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THE RELATIONSHIP BETWEEN THE PHYSICAL CONDITION OF THE HOME ENVIRONMENT AND HISTORY OF DISEASE WITH THE INCIDENCE OF TUBERCULOSIS IN THE WORKING AREA OF THE RANGKASBITUNG HEALTH CENTER IN 2023

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Abstract
This study aims to determine the relationship between the physical condition of the home environment and history of disease with the incidence of tuberculosis or pulmonary tuberculosis in the work area of the Rangkasbitung Health Center in 2023. This study is a descriptive correlation study with cross sectional design, which is research that explores the relationship between the physical condition of the house and the behavior of residents towards the incidence of tuberculosis. The type of data used is primary data, from the results of questionnaires and secondary data obtained from recording and reporting TB patient visit data at the Rangkasbitung Health Center. Data analysis in the study, using univariate analysis with positive TB incidence results (69.2%); Bivariate analysis showed a relationship between home air circulation and the incidence of tuberculosis (P<0.028), occupancy density (P<0.011), lighting (P<0.015), humidity (P<0.020), education (P<0.002), employment (P<0.006), and smoking (P<0.009); and humidity factor being the dominant factor with the largest OR (OR=28.579). The results of the cross-sectional test in the study, showed a significant relationship between the physical condition of the home environment and the history of disease with the incidence of tuberculosis in the work area of the Rangkasbitung Health Center. Suggestions in this study are the need for education related to environmental factors and behaviors that cause tuberculosis, such as counseling about healthy homes with qualified ventilation, good lighting, good humidity, occupancy in an adequate place, and reducing cigarette use habits. Other factors that need to be improved, in order to support the reduction in TB prevalence rates, namely education and employment factors. Patients with pulmonary tuberculosis must also be given understanding, related must always be tried to be in a place that has adequate air ventilation and good humidity, in order to reduce the risk of the severity of TB disease which can lead to death or the duration of the treatment process.

Keywords: Tuberculosis, Air Circulation, Humidity, Lighting, Occupant Density, House Flooring, Behavior, Smoking

1. Introduction

The World Health Organization (WHO) in the Global Tuberculosis Report (2021) states that globally TB or pulmonary TB has attacked around ten million people in the world. The prevalence of cases in several countries around the world is still quite large, the highest is in India (27.0%), followed by China (9.0%), Indonesia (8.0%), the Philippines (6.0%), Pakistan (5.0%), Nigeria (4.0%), Bangladesh (4.0%), and South Africa (3.0%). TB is still a major health problem in various countries and is still one of the tenth deadly diseases in the world. (WHO, 2021).

Suspected cases of tuberculosis (TB) in Indonesia still reach 824 thousand people. This makes the Minister of Health of the Republic of Indonesia ask that 90% of this number can be detected in 2024. Director General of Disease Prevention and Control, dr. Maxi Rein said, that TB in Indonesia and in the world is still a major health problem. This disease is one of the ten leading causes of death in the world, and Indonesia is the country with the 3rd highest prevalence, after India and China efforts to solve it have been carried out for years, vaccines and cures have been found long ago even since Indonesia became independent, but it is still never felt can be handled well. (Ministry of Health, 2022).

Environmental factors are factors that have the largest role in the development of TB disease, which is about 40% influenced by the environment, followed by behavioral factors 30%, health service factors 20%, and finally genetic factors (heredity) 10%. (Findi M, 2023). Research in Bandar Lampung also states that TB is related to factors in the physical environment of the house, namely lighting, occupancy density and ventilation (Yushananta, 2021).

The transmission and spread of TB disease is closely related to behavioral and environmental factors. Meanwhile, for circumstance factors, such as environmental sanitation related to the presence of causative bacteria, which will later trigger disease transmission, especially tuberculosis. The handling of pulmonary TB cases in Indonesia is still not good enough and usually occurs in the population with less nutritional intake, psychological stress, crowded and crowded housing, inadequate home ventilation, and poor health care.

The prevalence of TB which is still high in Indonesia and in the world is in line with data on TB sufferers obtained from the Health Office, Lebak Regency. It was reported that in 2021 there were 936 cases, and the cases increased in 2022 to 1071 cases. The cause of this high case is thought to be due to the lack of knowledge of patients about TB itself and in its spread of the disease, especially regarding the physical condition and home environment of TB sufferers (Lebak Regency Health Office, 2022). In accordance with these data, the incidence of tuberculosis which refers to environmental factors was chosen in the study because it was felt that its prevalence was still high and was said to have increased in Indonesia, especially in Rangkasbitung City, Banten.

