Original article

Analysis of sanitary hygiene management in the "x" hospital operating room

[1]Mas UdiPrihanto*, [2]TjiptoSoewandi, [3]Lilis Sulistyorini

[1]Magister of Occupational Health and Safety,Faculty of Public Health, Airlangga University, Surabaya, Indonesia

[2] Department of Occupational Health and Safety, Faculty of Public Health, Airlangga University, Surabaya, Indonesia.

[3] Environment Health Department, Public Health Faculty, Airlangga University, Surabaya, Indonesia.

Corresponding author *

Abstract:

The operating room workers (nurses) were at risk of occupational disease, due to be exposed to biological hazards. Exposure to biological hazards contained in the operating room can be derived from the work environment, the actions workers, medical equipment, and from the patient. Environmental factors that influence the growth of microorganisms include temperature, humidity, and lighting. The purpose of this study was to analyze the management of hygiene and sanitation in the hospital operating room.

This study was an observational study with the observation and measurement of the behavior, material, facilities and infrastructure, air environments (temperature, humidity, lighting). Results showed 75% of respondents have a good level of knowledge, 50% have a working attitude in the medium category, and 75% acting insecure. 95.9% the workers had no education and training appropriate to their task. Operational procedureunit(OPU) was not good available in the operating room. Disinfectant materials used properly only on room 1 and 5, the good OPU only in linen and surgical instruments. Examination bacilus linen spores and air conditioner mildew proofing was not in accordance with the schedule that determined by the hospital.The temperature, humidity and noise across the operating room was not in accordance with the quality. Conclusion: humidity, noise, dust, lighting, linen, sterilization, the walls, the door was the variables that had significant relationship with the concentration of microorganisms in the operating room.

Keyword: *hygiene, sanitation, operating room, environment.*

Introduction:

The hospital as a gathering place for the sick and healthy people, the potential to become a place of disease transmission and allow the environmental pollution and health problems (MOH No. 1204 / Menkes / SK / X / 2004). Environmental quality in hospitals is a matter that must be considered, because some of the ways of transmission of germs that cause the infection can occur by way of droplet, airborne or direct contact. The cause of the disease may be in the air, floors, walls and medical equipment (Suwarni & Sutomo, 2001). Contaminated environment has a considerable role as the transmission of the disease that can cause nosocomial infections (Widajati, 2008).

The operating room is a critical service area zoning hierarchy that prioritizes aspects of sterility (MoH RI, 2012). The operating room is a space prone as the occurrence of wound infections. Nosocomial infection rate for surgical wound in Indonesia was reported by 2.3% - 18.3% (Triatmodjo, 1993). The results of Nainggolan research (1994) in Sleman found cases of nosocomial surgical site infections at 3.5%. Minister of Health Decree No. 1204 / MOH / SK / 2004 About Terms of Environmental Health Hospital established that the operating room is included in the zone at very high risk. In this rule states that the operating room must be free of pathogens and germs digit operating room air a maximum of 10 CFU / m3 (MOH, 2004).

Suwarni & Sutomo descriptive study (2001) on ten (10) hospitals in Yogyakarta showed the operating room air germ eligible only in four hospitals (40%). Of the four hospitals in the city of Yogyakarta, there are two hospitals (50%) with an operating room air does not meet the

requirements for air germ number> 350 germs / m3 (BTKL & PPM, 2003).

The results of the initial survey in the operating room X Hospital exceed the temperature quality standards reach of 19-24 ^{0}C and number of germs <10 / m3 of air. Hospital operating room environment X hospital shows some parameters that are not yet qualified. Based on surveys of hospital hygiene and sanitation efforts in hospitals has not been conducted in accordance with the prescribed rules.

Sterilization ultraviolet (UV) is an effort that can be done to reduce the number of germs air. Research conducted Kristanti (2011) demonstrated that UV radiation can effectively reduce the number of air germs of 50-100%, the temperature and humidity of the air affect the number of bacteria.

Therefore, it is necessary to evaluate the implementation of hygiene and sanitation in the hospital to prevent an increasing the concentration of microorganisms in the air. Evaluation of the four aspects of management input, process, output, outcome is based MOH No. 1204 /MOH / SK / X / 2004 on Hospital Healthy Environment Regulation, with the hope of emerging feed back to efforts to improve implementation of sanitation in hospital operating room.

Method:

This study is an observational study conducted cross-sectional. Observation and measurement of the behavior, the material that is the material (use a disinfectant), medium (walls, doors, ceiling, floor), infrastructure (AC, surgical instruments, linen, water and sterilization), air environment (temperature, humidity, lighting). This research was conducted in five (5) operating room, which is OK I, II OK, OK III, IV OK, OK V, X hospital in Sampang, conducted in April 2015 until July 2016.

