



RELATIONSHIP BETWEEN TEMPERATURE AND HUMIDITY WITH TUBERCULOSIS INCIDENCE IN THE COMMUNITY

Muhammad Ikhtiar, Mansur Sididi

Faculty of Public Health, Universitas Muslim Indonesia, Jl. Urip Sumoharjo, KM. 5 Makassar, Sulawesi Selatan 90231, Indonesia

*muhammad.ikhtiar@umi.ac.id

ABSTRACT

The global commitment to ending tuberculosis is outlined in the End TB Strategy, which targets an 80% reduction in tuberculosis incidence and 90% reduction in tuberculosis deaths by 2030. Objective: found a relationship between temperature and humidity with pulmonary TB. This research is a quantitative research with a cross sectional study approach. Independent and dependent variables are measured simultaneously at the same time. The sampling method used is simple random sampling with a sample size of 138 Data analysis using the Chi Square test. The results of the chi square test obtained a value of $p = 0.001 < 0.05$, meaning that there is a relationship between temperature and humidity with the incidence of tuberculosis. Based on the results of the study, it was found that there were 73 respondent houses (52.9%) whose house temperatures met the requirements and 65 respondents (47.1%) who did not meet the requirements, meaning that there was a relationship between temperature and the incidence of tuberculosis. The results of the chi square test $p = 0.001 < 0.05$, which means that there is a significant relationship between temperature and the incidence of tuberculosis with a 4.66 times greater risk of getting TB. There is a relationship between temperature and humidity with the incidence of tuberculosis in Salo sub-district.

Keywords: humidity; TB; temperature

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INTRODUCTION

The global commitment to ending tuberculosis is outlined in the End TB Strategy which targets reducing the incidence of tuberculosis by 80% and deaths from tuberculosis by up to 90% by 2030. The Indonesian Ministry of Health has prepared an Elimination Roadmap with a global target by 2030, the incidence will fall by 80% to 65 per 100,000 population, and deaths will decrease to 6 per 100,000 population with efforts to increase the coverage of discovery and treatment of tuberculosis ≥ 90 , the success rate of tuberculosis treatment $\geq 90\%$ and tuberculosis prevention therapy (TPT) $\geq 80\%$. One of the conditions of indoor air is temperature and humidity requirements. If the temperature and humidity do not meet the criteria, germs will grow or increase in germs in the air. (Gulhan et al., 2020; Q. Wang et al., 2023).

While population migration is a known risk factor for the transmission of Tuberculosis in developed countries, it has not yet become a severe problem in Indonesia that the government pays attention to. However, the risk of transmission in Indonesia remains a concern, with a rate of 1-3%. This means that among 100 residents, 1-3 people are at risk of being infected with TB, underscoring the need for continued vigilance and preventive measures. This

research very important because Air temperature affects the incidence of TB so we can anticipate it.

METHOD

The type of research used is quantitative research, and the method used is a cross-sectional study. The independent variable and the dependent variable are measured simultaneously. The research sample was determined using a simple random sampling method with a determined sample size of 138 samples with the sample is the community of Salo sub-district. The data analysis method uses univariate analysis and is in the form of distribution tables and analysis tables and with Questionnaire. The distribution table is age and gender, while the analysis table concerns the relationship between temperature and humidity and the potential incidence of Tuberculosis

RESULTS

Tabel 1
Distribution of Respondents Based on Occupation (n=138)

Variable	f	%
No. Job	1	.7
Housewife	46	33.3
Contract employees	7	5.1
Student	13	9.4
Self-employed	24	17.4
Government employees	16	11.6
Teachers/Lecturer	2	1.4
Farmer	4	2.9
Private employees	1	.7
Retired	2	1.4
Bricklayer	2	1.4
Pedicab driver	3	2.2
Motorcycle taxis driver	6	4.3
Parking attendants	11	8.0

Table 1, the research results from 138 respondents show that the largest number of respondents were housewives, with 46 (33.3%), and the fewest were unemployed and private employees, with 1 respondent each (0.7%).

Table 2.
Distribution of Respondents Based on Education (n=138)

Education	f	%
No	10	7.2
elementary school	35	25.4
junior high school	19	13.8
Senior high school	53	38.4
bachelor	20	14.5
Master degree	1	0.7

Table 2 shows that the research results showed that the most significant number of respondents had a high school education, namely 53 respondents (38.4%), and the least had a master's degree, 1 respondent (0.7%). *Analisis Univariate*

Table 3.
Distribution of Respondents Based on House Temperature (n=138)

Temperature	f	%
Qualify	73	52.9
No. Qualify	65	47.1

Table 3 shows that the research results showed that 73 respondents' houses (52.9%) had temperatures that met the requirements, and 65 respondents' houses (47.1%) had temperatures that did not meet the criteria.

Table 4.