Supported by TB data obtained from the Rangkasbitung Health Center in 2022, Rangkasbitung City, Lebak Regency, is included in the area with the highest TB cases with a prevalence of 107 cases. The case, allegedly due to treatment failure in the form of patient non-compliance in undergoing the treatment process which is a factor Another supporter of the high number of cases. Meanwhile, factors of the physical condition of the home environment (ventilation, lighting, humidity, occupancy density), smoking habits, history of disease, educational and occupational factors are still the main factors causing the high number of TB cases. Therefore, researchers are interested in conducting research on the relationship between the physical condition of the home environment and history of disease with the incidence of tuberculosis in the work area of the Rangkasbitung Health Center in 2023.

2. Theoretical Background

Tuberculosis (TB) is a disease that is quite popular in Indonesia, TB is a disease caused by bacterial pathogens that are usually not handled properly. TB is one of the infectious diseases with Mycobaterium tuberculosis bacteria as a causative agent. Tuberculosis bacteria will mostly attack the lungs, but can also attack other organs in the human body. The source of transmission, which comes from the patient's sputum directly or

tuberculosis with positive BTA, which if not immediately handled properly can be fatal to the patient, can even cause loss of life. Handling TB cases in Indonesia has been carried out early through government programs, especially in toddlers, namely by immunization or BCG vaccination. However, in handling it is considered still less than optimal.

Hendrick L. Blum stated that public health status is the result of the interaction between behavioral, environmental, health care and heredity or congenital factors. Meanwhile, according to the epidemiological triangle model, the onset of a disease is the result of an imbalance between the host, disease, and environment. For the case of pulmonary TB, it is said to lead to an imbalance of environmental factors.

Several factors that trigger Pulmonary TB, including the physical environmental conditions of the house or dwelling that do not meet the standards. This makes the house a breeding ground for Mycobacterium Tuberculosis. In a previous study by Ariani, Lapau, Zaman, Mitra, &; Rustam (2022), stated that there was a relationship between inadequate ventilation and the incidence of pulmonary tuberculosis. It is said, that in houses that do not have windows or houses with only one window at risk 4 times greater can cause residents to suffer from tuberculosis. Supported by previous research which also says, that there is a relationship between ventilation ownership at home with the incidence of pulmonary tuberculosis. This happens, due to the increase in carbon dioxide concentration and reduced oxygen concentration in the house.

The physical condition of the house will affect the process of pulmonary TB incidence. Inadequate home conditions, such as waterproof and damp floors or floors that are dry and become dusty in the summer, will increase the risk of proliferation of harmful TB-causing bacteria. In addition, the construction of houses and neighborhoods that do not meet health requirements will trigger and become a source of transmission of several other types of environment-based diseases. Pulmonary TB disease, as described above, is closely related to sanitary conditions and unhealthy behavior of residents. Another factor that influences the incidence of pulmonary TB is behavioral factors. Behavior is one of the factors that plays an important role in determining the degree of public health, so that it can reduce the morbidity rate of a disease, one of which is pulmonary TB disease (Imaduddin &; Setiani, 2019).

Health behavior is all activities or activities of a person, both those that can be observed directly (observable) and those that cannot be observed directly by others (unobservable) related to the maintenance and improvement of health. Meanwhile, according to Hendrick L. Blum, health behavior for the benefit of practical education is developed into 3 levels of domain, namely knowledge, attitudes, and actions or practices. Therefore, it can be concluded that health behavior in general can be grouped into two, namely (1) healthy behavior or healthy behavior to stay healthy and efforts to improve their health, and (2) health seeking behavior or behavior of sick people (affected by disease problems) to get healing to be healthy.

Therefore, behavioral factors are considered very important in healing and preventing TB infection. These behavioral factors, can be started from (1) carrying out healthy life behaviors, such as consumption of nutritionally balanced foods, adequate rest, adequate exercise, avoiding cigarettes, alcohol, drugs, and stress; (2) conduct early immunization, especially in toddlers; (3) do not spit carelessly and cover the mouth when coughing or sneezing; (4) conduct regular and periodic checks; (5) the most important thing is adherence to taking TB drugs if already infected, and the need to control yourself to stay in a safe condition and avoid air pollution during healing.

3. Methods

3.1 Types of Research

This study was a descriptive study of correlation with cross sectional design, conducted on 107 people. The focus of this research is on the relationship between the physical condition of the house and the behavior of residents on the incidence of pulmonary tuberculosis in 2023 in the working area of the Rangkasbitung Health Center.