Secondary data were collected from the data SOP (Standard Operating Procedure) sanitation measures in the hospital operating room. Based on microorganism concentration in operating room from BBTKLPP Surabaya in 2012 and 2013 data. The primary data obtained directly through questionnaire and observation sheet. Mechanical analysis of quantitative data obtained from the document data, questionnaires, observations and measurements were analyzed by the use of portable software PASW statistical 1

Results:

1. Identifying the Knowledge, Attitudes and Actions Working Respondents

Distribution of data according to their level of knowledge, attitudes and actions of the working respondents are shown in Table 1.

Table 1. Frequency Distribution of Knowledge, Attitudes and Actions Working in Operating Room

Factor		Frequency	Percentage
Knowledge	1. Medium	6	25
	2. Good	18	75
Attitude	1. Less	8	33.3
	2. Medium	12	50
	3. Good	4	16.7
Action	*1. Safe*	6	25
	2. Unsafe Act	18	75

Table 1 illustrates that the majority of respondents have good knowledge (75%), respondents had a moderate attitude (50%), and most respondents perform actions act Unsafe work (75%).

2. Identifying Man, method, material and time

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a. Man

Here is presented the results of the identification of factors man, method, material and time as shown in Table 2.

Table 2 Identification of Compliance Education Workers in Operating Room.

Job	Good		Less	
	F	(%)	F	(%)
Chief in Surgery Room	1	4.2	0	0
The Nurse in Surgery Room	18	75	0	0
Sterilization of Undertaking	1	4.2	0	0
Sanitation and Hydiene Officer	3	12.5	1	4.1
Total	23	95.9	1	4.1

Table 2 is known that the majority of health workers have the appropriate education to work.

b. Methode

Based on the results of the examination results obtained identification method factor as in the table.

Table 3. Identification of SOP in the Surgery Room

Unit Operating Procedure	Avaliablity Procedure	
	Good	Less
Cleaning Walls	80%	20%
Cleaning Door	0%	100%
Cleaning Roof	80%	20%
Cleaning Floor	80%	20%
Cleaning AC	0%	100%
Storage Surgery Equipment	80%	20%
Treatment of linen	0%	100%
Water Treatment	0%	100%
Implementation in surgery room	0%	100%
Management of the syringe in surgery room	100%	0%

Table 3. Mention there is one type of SOP are available throughout the operating room that is SOP management of syringes in the operating room. SOP others are still available throughout the operating room, it can happen anyway because not evenly distributed throughout the operating room.

c. Identifying Material

Based on the results of the examination results obtained identification material factor as shown in Table 4.

Table 4. Identification of Means in Operating Room

examination results obtained factor identification method as in the table.

Table 4. Identification of SOP in the Operating Room

No.	Variables	Measurement Location in OK				
		I	II	III	IV	V
1.	AC	B	C	K	K	B
2.	Surgery Equipment	B	B	B	B	B
3.	Linen	B	B	B	B	B
4.	Water	K	K	K	K	K
5.	Sterilization	B	B	K	K	B

Table 4 is known that throughout the operating room linen variables and operating tools in good condition. Air conditioning, water supply and sterilization, there are still enough condition and less good.

Table 5. Identification Facility in Operating Room

No.	Variables	Measurement Location in OK				
		I	II	III	IV	V
1.	Wall	B	K	K	K	K
2.	Doors	B	B	B	B	B
3.	Roof	B	K	K	K	K
4.	Floor	K	B	K	K	B

Table 5 is known the utilities throughout the operating room are included in both categories only operating room door.

The walls, ceiling and floor had good and less good condition in each operating room.

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a. Identifying Time Factors

Here is presented the results of the identification of a periodic inspection environment.

