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The Impact Of The Physical Environment On Tuberculosis In Wonorejo Kediri Regency

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ABSTRACT

The poor of physical environment is the main factor causing the development bacteria of TB (mycobacterium tuberculosis). Mycobacterium tuberculosis will accumulate more and more in a poor environment.The purpose of this study was to determine the impact of the physical environment on the Incidence of Tuberculosis in Wonorejo, Kediri Regency. The research design used was case control with a population consisting of two groups, namely all people with sputum examination results (BTA +) as the case group and people with sputum examination results (BTA -) as the control group. A sample of 40 respondents was taken by simple random sampling. The independent variable is the physical environment of the house (ventilation, floor type and occupancy density) with the dependent variable being the incidence of tuberculosis. Data was collected using observation sheets.The results of the simultaneous analysis show that there is a significant influence between the physical environment and the incidence of TB (p-value = 0.000), while partially the physical condition of the house, namely ventilation, p-value = 0.00 and occupancy density, p-value = 0.044 each had an effect on the incidence of tuberculosis, but the type of floor (p-value = 0.999) had no effect on the incidence of TB. The condition of the house that does not meet the healthy requirements, especially in terms of ventilation and occupancy density, makes the bacteria that cause TB able to live and multiply. is on the decline.

Keywords: Density, Tuberculosis, Ventilation.

BACKGROUND

Tuberculosis (TB) is a chronic infectious disease caused by a bacterium called Mycobacterium tuberculosis. TB disease can be cured. TB can be transmitted from one person to another through air transmission (droplets of patient sputum). TB sufferers will produce droplets containing a number of bacilli from mycobacterium tuberculosis when they cough, sneeze, or talk. People who inhale the bacilli from the battery can contract this disease. Tuberculosis is one of the diseases whose control is a global commitment in the MDG's (Kemenkes, 2015)

TB is one of the ten leading causes of death, which exceeds the death rate from HIV/AIDS cases. Millions of people suffer tuberculosis every year. In 2017, TB caused an estimated 1.3 million deaths in HIV-negative people and an additional 300,000 deaths from TB in HIV-negative people. This number makes Indonesia the third highest for TB cases after India and China. This condition is certainly a cause for concern because it has a major social and

financial impact on patients, their families and the community. TB is an infectious disease and an extraordinary problem for Indonesia because it is a global record. This disease can be transmitted easily so there must be implementation and a national strategy to prevent it (InfoDatin, 2018).

The incidence of TB in Indonesia in 2022 is more than 700 thousand cases. This figure is the highest since TB became a national priority program. TB cases in Indonesia are in third place after India and China, with 824,000 cases and 93,000 deaths per year or the equivalent of 11 deaths per hour. Based on the Global TB Report for 2022, the highest number of TB cases is in the productive age group, especially those aged 25 to 34 years. In Indonesia, the highest number of TB cases is in the productive age group, especially those aged 45 to 54 years. There were 81,753 cases of TB found throughout 2022 or 74% of the estimated 107,547 found in East Java (BPS, 2022).

Based on data from the Kediri Regency health office in 2022, out of 3,476 TB suspects, 1,931 people were recorded as TB cases. Data from the Republic of Indonesia Ministry of Health as of November 2021 shows that the TB case detection coverage is 33 percent (85 percent target), the treatment success rate is 76 percent. so that the target has not met the target set at 90% (Dinkes, 2023)

One of the factors causing the increase in TB transmission is the environment. Physical environmental factors are the main causal factors for TB incidence. The increase in cases of pulmonary TB is related to poverty and poor environmental conditions so that it is easy to transmit. The spread of the TB virus is very fast, so that one family who suffers from TB can spread it to other family members (Mansjoer, 2020)

The problem of tuberculosis arises when the sanitation of the home environment is related to air pollution, for example piles of garbage or clogged sewage which can become a breeding ground for Mycobacterium tuberculosis which can cause tuberculosis. In addition, the condition of the house ventilation is insufficient. Home ventilation that functions to keep the air flowing in the house fresh (Hiswani, 2004)

Based on report data from BPS at 2022 it states that the condition of livable houses in East Java in 2021 is 66.93 percent. This means that around 66.93 percent of households have access to livable houses. Meanwhile, households that do not have access to livable housing are 33.57% (Kominfo, 2022).