The sample in this study used a total sampling technique by determining the sample obtained as much as the entire population of TB patients starting from 2022 to 2023, with adults aged 19-44 years who made examination visits in the work area of the Rangkasbitung Health Center totaling 107 patients.

3.2 Data Collection

Data taken in the study, namely primary and secondary data. Primary data were obtained directly from the results of questionnaires to the community related to home environmental conditions, and secondary data were obtained from electronic recording and reporting of TB patient visit data in the work area of the Rangkasbitung Health Center.

The data that has been obtained is then processed through stages: editing, coding, entry, and cleaning. Then, it was analyzed by univariate analysis to see a picture of the frequency distribution of the variables studied, followed by bivariate analysis to see the relationship between two related or related variables (independent and dependent variables), namely variables of home environment conditions using SPSS 23 software with a Chi-Square statistical test with a 95% confidence degree (α=0.05). If the p-value obtained is less than 0.05 ($p<0.05$), then it can be said that there is a meaningful relationship. Finally, it is a multivariate analysis to find out the most dominant variable against the dependent variable. The test used is the Regression Logistics test with bivariate variable selection which has a value of $p<0.25$. Next, a Prevalence Odds Ratio (POR) test was carried out.

3.3 Aspects of Research Ethics

This research received ethical approval from the Faletehan University Research Ethics Commission with letter number 86 / KEPK. UF/II/2024.

4. Results and Discussion

4.1 Statistical Analysis

Univariate analysis, used to see the frequency distribution of TB events in the working area of the Rangkasbitung Health Center, with a total of 107 people. Then bivariate analysis to see the relationship between two related or related variables, and continued with multivariate analysis to find out the most dominant variable to the dependent variable.

4.2 Univariate Analysis

Subject Characteristics Based on the Incidence of TB in the Working Area of the Rangkasbitung Health Center

4.2.1 Subject characteristics were obtained based on the incidence of TB in the working area of the Rangkasbitung Health Center in 107 research respondents presented in Table 1.

Table 1. Frequency Distribution of Respondents Based on TB Incidence in the Working Area of the Rangkasbitung Health Center in 2023

Incidence of tuberculosis	Sum	Percentage (%)
Positive	74	69,2
Negative	33	30,8
Total	107	100

Based on Table 1, regarding the frequency distribution based on the incidence of TB in the working area of the Rangkasbitung Health Center with 107 respondents, it shows that there are 74 people (62.9%) more affected by TB or positive TB, compared to those who are not affected by TB or negative TB, which is 33 people (30.8%).

4.2.2 Frequency of Respondents Based on Home Air Circulation with TB Incidence

The frequency of respondents was obtained based on home air circulation with the incidence of tuberculosis in the working area of the Rangkasbitung Health Center presented in Table 2.

Table 2. Frequency Distribution of Respondents Based on Home Air Circulation in the Working Area of the Rangkasbitung Health Center in 2023

Home Air Circulation	Sum	Percentage (%)
Not every room has a window	46	43,0
Every room has a window	61	57,0
Total	107	100

Based on Table 2 regarding frequency distribution based on home air circulation with TB incidence, it shows that there were a number of respondents with "no windows" as many as 46 people (43.0%) or fewer compared to respondents "have windows" as many as 61 people (57.0%).

4.2.3 Frequency of Respondents Based on Occupancy Density with TB Incidence

The frequency of respondents was obtained based on the density of house occupancy with the incidence of tuberculosis in the working area of the Rangkasbitung Health Center presented in Table 3.

Table 3. Frequency Distribution of Respondents Based on Occupancy Density in the Working Area of the Rangkasbitung Health Center in 2023

Occupancy Density	Sum	Percentage (%)
Solid (< 8 m2 / person)	52	48,6
No (≥ 8 m2 / person)	55	51.4
Total	107	100

Based on Table 3 regarding frequency distribution based on home air circulation with TB incidence, it shows that the most respondents with the "not dense" category were obtained by 55 people (51.4%), then for occupancy with the "solid" category by 52 people (48.6%).

4.2.4 Frequency of Respondents Based on Lighting with TB Incidence

The frequency of respondents was obtained based on home lighting with the incidence of tuberculosis in the working area of the Rangkasbitung Health Center presented in Table 4.