Humidity Distribution in the Working Area of the Salo Community Health Center, Pinrang Regency

Temperature	f	%
Qualify	55	39.9
No. qualify	83	60.1

Table 4 shows that the research results showed that 55 respondents' houses (39.9%) had humidity that met the requirements, and 83 respondents' houses (60.1%) had humidity that did not meet the criteria.

Table 5. The Relationship between Temperature and the Incidence of Tuberculosis

Temperature	Tuberkulosis				Total		p value
	suffering from TB		No TB		f	%	
	f	%	f	%			
Qualify	5	6,8	68	93,2	30	100	0,000
No. qualify	25	38,5	40	61,5	108	100	

Table 5 measures the relationship between temperature and the incidence of Tuberculosis. Of the 138 respondents, 5 (6.8%) sufferer houses met the requirements and 25 (38.5%) did not. In the homes of respondents who did not suffer from Tuberculosis, (93.2%) house temperatures that the requirements, and 40 (61.5%) did not meet them. The chi-square test results obtained a p-value = 0.000, which means the p-value is smaller than 0.05, so Ha is accepted, and Ho is rejected. This shows that there is a significant relationship between temperature and the incidence of Tuberculosis.

Tabel 6.

Relationship between humidity and the incidence of tuberculosis

Humadity	Tuberkulosis				Total		p value
	suffering from TB		No TB		f	%	
	f	%	f	%			
Qualify	0		55	100	55	100	
No qualify	30	36,1	53	63,9	83	100	0,000

Table 6 measures the relationship between humidity and the incidence of tuberculosis. It is known that of the 138 respondents who suffered from it, no houses with humidity met the requirements, and 30 (36.1%) did not. For respondents who did not suffer from it, 55 (100%) met the requirements, and 53 (63.9%) did not. The chi-square test results obtained a p-value = 0.000, which means the p-value is smaller than 0.05, so Ha is accepted, and Ho is rejected. This shows that there is a significant relationship between humidity and the incidence of tuberculosis.

DISCUSSION

The relationship between temperature and the incidence of tuberculosis

House temperature is a quantity that expresses a room's degree of hotness and coldness. The temperature in the room at home is too low and can cause health problems, leading to hypothermia, while the temperature is too high and can cause dehydration. Abnormal temperatures can also create a medium for the growth of microorganisms. Abnormal temperatures play a role in the incidence of pulmonary Tuberculosis. The research results found that there were 73 respondents' houses (52.9%) whose houses met the requirements and 65 respondents (47.1%) whose houses did not meet the criteria. So, the chi-square test results are $p=0.000<0.05$, which means there is a relationship between temperature and the incidence of Tuberculosis. The factor that causes this is that public knowledge is still lacking regarding

house construction, which must be appropriate so that the indoor temperature does not change drastically.

This research is in line with research conducted by Chaw et al. (2022) Which investigated the relationship between climate variables and the incidence of pulmonary Tuberculosis (PTB) in the Brunei-Muara district, Brunei Darussalam and obtained results that climate greatly influenced the incidence of TB. Other research also discusses the relationship between Ambient delicate particulate matter (PM_{2.5}) and the incidence of Tuberculosis, and it is proven that this research in China concluded that Overall, around 20% or more of TB cases in 22 study cities during the 2011-2020 period, were caused by exposure to PM_{2.5} (J. Wang et al., 2023).

The relationship between humidity and the incidence of tuberculosis

Home air humidity is the average water content in the house. According to the Republic of Indonesia Minister of Health Regulation, no. 1107 of 2011 concerning Guidelines for Healthy Indoor Air, air humidity that meets the requirements can cause the growth of microorganisms, which can cause problems with human health. The research results found 55 respondents (39.9%) whose houses met the requirements and 83 respondents (60.1%) whose houses did not meet the criteria. So, the chi-square test results are $p = 0.001 < 0.05$, which means there is a significant relationship between temperature and the incidence of Tuberculosis.

Several factors cause high humidity, namely poor house construction, such as leaking roofs, floors, and walls that are not watertight. Therefore, control and prevention of tuberculosis in hospitals is best achieved through three approaches, namely administrative (diagnosis). Early screening, etc.), engineering (physical facilities e.g., ventilated isolation rooms), and personal respiratory protection (filtered face masks)(Humphreys, 2007). This research is in line with the results of research in India. Research findings in India state that strategies are needed to reduce fuel exposure, such as using stoves and clean ventilation. (Bentayeb et al., 2015; Chan & Fang, 2021; Patel et al., 2021). It's different with research Escombe et al. (2019) This suggests hospitals make simple and inexpensive modifications to design infrastructure with open ventilation.

CONCLUSION

As a conclusion of this research, there is a relationship between temperature and humidity and the incidence of tuberculosis in the Salo sub-district, Kab. Pinrang and it is recommended that people maintain the temperature and humidity of the room where they live.

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