Table 6. Identification Implementation Schedule Examination in Operating Room

No	The Kind of Examination		The Kind of examination at Operation room				
			I	II	III	IV	V
1	PeriodicInspection Room	Periodic Inspection	Good	Good	Good	Good	Good
2	Examination AC of microorganisms in surgery room	1. Inspection Number of Bacteria Swab in the wall	Good	Good	Good	Good	Good
		2.Inspection number of bacteria wipe in the floor	Good	Good	Good	Good	Good
		3 Inspection number of bacteria swab in surgical instrument	Good	Good	Good	Good	Good
		4. Inspection Number of bacteria swab in surgical instrument	Good	Good	Good	Good	Good
3	Inspection the level of dust in AC	Inspection Schedule	Good	Good	Good	Good	Good
4	Inspection Mushroom in AC	Inspection Schedule	Less	Less	Less	Less	Less
5	Inspection microbiologicalin clean water	Inspection Schedule	Good	Good	Good	Good	Good
6	Inspection of Spores bacillus linen	Inspection Schedule	Less	Less	Less	Less	Less
7	Inspection of clean water chemistry parameters	Inspection Schedule	Good	Good	Good	Good	Good
8	Calibration sterilizer equipment	Inspection Schedule	Good	Good	Good	Good	Good

Table 6. Note that there are several checks carried out not in accordance with the schedule determined by the hospital. The examination is the examination of spores bacilus linen and air conditioning mushroom inspection.

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Table 7. Results of Measurement and Inspection Periodic air in the Surgery Room Environment

Air Environment							
No.	Variables	MOH Strandarilization	Measurement Location in OK				
			I	II	III	IV	V
1.	Temperature	19 – 24	27.0	27.0	26.2	26.8	26.7
2.	Humidity	45 – 60	62.80	51.20	53.25	45.80	65.80
3.	Noise	45	54.30	45.20	49.00	45.60	60.00
4.	Dust	150	43.0	63.0	19.0	29.0	87.0
5.	Lighting - General Surgery - Desk Surgery	 300 – 500 10000 – 20000	 143 10420	 159 11200	 140 16320	 131 10699	 325 10577

Table 7 shows the temperature, humidity and noise across the operating room is not in accordance with the standard. Dust content and lighting throughout the operating room in the state according to the quality standard.

2. Identification of Microorganisms Concentration

The concentration of microorganisms can be seen in Table 8

Table 8. Concentration of Microorganisms Examination in Operating Room

Location	**Volume Air (L)**	**MOH Standarilization**	**Germ Figure Total (CFU/m^3)**	**Information**
OK I	1000	< 10 /m^3	60	not meet the requirements of air space
OK II	1000	< 10 /m^3	48	not meet the requirements of air space
OK III	1000	< 10 /m^3	32	not meet the requirements of air space
OK IV	1000	< 10 /m^3	28	not meet the requirements of air space
OK V	1000	< 10 /m^3	96	not meet the requirements of air space

Table 8. known that all the operating room can not fulfill the requirements specified air space that is < 10 /m^3.

3. Identification of Organizational Health and Safety (HSE) and Prevention and PengendalianInfeksi (PPI)

Based on observations in mind that the organization in charge HSE is still unformed. Implementation of activities related to HSE and the Environment is still performed by a committee and a team of infection control and prevention. Here is presented a correlation of variables measured and observed at a concentration of microorganisms in the operating room.

Table 9 Pearson Product Moment Correlation Analysis Variable Concentrations Measured by microorganisms in the Operating Room

No.	Independent Variables	Pearson Correlation	Relationships Levels
1.	Temperature	0.053	Weak
2.	Humidity	0.886	Strong
3.	Noise	0.895	Strong
4.	Dust	0.889	Strong

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No.	Independent Variables	Pearson Correlation	Relationships Levels
5.	Lighting	0.910	Strong
6.	AC	0.793	Medium
7.	Surgery Equipment	0.552	Medium
8.	Linen	0.896	Strong
9.	Water	-0.751	Medium
10.	Sterilization	0.878	Strong
11.	Wall	0.083	Weak
12.	Doors	0.944	Strong
13.	Roof	0.048	Weak
14.	floor	0.609	Medium

Table 9 shows the variable humidity, noise, dust, lighting, linen, sterilization, the door has a strong relationship with the concentration of microorganisms in the operating room. Variable temperatures, walls, and ceilings have a weak relationship with the concentration of microorganisms. Variable AC, operating tools, water bersih, and the floor has a connection was with the concentration of microorganisms in the operating room.

Discussion:

4.1 Predisposing Factors

Predisposing factors embodied in knowledge, attitudes, and beliefs. Trust (confidence) of an object is one of the principal components forming attitudes (Allport, 1954). Most workers have the operating room work attitude categories were (quite good), which is 12 people (50%). But a small portion, namely 8 (33.3%) in the category of poor work attitude and the resulting distribution of data by the actions or behavior of employment shows that the majority of the workforce operating room (75%) do unsafe behavior (unsafe act), while 25% demonstrate safe behavior (safe).