Table 4. Frequency Distribution of Respondents Based on Lighting in the Working Area of the Rangkasbitung Health Center in 2023

Lighting	Sum	Percentage (%)
No (< 60 lux)	41	38,3
Yes (≥ 60 lux)	66	61,7

Total	107	100

Based on Table 4 regarding the frequency distribution of respondents based on home lighting with TB incidence, it shows that there are 41 people (38.3%) respondents with the category "no or less home lighting". Meanwhile, for respondents with the category "yes or enough home lighting" as many as 66 people (61.7%).

Sufficient lighting or said good according to Permenkes (2011), is lighting with lux or brightness levels that are more than equal to 60 lux per room.

4.2.5 Frequency of Respondents Based on Humidity with TB Incidence

The frequency of respondents was obtained based on house humidity with the incidence of tuberculosis in the working area of the Rangkasbitung Health Center presented in Table 5.

Table 5. Frequency Distribution of Respondents Based on Humidity in the Working Area of the Rangkasbitung Health Center in 2023

Moisture	Sum	Percentage (%)
Not qualified (> 60%)	16	15,0
Qualified (45-60%)	91	85,0
Total	107	100

Based on Table 5 regarding the frequency distribution based on home air humidity with the incidence of tuberculosis, it shows that the most respondents with the "qualified" category were 91 people (51.4%), then for the "ineligible" category as many as 16 people (15.0%).

4.2.6 Frequency of Respondents Based on Education with TB Incidence

The frequency of respondents was obtained based on the level of education with the incidence of TB in the working area of the Rangkasbitung Health Center presented in Table 6.

Table 6. Frequency Distribution of Respondents Based on Education in the Working Area of the Rangkasbitung Health Center in 2023

Education	Sum	Percentage (%)
Low	89	83,2
High	18	16,8
Total	107	100

Based on Table 6 regarding the frequency distribution based on education level with the incidence of tuberculosis, it shows that respondents with the "low education" category are more, reaching 89 people (83.2%), and then for the "higher education" category as many as 18 people (16.8%).

4.2.7 Frequency of Respondents Based on Occupation with TB Incidence

The frequency of respondents was obtained based on occupation with the incidence of TB in the working area of the Rangkasbitung Health Center presented in Table 7.

Table 7. Frequency Distribution of Respondents Based on Work in the Working Area of the Rangkasbitung Health Center in 2023

Work	Sum	Percentage (%)
Work	91	85,0
Does not work	16	15,0
Total	107	100

Based on Table 7 regarding the frequency distribution based on occupations with TB incidence, it shows that respondents with the category of "working" are more, namely 91 people (85.0%), and "not working" are 16 people (15.0%).

4.2.8 Frequency of Respondents Based on Smoking Habits with TB Incidence

The frequency of respondents was obtained based on smoking habits with the incidence of tuberculosis in the working area of the Rangkasbitung Health Center presented in Table 8.

Table 8. Distribution of Respondents' Frequency Based on Smoking Status in the Working Area of the Rangkasbitung Health Center in 2023

Smoking Status	Sum	Percentage (%)
Yes	59	55,1
No	48	44,9
Total	107	100

Based on Table 8 regarding the frequency distribution of respondents with smoking habits to the incidence of tuberculosis, it shows that respondents with the category "yes smoke" more, reaching 59 people (55.1%), and "not smoking" less, namely 48 people (44.9%).

4.3 Bivariate Analysis

4.3.1 The Relationship of Home Air Circulation with TB Incidence

Analysis of the relationship between air circulation and the incidence of tuberculosis in the working area of the Rangkasbitung Health Center is presented in Table 9.

Table 9. Distribution of Respondents Based on Home Air Circulation with TB Incidence in the Working Area of the Rangkasbitung Health Center in 2023

Home air circulation	Incidence of tuberculosis						P−value	PR (95% CI)
	Positive		Negative		Total			
	n	%	n	%	n	%		
Not every Rooms have windows	37	80,4	9	19,6	46	100	0,0	1,326 (1,036-1,698)
Every room have window	37	60,7	24	39,3	61	100	28	

The results of the Chi-Square test show that there is a significant relationship between home air circulation and TB incidence with a p-value (p<0.028). The PR results showed, that air circulation that not every room has a window is 1,326 times more likely to suffer from tuberculosis compared to air circulation every room has a window (1,036-1,698).

4.3.2 The Relationship of Occupancy Density with TB Incidence

Analysis of the relationship between occupancy density and the incidence of tuberculosis in the working area of the Rangkasbitung Health Center is presented in Table 10.