A livable house has 5 criteria that must be met including the availability of clean water and network sanitation, a strong and secure building, good lighting ventilation, a clean and healthy environment, and finally adequate facilities. The criteria for a livable healthy home focus on the health and safety of the occupants. In the criteria for a livable healthy home, ventilation and lighting are even more important because they can prevent the spread of diseases such as respiratory infections. Based on the background of the existing problems, need to do research with the purpose of this study was to determine the effect of the application of the physical environment and people's behavior on the incidence of tuberculosis in the work area of the Wonorejo Health Center, Ngadiluwih District, Kediri Regency. This study differs from previous studies in which the physical environment studied was only floor type, ventilation and occupant density which is a breeding place for TB germs.

METHOD

The research design used was case control with a population consisting of two groups, namely all people with sputum examination results (BTA +) as the case group and people with sputum examination results (BTA -) as the control group. A sample of 40 respondents was taken by simple random sampling. The independent variable is the physical environment of the house (ventilation, floor type and occupancy density) with the dependent variable being the incidence of tuberculosis. Data was collected using observation sheets. Data analysis with

logistic regression correlation test at α = 0.05

RESULT

Table 1. Description of Research Results

No	Characteristics	Cases		Control	
		n	%	n	%
1	**Floor Type**				
	Not Qualify	2	9,1	0	0
	Qualify	20	90,9	22	100
2	**Ventilation**				
	Not Qualify	14	63,6	2	9,1
	Qualify	8	36,4	20	90,9
3	**Occupant Density**				
	Not Qualify	14	63,6	6	27,3
	Qualify	8	36,4	16	72,7
	Total	**20**	**100**	**20**	**100**

Based on table 1, the results of research on observing the type of floor of the house illustrates that most of the respondents were TB sufferer (cases) have a type of floor that qualify of 90,9%, but there are still a small number of them who have a type of floor that does not qualify of 9,1 %. Meanwhile, all respondents were not TB sufferer (Control) have type of floor in their house that qualify

The results of a review of ventilation conditions at home explained that the majority of respondents were not TB sufferer (cases) had home ventilation that not qualify of 63%. Most of respondents TB Sufferer (controls) had ventilation in their homes that qualify of 90,9%.

The results of the research on determining the number of occupants in the house (occupant density) in TB sufferers (cases) mostly not qualify of 63.6%. Most of respondents were not TB sufferers (controls) have occupant density that qualify of 72.7%.

Table 2. Data Analysis the Impact Of Physical Environment on the Incidence of TB

Statistic test	Variable	Sig.
Simultaneous	*Model Fitting Information (final)*	0,000
Partial	X1_ventilation	0,009
	X2_Density	0,044
	X3_Floor	0,999

Simultaneous test results obtained p-value = 0.000 < α = 0.05, so H0 is rejected and H1 is accepted, which means that there is a simultaneous influence between floor conditions, ventilation, and oocupant density with the incidence of TB in Wonorejo Health Center, Ngadiluwih District , Kediri Regency. The results of partial analysis testing showed that there was an influence between ventilation conditions on the incidence of TB (p-value = 0.009). The occupancy density variable has an effect on the incidence of TB (p-value = 0.044). Floor type has no effect on the incidence of TB (p-value = 0.999).

DISCUSSION

The results of the research on the physical environment showed that almost all respondents in the case group had floors that not qualify of 20 respondents (90.9%), while all respondents in the control group had floors that qualify of 22 respondents (100%). The condition of the floors owned by most of the respondents did not meet the requirements, namely they were not watertight. The condition of the floors in the house are mostly tiled only in the living room, while other parts such as the bedroom still have floors made of cement and when

it rains there is water seepage. In the kitchen there are still has a ground floor in the form of soil (dirt floor).

Based on the Decree of the Minister of Health No.829/Menkes/SK/VII/1999 concerning Health Requirements for Housing, it is stated that the requirements for housing components for floors are waterproof and easy to clean. Waterproof floors such as ceramics, tiles, and cement floor, while floors are not waterproof, namely soil or damaged plaster (Depkes, 2000) .

According to Irianto's statement (2014) states that a tile or cement floor is good. The floor can act as a medium for pulmonary TB transmission. Microorganisms such as bacteria that previously came from sources of disease (sufferers) then live and reproduce on the floor of the house, where the development of these bacteria follows the wet and dry conditions of the floor.

