer's instructions the concentration used is 20 milliliters for 8 liters of water. While the concentration used by the *cleaning service* officer of Hospital "X" is 25 milliliters for 5 liters of water. So the PPI team (Infection Prevention and Control) of Hospital "X" Surabaya is still appropriate in following the manufacturer's instructions. Previous research have resulted in the use of disinfectants to decrease the number of germ floor.

5. CONCLUSION

The results showed that the number of germs in the ER room of Hospital "X" Surabaya has decreased but still not meet the requirements of Health Minister Decree Number 1204/SK/MENKES/SK/X/2004 on the health of the hospital environment. So disinfectant type "Y" causes the decreasing in the number of germs in the floor of ER room of Hospital "X" Surabaya. And the factors of sanitary conditions, the physical environment of air, airing and the number of visitors affect the high number of germs in the floor of ER room of Hospital "X" Surabaya.

6. SUGGESTION

To decrease the number of germ floor in the ER room of Hospital "X" Surabaya to meet the requirements of Health Minister Decree Number 1204/SK/MENKES/SK/X/2004 on the health of the hospital environment with the standard number of germ floor in the ER room is 5-10 CFU/cm². It is recommended for *cleaning service* officers to further improve the work in cleaning the floor by working according to SOP already established by the hospital and mastering the technique of cleaning the floor properly.

The presence of periodic and continuous control of air physical environment conditions such as temperature and humidity, to be conditioned to conform to the determined standards, by maintaining air vents in the ER room of Hospital "X" Surabaya and afforestation in the form of tree planting at close range using Construction of *green panels* that can protect the indoor room from the sun directly and restrictions on the number of visitors in the ER room of Hospital "X" Surabaya so as not to heat, dirty and cause disease. As well as polishing on the floor every 1 month to be clean and free from germs.

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