Table 10. Distribution of Respondents Based on Density with TB Incidence in the Working Area of the Rangkasbitung Health Center in 2023.

Density	Incidence of tuberculosis						P−value	PR (95% CI)
	Positive		Negative		Total			
	n	%	n	%	n	%		
Dense	42	80,8	10	19,2	52	100	0,011	1,388 (1,070-1,801)
Not	32	58,2	23	41,8	55	100		

From the results of the data analysis, it shows that respondents with positive TB more respondents had "dense occupancy density" (80.8%), compared to "no occupancy density" (58.2%). Chi Square test results, show there is a significant relationship between occupancy density and the incidence of TB p-Value (p<0.011). The PR results showed that dense occupancy density was 1,388 times more likely to suffer from tuberculosis compared to no occupancy density (1,070-1,801).

4.3.3 The Relationship of Lighting to the Incidence of TB

Analysis of the relationship between lighting and the incidence of tuberculosis in the working area of the Rangkasbitung Health Center is presented in Table 11.

Table 11. Distribution of Respondents Based on Lighting with TB Incidence in the Working Area of the Rangkasbitung Health Center in 2023

Lighting	Incidence of tuberculosis						P−value	PR (95% CI)
	Positive		Negative		Total			
	n	%	n	%	n	%		
Not	34	82,9	7	17,1	41	100	0,015	1,368 (1,077-1,738)
Yes	40	60,6	26	39,4	66	100		

The table of results above, too, shows that respondents with positive TB have more "no lighting" (82.9%) than "yes lighting" (60.6%). Chi Square test results, show that there is a significant relationship between exposure and the incidence of TB p-Value (p<0.015). The PR results showed that "no" lighting or less lighting was 1,368 times more likely to suffer from tuberculosis compared to yes lighting (1,077-1,738).

4.3.4 The Relationship of Humidity with the Incidence of TB

Analysis of the relationship between humidity and the incidence of tuberculosis in the working area of the Rangkasbitung Health Center is presented in Table 12.

Table 12. Distribution of Respondents Based on Lighting with TB Incidence in the Working Area of the Rangkasbitung Health Center in 2023

Moisture	Incidence of tuberculosis						P−value	PR (95% CI)
	Positive		Negative		Total			
	n	%	n	%	n	%		
Not eligible	15	93,8	1	6,2	16	100	0,020	1,446 (1,187-1,761)
Qualify	59	64,8	32	35,2	91	100		

Based on Table 12 shows, respondents with positive TB have more unqualified humidity (93.8%) compared to qualified (64.8%). Chi Square test results show a significant relationship between humidity and TB incidence p−Value (p<0.020). PR results showed that unqualified humidity was at 1,446 times higher risk of suffering from tuberculosis compared to qualified humidity (1,187-1,761).

4.3.5 The Relationship of Education with the Incidence of TB

Analysis of the relationship between occupancy density and the incidence of tuberculosis in the working area of the Rangkasbitung Health Center is presented in Table 13.

Table 13. Distribution of Respondents Based on Education with TB Incidence in the Working Area of the Rangkasbitung Health Center in 2023

Education	Incidence of tuberculosis						P−value	PR (95% CI)
	Positive		Negative		Total			
	n	%	n	%	n	%		
Low	67	75,3	22	24,7	89	100	0,002	1,936 (1,072-3,496)
Tall	7	38,9	11	61,1	18	100		

Based on Table 13, TB positive respondents are more likely to have a low level of education (75.3%) than those with a higher level of education (38.9%). The results of the Chi Square test showed that there was a significant relationship between education and the incidence of tuberculosis p−Value (p<0.002). The PR results showed that low education had a 1,936 times risk of suffering from tuberculosis compared to higher education (1,072-3,496).

4.3.6 Occupational Relationship with TB Incidence

Analysis of the relationship between work and the incidence of TB in the working area of the Rangkasbitung Health Center is presented in Table 14.

Table 14. Distribution of Respondents Based on Work with TB Incidence in the Working Area of the Rangkasbitung Health Center in 2023

Work	Incidence of tuberculosis						P−value	PR (95% CI)
	Positive		Negative		Total			
	n	%	n	%	n	%		
Work	68	74,7	23	25,3	91	100	0,006	1,993 (1,047-3,793)
Does not work	6	37,5	10	62,5	16	100		

The table above also shows that respondents with positive TB are more likely to have a job or work (74.7%) than those without work (37.5%). The results of the Chi Square test showed a significant relationship between occupation and the incidence of tuberculosis p−Value (p<0.006). The PR results showed that the working category was 1,993 times more likely to suffer from tuberculosis compared to non-working (1,047-3,793).