Attitude is a reaction or response which was still closed from a person to a stimulus or object. Attitude is not an action or activity, but predisposes action behavior. This attitude is still a closed reaction, not an open reaction or behavior that opens (Asrini et al., 2007). Research conducted Sudhiarti (2013) states that there is a relationship between attitude and knowledge of nurses in hospitals and further the study also concluded that there is a relationship between the behavior of medical waste bins with the attitude of the nurses at the hospital.

Behavioral component in the structure being shown how to behave tendencies that exist in a person associated with the object attitudes they face. Changes in behavior that occurs in a person can be known through perception, but everyone has a different perception, even though observing the same object. Changes in behavior in adults would be more difficult because adults already have the attitude, knowledge and specific skills that may have been held for years. Their knowledge, attitudes and behaviors that they believe will be difficult not acceptable, for it is necessary to separate business that believes it is important to learn the subject knowledge, attitudes and behaviors (Bachtiar et al., 2008).

4.2 Man Factors

Most labor operating room at X hospital get education and appropriate work (well) was 23 people (95.9%) and based on data distribution by HSE training participation of as many as 15 people (62.5%) workforce hospital operating room at X hospital have HSE training. Notoadmodjo (2012) revealed that the behavior is in harmony with the environment and the individual concerned is a coherence between the internal and external factors. Education and training is one of the factors that affect the quality of human resources.

Human resource development through education and training is the operational functions in human resource management. One of the most effective vehicle that can and should be used by the company to develop its employees through the provision of education and training.

Education and training of employees is seen increasingly crucial benefits, since human resources are a treasure or valuable assets owned by the company and also determine the success of the company to achieve the goal. Therefor the education and training within the company can give demands of the job or position as a result of advances in science and technology and increased competition among similar companies (Sutrisno, 2011).

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4.3 Methode Factors

Every job requires SOP to be clear and traceable. In the ISO 9001 quality manual said that write what they are doing and do what is written. The study states the availability of the SOP in the operating room is not optimal available in all operation rooms. SOP is a guideline or a reference to perform job duties in accordance with the functions and tools for performance evaluation of government agencies based on technical indicators, administrative and procedural appropriate work procedures, procedures labor and employment systems in the unit concerned. Standard operating procedures are standardized procedures or stages and must pass to complete a particular work process (Perry and Potter, 2005).

4.4 Material Factors

The study states the operating room had use desinfectant materials properly in accordance with rule MOH No.1204 / MOH / SK / X / 2004. Based Abrorshodiq (2013) in Khiyaroh (2014), all surfaces of equipment in the operating room was cleaned with desinfectant or soap water.

Terms of Environmental Health Hospital mention the identification of biological hazards in the hospital with an examination of each semester (the cleanliness of floors and walls, the number of bacteria air space, microbiological examination of water, inspection swab AC, surgical instruments and linen). But the infrastructure throughout the operating room is not all fit in either category.

Operating room is a special unit at the hospital, a place to do surgery, both elective and acute, which requires that the aseptic (sterile). The room operations require specially attention in its care in need of a manajamen or a way for art and well-structured, organized, programmed in accordance with the role and function of every aspect involved in the operation room, so the operating room can be used properly. It could be said that the management of the operating room is an organization of work activities and keeping people who are in the operating room that runs the function and role of each so that the work can be resolved effectively and efficiently (Hasri et al., 2012).

4.5 Time Factors

The results showed some of the checks carried out not in accordance with the schedule determined by the hospital, especially examination bacilus linen spores and mildew proofing AC. Besides the temperature, humidity and noise across the operating room is not in accordance with the quality standards established. Dust content and lighting throughout the operating room in the state according to the quality standards set. If the inspection is not conducted on schedule, sterility can not be maintained properly. Maintenance includes the operating room tool chamber cleaning process along with the existing standards do dikamar operasiharus regular schedule to prevent cross-infection from or to patients and maintain sterility (Zahrah 2010 in Khiyaroh, 2014) .The important in examination schedule of physical, biological and chemical is to ensure appropriate environmental conditions maintained quality standards, and if the conditions of the operating room environment is not maintained then there will be a danger to health professionals and patients.

The health risks can arise from exposure to various chemicals. Many chemicals that have toxic properties can enter the bloodstream and cause damage to the system and other organs of the body. Hazardous chemicals can be solid, liquid, vapor, gas, dust, smoke or fog and can enter the body through inhalation, ingestion, or skin absorption or contact invasive. In order to anticipate the negative impact that may occur in the workplace due to the danger of chemical factors it is necessary to control the technical working environment so that the levels of chemicals in the air working environment does not exceed the threshold value (NAV) (ILO, 2013).

