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INDIVIDUAL CHARACTERISTICS, ANTIBODY, WORK ENVIRONMENT AND SICK BUILDING SYNDROME (SBS) (A STUDY ON EMPLOYEES OF PT TELKOM JEMBER)

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ABSTRACT

Sick Building Syndrome (SBS) is a collection of complaints that a person feels being inside of a building or a room. SBS happens to many employees who work indoors. The purpose of this study is to analyze the influence of individual characteristics, IgE antibodies, and work environment against the incidence of SBS in the employees of Telkom Jember. The research design used was cross sectional. The results showed that there was influence of age, duration of work, IgE antibody, room temperature and humidity to the incidence of SBS on Telkom Jember employees with sig <0,05. The most influencing factor on the incidence of SBS is IgE. The results also showed that smoking habits, nutritional status, ventilation conditions, lighting and room dust levels do not affect the occurrence of SBS. Improvements that can be done are improvements to the working environment, especially in controlling the temperature and humidity of the room and healthy living the for employees.

Keywords: SBS, IgE, Work Environment

INTRODUCTION

Background

Health problem is a problem felt by many people, especially workers. One of the health problems in office workers is Sick Building Syndrome or commonly abbreviated as SBS. Sick Building Syndrome is a collection of symptoms of diseases caused by the condition of office, industry, commerce, and residence buildings associated with the length of time someone is in the building and associated with the indoor air quality[1]. The medical world introduced SBS as a health problem due to air pollution that occurred in the work environment in 1980[2]. Studies from the United States and Europe show that workers in industrialized countries spend more time in the room than 90 percent of their time[3].

SBS is characterized by fatigue, feeling heavy / lethargic, headache, nausea, difficulty concentrating, itching, burning, or irritation, hoarseness, dry throat, cough, dry or flushed skin, itching on the scalp or ears, dry hands, itching, and red skin[4]. Factors related to the occurrence of SBS including age, employment, smoking and nutritional status[5]. A research conducted by Zhank et al. (2014) found that parental asthma and allergies (heredity) and pollen or allergy pets (atopy) can also be a risk factor for SBS[6]. SBS is also caused by work environment factors. Work environment is the condition or circumstances around employees that can affect employee performance, such as the presence of air conditioning, lighting, temperature, humidity, dust and so on[7].

PT Telkom is an information and communication company as well as a service provider and telecommunication network in Indonesia[8].Previous research in Telkom Jember stated that 47.8% of Telkom employees suffer from SBS[9]. Observations which have been done by the researchers, researchers found thatTelkom Jember building is a high building that is closed. There are several rooms in each floor and in accordance with each unit. Each room observed has air conditioning as artificial ventilation and windows as

natural ventilation but it never opened. Ventilation has the benefit of air circulation, if there is no air exchange in the room then the humidity of the room will increase and it can cause disease to the workers.

Purpose

The purpose of the study based on the background that has been described is to analyze the influence of Individual Characteristics (age, occupation, smoking and nutritional status), Antibodies (IgE) and Work Environment (temperature, humidity, ventilation, lighting and dust), to the incidence of Sick Building Syndrome SBS) to Employees at PT Telkom Jember

METHODS

The research design used in this research was cross sectional. The number of case is 42. The sampling technique used a purposive sampling. There are 6 rooms measured according to the respondent's workspace. Data Research instrument to obtain data of individual characteristics is by using questionnaires, levels of IgE antibody is by using blood samples of employees tested by ELISA, while the work environment is by using a measuring instrument. Thermohygrometer is for temperature and humidity measurements, Lux meters for lighting, and High volume air sampler (HVS) for measuring the space dust. The influence analysis test used Logistic Regression Test.

RESULTS

Result I

The distribution of data and the result analysis of individual characteristics against SBS incidence in employees can be seen in Table 1.

Table 1. Analysis of the Influence of Individual Characteristics on SBS Events.

Individual Characteristics	*SBS*				*Sig*
	SBS		No *SBS*		
	n	%	n	%	
Age					
< 40 years	6	29	14	67	0.016
≥ 40 years	15	71	7	13	
Total	21	100	21	100	
Years of service					
< 3 Years	6	29	15	71	0.007
≥ 3 Years	15	71	6	29	
Total	21	100	21	100	
Smoking					
No smoking	15	71	13	61	
Light smoker	4	4	6	29	0.641
Heavy smoker	2	2	2	10	
Habbit smoker	0	0	0	0	
Total	21	100	21	100	
Nutritional status					
Thin	1	5	0	0	
Normal	13	62	13	62	0.833
Overweight	4	19	6	29	
Obesity	3	15	2	10	
Total	21	100	21	100	

Table 1 shows that the variables of characteristic affecting the incidence of SBS are age and employment with sig <0,05, whereas smoking habit and nutritional status have no effect on SBS incidence due to sig value> 0,05.

Result II

The distribution of data and analysis results of IgE Antibodies in Blood on SBS occurrences in employees can be seen in Table 2.

Table 2. Analysis of the IgE Antibodies effect in blood on SBS occurrences.

Antibody	*SBS*				*Sig*
	SBS		Non - *SBS*		
	n	%	n	%	
IgE					
Normal < 100 IU/ml	5	24	15	71	0.003
Unnormal ≥ 100 IU/ml	16	76	6	29	
Total	21	100	21	100	

The result of data analysis from Table 4:13 showed that there is influence of IgE Antibodies level in employee blood to SBS incidence with the value of sig 0,003 <0,05. SBS incidence is felt more by employees who have abnormal blood with IgE levels of (76%).

Result III

The data distribution and the result of work environment analysis to the SBS incidence in employees can be seen in Table 3.