4.3.7 The Relationship of Smoking Habits with the Incidence of TB

Analysis of the relationship between smoking habits and the incidence of tuberculosis in the working area of the Rangkasbitung Health Center is presented in Table 15.

Table 15. Distribution of Respondents Based on Smoking Habits with the Incidence of TB in the Working Area of the Rangkasbitung Health Center in 2023

Smoking Habits	Incidence of tuberculosis						P−value	PR (95% CI)
	Positive		Negative		Total			
	n	%	n	%	n	%		
Yes	47	79,7	12	20,3	59	100	0,009	1,416 (1,069-1,875)
Not	27	56,2	21	43,8	48	100		

Table 15 shows that respondents with positive TB are more likely to smoke (79.7%) than nonsmokers (56.2%). The results of the Chi Square test showed a significant relationship between smoking habits and the incidence of tuberculosis p−Value (p<0.0069. PR results showed that respondents who smoked had a 1,416 times risk of suffering from tuberculosis compared to non-smokers (1,069-1,875).

4.4 Multivariate Analysis

After univariate and bivariate analysis, the next step is to analyze the study with multivariate analysis to find out the most dominant variable to the variable.

Table 16. Multivariate Early Models

Variables in the Equation

		B	S.E.	Wald	Df	Sig.	Exp(B)	95% C.I.for EXP(B)	
								Lower	Upper
Step 1a	Home air circulation	-.020	.743	.001	1	.978	.980	.228	4.207
	Occupancy density	.586	.523	1.251	1	.263	1.796	.644	5.010
	Lighting	.852	.813	1.100	1	.294	2.345	.477	11.529
	Humidity	2.574	1.388	3.439	1	.064	13.122	.864	199.336
	Education	1.684	.802	4.404	1	.036	5.387	1.118	25.969
	Work	1.309	.818	2.558	1	.110	3.703	.744	18.416
	Smoke	1.028	.536	3.670	1	.055	2.795	.977	7.997
	Constant	-13.051	3.453	14.288	1	.000	.000		

a. Variable(s) entered on step 1: home air circulation, density, lighting, humidity, education, employment, smoking.

Table 16 shows that the variables that have a p-Value of >0.05 are home air circulation, occupancy density, lighting, occupation, and smoking. Then, the variable that is issued first is air circulation because it has the largest p-value.

Table 17. Variable expenditure on the model

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B)	
								Lower	Upper
Step 1[a]	Sirkulasi udara rumah	-.020	.743	.001	1	.978	.980	.228	4.207
	Kepadatan huniann	.586	.523	1.251	1	.263	1.796	.644	5.010
	Pencahayaann	.852	.813	1.100	1	.294	2.345	.477	11.529
	Kelembabann	2.574	1.388	3.439	1	.064	13.122	.864	199.336
	Pendidikan	1.684	.802	4.404	1	.036	5.387	1.118	25.969
	Pekerjaan	1.309	.818	2.558	1	.110	3.703	.744	18.416
	Merokok	1.028	.536	3.670	1	.055	2.795	.977	7.997
	Constant	-13.051	3.453	14.288	1	.000	.000		
Step 2[a]	Kepadatan huniann	.584	.521	1.258	1	.262	1.793	.646	4.977
	Pencahayaann	.837	.599	1.953	1	.162	2.310	.714	7.476
	Kelembabann	2.573	1.387	3.441	1	.064	13.109	.864	198.827
	Pendidikan	1.683	.801	4.410	1	.036	5.381	1.119	25.884
	Pekerjaan	1.313	.808	2.639	1	.104	3.716	.763	18.106
	Merokok	1.024	.517	3.916	1	.048	2.784	1.010	7.675
	Constant	-13.051	3.452	14.294	1	.000	.000		
Step 3[a]	Pencahayaann	.914	.596	2.348	1	.125	2.494	.775	8.027
	Kelembabann	2.750	1.371	4.022	1	.045	15.640	1.064	229.846
	Pendidikan	1.847	.778	5.633	1	.018	6.339	1.379	29.135
	Pekerjaan	1.386	.808	2.944	1	.086	3.998	.821	19.466
	Merokok	.960	.509	3.557	1	.059	2.611	.963	7.079
	Constant	-12.783	3.417	13.993	1	.000	.000		
Step 4[a]	Kelembabann	3.353	1.293	6.727	1	.009	28.579	2.269	360.013
	Pendidikan	1.804	.745	5.860	1	.015	6.075	1.410	26.180
	Pekerjaan	1.370	.778	3.098	1	.078	3.934	.856	18.087
	Merokok	.860	.495	3.022	1	.082	2.364	.896	6.237

a. Variable(s) entered on step 1: home air circulation, density, lighting, humidity, education, employment, smoking.