4.6 Concentration of Microorganisms

The results showed that all the operating room can not fulfill the requirements specified air space that is <10 / m3. This will increase the risk of potential biological hazards, such as nosocomial infections. Coupled with the individual characteristic data showing the age of the majority of respondents aged 31-40 years, ie 45.8%. The age factor effect on individual susceptibility. The results of Pearson product moment correlation analysis showed variable humidity, noise, dust, lighting, linen, sterilization, walls, doors are variables had no significant

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relationship with the concentration of microorganisms in the operating room. Variable temperature, air conditioning, appliance operation, clean water, ceiling, and floor there is no significant correlation with the concentration of microorganisms in the operating room.

In addition to the chemical hazards, physical hazards factors also need to be done. Physical factors are factors in the workplace that is physics, among others, noise, lighting, vibration, work climate, micro-wave and ultra violet rays. Biological factors also be an one of danger factor that should be routinely performed measurements or checks for causes of occupational diseases are very diverse kinds. As workers at the agriculture, plantation and forestry as well as in the office that is indoorair quality, many face a variety of viral diseases, bacteria or result of agriculture, for example tabakosis to workers who work on tobacco, bagasosis in workers inhaling dust organic eg workers wheat (aspergillus) and sugar.

Pulmonary diseases by fungi often occur in workers who inhaled organic dusts, for example, had been reported in the literature on pulmonary aspergillus on wheat workers. Similarly, the "grain of asthma" sporotrichosis is just one example of occupational diseases caused by fungi. Nail fungus disease often affects the workplace worker damp and wet or when they are too many to soak your hands or feet in the water such as washing. Somewhat different from the factors that cause occupational diseases other biological factors can be transmitted from one worker to another worker. Additional efforts must also be pursued ways of prevention of infectious diseases, such as vaccination or immunization by injection, are absolutely necessary to workers in Indonesia as a regular health enterprises (ILO, 2013).

4.7 The existence of HSE Organization and PPI

The existence of the HSE and PPI has been formed, but still not optimal. Implementation of the HSE in the hospital depends on the sense of responsibility of the management and officers of the duties and obligations of each as well as cooperation in the implementation of HSE. This responsibility should be instilled through their clear rules. The pattern of the division of responsibilities, counseling to all officers, guidance and training as well as discipline. Chairman of the organization / unit HSE implementing specific hospitals must prepare data and information on the HSE in all workplaces, formulate problems and to analyze the causes of the problem together with units of work, then find a way to solve and communicate it to the work units, so that it can be implemented well. Furthermore, monitor and evaluate the implementation of the program, to assess the extent to which the program has been successfully implemented. If there is still a shortage, it is necessary to identify the deviations and sought to solve (Darmadi, 2008).

Infection prevention and control program at the hospital is to identify and reduce the risk of infection or transmission of infection between patients, staff, health professionals, contract workers, volunteers, students, and visitors. The risk of infection and program activities may differ between one hospital to hospital, depending on the activities and services that connected with clinical hospital, the patient population served, geographical location, patient volume, and number of employees. Effective programs generally have determined the program leader, trained staff, methods for identifying and proactively address the risk of infection, appropriate policies and procedures, determining, also staff education, and coordination of the program in all hospitals (MOH, 2008).

Conclusions And Suggestions:

Conclusions

The conclusion that can be derived from this research are:

There are 75% of workers have a good level of knowledge, 50% have a working attitude in the medium category, and 75% acting aman. There were 95.9% of human resources have the education and training appropriate yet to the burden of his task. SOP in each operating room is not yet available. Disinfectants are used well throughout the operating room, facilities and infrastructure are in poor condition. AC and linen examination schedule is not in accordance with the specified schedule. Temperature, humidity and noise across the operating room is not in accordance with the quality standards established. Implementation of activities related to HSE and the Environment is still performed by a committee and a team of infection control and prevention. There is a strong relationship between humidity,

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noise, dust, lighting, linen, sterilization, the door to the concentration of microorganisms in the operating room. Variable temperatures, walls, and ceilings have a weak relationship with the concentration of microorganisms. Variable air conditioning, appliance operation, clean water, and the floor has a moderate relationship with the concentration of microorganisms in the operating room.

Suggestion

Advice can be given are:

Workers who have been available in the operating room was given training and education in accordance with the burden of the task that has been given. Each implementation of the action should be equipped with the SOP and SOP distributed on each room. The ingredients (water, air conditioning, and sterilization) and infrastructure (walls, ceiling, floor) which allows it to be met immediately should the proposed rule based MOH No. 1204 / MOH / SK / X / 2004.

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