Table 3. Work Environmental Analysis of SBS incident.

Work environment	SBS incident				*Sig*
	SBS		Not SBS		
	n	%	n	%	
Room temperature					
As the standard	8	38	16	76	0.016
Not Standard	13	62	5	24	
Total	21	100	21	100	
Humidity					
As the standard	8	38	9	43	0.003
Not Standard	13	62	12	57	
Total	21	100	21	100	
Lighting					
Low	21	100	21	100	1.000
Normal	0	0	0	0	
High	0	0	0	0	
Total	21	100	21	100	
Ventilation					
Less Condition	13	62	15	71	0.514
Good condition	8	38	6	29	
Total	21	100	21	100	
Dust					
Eligible	18	86	17	81	0.680
Not eligible	3	14	4	19	
Total	21	100	21	100	

Table 3 shows that the variables of the work environment that affect the SBS occurrence are temperature and humidity with sig value of <0.05, whereas the lighting, ventilation and dust conditions have no effect on SBS incidence due to sig value of >0.05. Lighting in all rooms is in low category, more room ventilation with less category, and dust qualified.

Result IV

The most influential factor analysis of SBS incidence in employees can be seen in Table 4.

Table 4. Factor Analysis of SBS Incidence

Step	Factor	Sig.	Exp(B)
Step 1[a]	IgE	.040	5.982
	Age	.192	3.457
	Years of service	.266	2.879
	Room temperature	.068	5.652
	Humidity	.252	2.744
	Constant	.002	.034
Step 2[a]	IgE	.028	6.603
	Age	.060	5.175
	Room temperature	.078	5.086
	Humidity	.144	3.466
	Constant	.003	.044
Step 3[a]	IgE	.014	7.699
	Age	.043	5.450
	Room temperature	.024	7.058
	Constant	.003	.061

Table 4 shows that the most influencing factor on the incidence of SBS is IgE in the blood of employees. This is because at step 3 IgE factor has the highest risk that is 7,699 compared with age and temperature factor.

DISCUSSION

Sick Building Syndrome also means as a collection of health problems felt by workers inside buildings with non-specific complaints related to air quality in buildings or room[10]. Many public health agencies were asked to investigate office workers' complaints about the indoor work environment that was considered to be making them sick[11]. In the 1990s, Sick Building Syndrome was one of the most frequently studied health issues. Workers feel the impact of illness due to work in a building or room, this is related to air quality and duration of workers inside the building[1]. Sick Building Syndrome is generally characterized by symptoms such as throat irritation, eyes, nose, headache, fatigue, nausea, skin irritation and respiratory disorders.

The results of this study indicate the age and duration of work affect SBS. A research conducted by NIOSH in 1980 also states that age above 40 years associated with an increase in the incidence of SBS due to age related to the immune system. The older the age of a person then the more decreased their body endurance. In accordance with the opinion of Rostron, if someone does a job in a long time, it can cause the ability and stamina decreased so he is more susceptible to *Sick Building Syndrome*[1].

IgE in the blood of employees also affect the incidence of SBS. Immunoglobulin E or IgE is an antibody circulating in the bloodstream. These antibodies sometimes also cause acute allergic reactions in the body. Therefore, the body of an allergic person has high levels of IgE. These inflammatory events produce typical allergic symptoms, namely sneezing, runny nose, watery eyes and smooth muscle contractions that can cause difficulty in breathing. Antihistamines will alleviate allergy symptoms by inhibiting receptors for histamine[12]. This is in accordance with a research by Zhank, he states that allergies can be a factor causing the Sick Building Syndrome[6].

Work environment is the condition or circumstances around employees that can affect employee performance, such as the presence of air conditioning, lighting and so on[7]. The influence of temperature and humidity on SBS incident on Telkom Jember employees can be caused by high temperature and humidity. Hot temperatures can reduce agility, prolong reaction time and decision-making time, interfere with the accuracy of the workings of the brain, interfere with the coordination of taste and motor nerves. However, the cold temperature reduces efficiency with stiff complaints or lack of muscle coordination[13].

Telkom Jember has lighting in all rooms in low category, more room ventilation with less good category, and dust is eligible. The assessment of the theory using Grandjean theory (2000), it states that the characteristics of working by using computer should be normal about 300-400 Lux. The results of the ventilation study found that all of the studied rooms had natural ventilation, central air conditioning and additional AC. Additional air conditioning is used when the central AC is not functioning properly. Every rest time at 12:00 to 13:00 pm windows in every room routinely opens and central AC is turned off. Maintenance of mechanical / artificial ventilation (AC) is not done every 2-3 weeks but every 3 to 4 months.

Solution to overcome SBS is to move the sources of pollutants or to modify them, to increase the speed of ventilation and air distribution, air purification, education and communication are important elements in indoor air quality management program[14]. In addition, the control can be improved by fixing the air conditioning system and air conditioning in the building can be one way to reduce the pollutants contained in the building. Minimumly, heating machines, ventilation systems and air conditioning systems (AC) should be designed to meet the minimum requirements of a good air system in a building. Ensuring that the air-conditioning system is operational and maintained with due regard to ventilation and good air exchange. If there are known sources of harmful pollutants released by the AC, there must be a sewer that directly leads outside the building. This method is usually done to eradicate the pollutants found in certain areas of the building, such as toilets, photocopy rooms, and smoking special rooms.

CONCLUSION

The conclusions in this study are the variables that affect the incidence of SBS is age, humidity, IgE, Temperature and humidity, while smoking habits, nutritional status, ventilation conditions, lighting and room dust levels do not affect the occurrence of SBS.

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