Table 18. Multivariate Final Model
Variables in the Equation

		B	S.E.	Wald	Df	Sig.	Exp(B)	95% C.I.for EXP(B)	
								Lower	Upper
Step 1a	Humidity	3.353	1.293	6.727	1	.009	28.579	2.269	360.013
	Education	1.804	.745	5.860	1	.015	6.075	1.410	26.180
	Work	1.370	.778	3 .098	1	.078	3.934	.856	18.087
	Smoke	.860	.495	3.022	1	.082	2.364	.896	6.237
	Constant	-12.197	3.281	13.821	1	.000	.000		

a. Variable(s) entered on step 1: home air circulation, density, lighting, humidity, education, employment, smoking.

Table 18 shows that the variables associated with TB incidence are humidity and education ($p<0.05$). Confounding variables, namely occupation and smoking ($p>0.05$). For variables, humidity is the most dominant factor because it has the largest OR of 28.579.

5. Conclusion

Based on the results of research and statistical analysis that has been carried out, several results were obtained based on univariate analysis: (1) there is a picture of the incidence of TB in the working area of the Rangkasbitung Health Center, with a total of 74 people (69.2%) and negative 33 people (30.8%); (2) obtained the frequency distribution of respondents based on home air circulation, with the categories "having windows" as many as 61 people (57.0%), and "not having windows" as many as 46 people (43.0%); (3) obtained the frequency distribution of respondents based on occupancy density, with the category of "dense" as many as 52 people (48.6%), and "not dense" as many as 55 people (51.4%); (4) obtained the frequency distribution of respondents based on lighting, with the category "no/less" as many as 41 people (38.3%), and "yes/enough" as many as 66 people (61.7%); (5) obtained the frequency distribution of respondents based on humidity, with the category "not eligible" as many as 16 people (15.0%), and "qualified" as many as 91 people (85.0%); (6) obtained the frequency distribution of respondents based on education, with the category of "low" as many as 89 people (83.2%), and "high" as many as 18 people (16.8%); (7) obtained the frequency distribution of respondents based on occupation, with the category of "working" as many as 91 people (85.0%), and "not working" as many as 16 people (15.0%); and (8) obtained the frequency distribution of respondents based on smoking habits, with the category "yes smoking" as many as 59 people (55.1%), and "not smoking" as many as 48 people (44.9%).

Furthermore, based on bivariate analysis: (1) there is a relationship between home air circulation and the incidence of tuberculosis in the working area of the Rangkasbitung Health Center in 2023, with P-Value values (0.028), PR = 1.326 (1.036-1.698); (2) there is a relationship between occupancy density and the incidence of tuberculosis in the working area of the Rangkasbitung Health Center in 2023, with P-Value (0.011), PR = 1.388 (1.070-1.801); (3) there is a relationship between lighting and the incidence of tuberculosis in the working area of the Rangkasbitung Health Center in 2023, with P-Value (0.015), PR = 1.388 (1.077-1.738); (4) there is a relationship between humidity and the incidence of tuberculosis in the working area of the Rangkasbitung Health Center in 2023, with P-Value (0.020), PR = 1.446 (1.187-1.761); (5) there is a relationship between

education and the incidence of TB in the working area of the Rangkasbitung Health Center in 2023, with P-Value (0.002), PR = 1.936 (1.072-3.496); (6) there is a relationship between work and the incidence of TB in the working area of the Rangkasbitung Health Center in 2023, with P-Value (0.006), PR = 1.993 (1.047-3.793); and (7) there is a relationship between smoking and the incidence of TB in the working area of the Rangkasbitung Health Center in 2023, with P-Value (0.009), PR = 1.416 (1.069-1.875).

Then for the multivariate analysis produced in this study, the variables associated with the incidence of tuberculosis are humidity and education ($p < 0.05$). Furthermore, the confounding variables, namely work and smoking ($p > 0.05$), and the most dominant is the humidity factor because it has the largest OR (OR=28.579).