The results showed that almost all of the respondents had houses with floor types that did not meet health requirements, some of the houses had been hardened, namely made of cement or ceramics, but there were still areas in the kitchen that had dirt floors. Good floor conditions can reduce water intrusion so as to reduce humidity in the house. A house floor that is always wet makes it easier for bacteria and moisture to form on the floor. The condition of the floor that meets the requirements can reduce the risk of the house becoming a place for the development of bacteria that cause pulmonary TB because the humidity in the house is reduced because the water on the floor can dry up quickly.

ventilation conditions at home explained that the majority of respondents were not TB sufferer (cases) had home ventilation that not qualify of 63%. Most of respondents TB Sufferer (controls) had ventilation in their homes that qualify of 90,9%. Some ventilation conditions from respondents have an area of less than 5% of the total area of the house. Ventilation of the house is mostly found only on the front of the house, but on every side of the house most of the houses do not have ventilation.

Ventilation are used for air exchange. Air needs to be replaced in order to get fresh body. In addition, so that germs in the air, such as bacteria and viruses, can get out of the room, so they don't become diseases. People who cough and sneeze exhale air filled with disease germs, which can infect the air around them. Infectious diseases that are transmitted through the air, including tuberculosis, bronchitis, pneumonia, and others. Good ventilation in the room must have other requirements, including the area of the fixed ventilation holes, a minimum of 5% of the floor area of the room. While the area of incidental ventilation holes (can be opened and closed) is a minimum of 5%. The sum of both becomes 10% multiplied by the floor area of the room. The size of this area is arranged in such a way that the incoming air is not too heavy and not too littlet (Kristanto, 2010).

Natural lighting and extensive ventilation are associated with the incidence of tuberculosis. This is consistent with the results of the study which illustrate that natural lighting has a relationship between natural lighting and pulmonary tuberculosis in the working area of the Bailaing Public Health Center with the results of bivariate analysis showing p = 0.000 (p <0.05) Odds Ratio (OR) = 4.808 and 95% CI = 0.832-27.798 . The results obtained for ventilation are that there is a relationship between ventilation area and pulmonary tuberculosis in the working area of the Bailaing Health Center with the results of bivariate analysis showing that p value = 0.001 (p <0.05) Odds Ratio (OR) value = 3.354 and 95% CI = 1.037-10.853 (Monintja, 2020).

Good air ventilation will affect other environmental factors such as temperature, humidity, lighting, floor conditions and so on. Through adequate ventilation, air exchange will improve and sunlight will shine on the room in the house which can kill TB germs. Therefore, pulmonary TB sufferers and their families need to understand how to use good air ventilation, that is, air vents or windows must be opened every day so that sunlight can enter the house.

Even though the number of air vents is sufficient but they are not opened every day, the purpose of ventilation as air exchange will not function properly.

Determining the number of occupants in the house (occupant density) in TB sufferers (cases) mostly not qualify of 63.6%. Most of respondents were not TB sufferers (controls) have occupant density that qualify of 72.7%. Most of the respondents have encountered that in the same household more than one head of the family is contacted. Some of them stated that they did not have enough rooms so that in one room between 3 and 4 children could be occupied.

The occupancy density for all houses is usually expressed in m2/person. The minimum area per person is very relative, depending on the quality of the building and the facilities available. Residential density is the ratio of the number of occupants to the area of the house occupied by the respondent in square meters (m2), with a minimum requirement of 8 m2/person. This study is in accordance with what was found by Mamangkey, 2013 concerning the relationship between occupancy density and the incidence of pulmonary TB, obtained P value = (0.000) $<\alpha = 0.05$, this means that H_o is rejected, which means that there is a relationship between occupancy density and the incidence of pulmonary TB (Mamangkay, 2013).

Simultaneous test results obtained p-value = 0.000 < α = 0.05, so H0 is rejected and H1 is accepted, which means that there is a simultaneous influence between floor conditions, ventilation, and oocupant density with the incidence of TB in Wonorejo Health Center, Ngadiluwih District , Kediri Regency. The results of partial analysis testing showed that there was an influence between ventilation conditions on the incidence of TB (p-value = 0.009). The occupancy density variable has an effect on the incidence of TB (p-value = 0.044). Floor type has no effect on the incidence of TB (p-value = 0.999).

Housing development has a major effect on improving family health status, therefore it is necessary to stipulate a Decree of the Minister of Health of the Republic of Indonesia concerning Housing Health Requirements. Health requirements as referred to in the Second Dictum cover residential housing consisting of building materials, components and spatial arrangement of the house, lighting, air quality, ventilation, infectious animal diseases, air, food, waste and sleeping space density (Depkes, 2000).

Related to environmental conditions, ventilation plays the most dominant role as a risk factor for TB disease. This can be seen from its function, ventilation as a place for continuous exchange of airflow to free room air from bacteria, especially pathogenic bacteria such as tuberculosis. Efforts that can be made by opening doors and windows every morning, trying to get sunlight into the house by installing plastic glass tiles so that it is not dark and reduces humidity and can kill germs and germs. Furthermore, the density of residential homes will facilitate the transmission of diseases such as tuberculosis. Bacterial colonies and occupancy density per square meter provide a synergistic effect of creating pollutant sources that have the potential to suppress immune reactions together with the occurrence of an increase in pathogenic bacteria with occupancy density in each family. Thus the TB bacteria in the home of pulmonary TB sufferers increases, if the number of occupants increases.

CONCLUSION

The condition of the physical environment of the house that not health qualify, especially in terms of ventilation and occupancy density, allows the bacteria that cause TB to live and multiply. Related to environmental conditions, ventilation plays the most dominant role as a risk factor for TB. Efforts that can be made by opening doors and windows every morning, trying to get sunlight into the house by installing plastic glass tiles so that it is not dark and reduces humidity and can kill germs.

REFERENCES

BPS. (2022, September 2). *2021, Kondisi Rumah Layak Huni di Jatim sebesar 66.93%*. Retrieved Mei 7, 2023, from Dinas Kominfo Provinsi Jawa Timur: https://kominfo.jatimprov.go.id/berita/2021-kondisi-rumah-layak-huni-di-jatim-sebesar-66-93

Depkes. (2000). *Keputusan Menteri Kesehatan RI Nomor 829/Menkes/SK/VII/1999 tentang Persyaratan Kesehatan Perumahan :*. Retrieved Mei 2, 2023, from Perpustakaan Badan Kebijakan PembangunanKesehatan: http://perpustakaan.badankebijakan.kemkes.go.id/index.php?p=show_detail&id=9756

Dinkes. (2023, Januari 24). *Dinkes Kabupaten Kediri Bersama SSR YABHYSA Bertekad Tanggulangi TBC*. Retrieved Mei 11, 2023, from Seputar Kediri: https://berita.kedirikab.go.id/baca/2023/01/dinkes-kabupaten-kediri-bersama-ssr-yabhysa-bertekad-tanggulangi-tbc

Hiswani. (2004). *Tuberkolosis Merupakan Penyakit Infeksi Yang Masih Menjadi Masalah Kesehatan Masyarakat*. Retrieved Desember 09, 2022, from e-USU Repository: https://dupakdosen.usu.ac.id/bitstream/handle/123456789/3675/fkm-hiswani12.pdf;jsessionid=78EBE2272E43FD4DA094AE6E7FCC668B?sequence=1

InfoDatin. (2018, Agustus). *Kategori Data : INFO DATIN*. Retrieved Desember 4, 2022, from Kementerian Republik Indonesia: https://www.kemkes.go.id/folder/view/01/structure-publikasi-pusdatin-info-datin.html

Kemenkes. (2015). *Profil Kesehatan Indonesia.* Jakarta: Kementerian Republik Indonesia.

Kominfo, D. (2022). *2021, Kondisi Rumah Layak Huni di Jatim* . Surabaya: Dinas Kominfo Provindi Jawa Timur.

Kristanto, W. (2010, Juli 19). *Tentang Rumah Sehat*. Retrieved Mei 10, 2023, from kementerian Pekerjaan Umum dan Perumahan Rakyat: https://kotaku.pu.go.id/view/3063/tentang-rumah-sehat-#:~:text=Ventilasi%20yang%20baik%20dalam%20ruangan,dan%20ditutup)%20minimum%205%25.

Mamangkay, F. (2013, September 10). *FAKTOR-FAKTOR YANG BERHUBUNGAN DENGAN KEJADIAN TB PARU PADA MASYARAKAT (SUATU PENELITIAN DI KELURAHAN LIMBA B KECAMATAN KOTA SELATAN KOTA GORONTALO)*. Retrieved Mei 7, 2023, from UNG Repository: https://repository.ung.ac.id/skripsi/show/841409049/faktor-faktor-yang-berhubungan-dengan-kejadian-tb-paru-pada-masyarakat-suatu-penelitian-di-kelurahan-limba-b-kecamatan-kota-selatan-kota-gorontalo.html

Mansjoer, A. (2020). *Kapita Selekta Kedokteran Edisi 4.* Jakarta: Media Aesculapius.

Monintja, N. G. (2020). Keadaan Fisik Rumah dengan Kejadian Tuberkulosis Paru. *Indonesian Journal of Public Health and Community Medicine*, 94-100.