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References

Abriansyah, O., &; Kardewi (2022). Risk Factor Analysis of Pulmonary Tb Incidence in the Working Area of Bungamas Health Center, East Kikim District, Lahat Regency. Bina Husada Health Journal, 14 (2), 56-61

Ariani, F., Lapau, B., Zaman, K., Mitra, M., &; Rustam, M. (2022). Factors associated with the incidence of pulmonary tuberculosis. Bahana Journal of Public Health, 6(1), 33–38. https://doi.org/10.35910/jbkm.v6i1.560

Christian, M., Irwansyah, B., &; Rahayu, S.T. (2019). Risk Factors for the Incidence of Pulmonary Tuberculosis in the Working Area of the Malinau Health Center, Malinau District, Malinau City, Malinau Regency in 2019. Journal of Public Health, 5(2), 62- 71

Diriba, K., &; Awulachew, E. (2022). Associated Risk Factor of Tuberculosis Infection Among Adult Patients In Gedeo Zone, Southern Ethiopia. Epidemiology of infectious diseases, 10, 1-10

FAJRIANSYAH, M. (2021). The relationship between the physical condition of the house to the incidence of pulmonary tuberculosis in the working area of the Puskesmas Pembina Jakabaring District, Palembang City in 2020.

Findi, M, L. (2023). Healthy Environment Prevent Transmission of Tuberculosis. Kncv New Zealand. Hidayatullah, A., Navianti, D., &; Damanik, H. D. L. (2021). Lungs in the Working Area

Puskesmas Kota Palembang The Physical Condition Of The House To The Event Of Pulmonary Tuberculosis In The Work Area Of Palembang City Health Center, Department Of Environmental Health Poltekkes Kemenkes Palembang. Journal of Environmental Sanitation, 1(2).

Imaduddin, D., &; Setiani, O. (2019). The Relationship between Home Physical Condition and Behavior with the Incidence of Pulmonary TB in the Working Area of Batu 10 Health Center Tanjungpinang City. Health Journal Community, 7(3), 8–14. Retrieved from https://ejournal3.undip.ac.id/index.php/jkm/article/download/25599/22767

Jayani, D.H. (2021). Average Expenditure by Commodity Group (March 2021). https://databoks.katadata.co.id/datapublish/2021/11/04/setelahmakanan-pengeluaran- Indonesian-people-many-for-buying-cigarettes-2021

Government department Health RI. (2022). No Title. Retrieved from http://p2p.kemkes.go.id/melalui-ina-time-2022-ke-4-menkes-budi-minta-90-Sufferers-of tuberculosis-can-be detected-in-year-2024/

Mardianti, R., Muslim, C., &; Setyowati, N. (2020). The Relationship of Home Environmental Health Factors to the Incidence of Pulmonary Tuberculosis (Case Study in Sukaharja District County During). NATURALIS (Journal of Natural Resources and Environmental Management Research), 9(2), 23-31

Mathofani, Puji E., &; Febriyanti, R. (2020). Factors Associated with the Incidence of Pulmonary Tuberculosis (TB) in the Working Area of the Serang City Health Center in 2019. Scientific Journal of Public Health, 12 (1), 1-10

Tone Nailufar, N. (2020, April 27). Understanding Density Inhabitant and Faktornya.Kompas.com.https://www.kompas.com/skola/read/2020/04/27/100000169/definitions-density-population-and-factors

Oktafiyana, F., Nurhayati, &; Murhan, A. (2016). The Relationship of the Work Environment of Patients with Pulmonary TB to the Incidence of Pulmonary TB Disease. Journal of Nursing, 12(1), 52-57

Tatangindatu, M. A., &; Umboh, M. J. (2021). Factors of the physical environment of the house and the incidence of pulmonary tuberculosis in coastal areas. Sesebanua Scientific Journal, 5(1), 31–35. https://doi.org/10.54484/jis.v5i1.381

WHO. (2021). Global tuberculosis report, 2020. Geneva, Switzerland: WHO, 2020. In I9789240037021. [Google Scholar].

Yuniar, I., Sarwono, &; Lestari, Susi D. (2018). Relationship of Nutritional Status and Income to the Incidence of Pulmonary Tuberculosis. Indonesian Journal of Nurses, 1(1), 18-25

Yushananta, P. (2021). Dengue Hemorrhagic Fever and Its Correlation with The Weather Factor In Bandar Lampung City: Study From 2009-2018. Aisyah Journal: Journal of Health Sciences, 6(1), 117–126. https://doi.org/10.30604/jika.v6i1.452.