# ANALYSIS OF DETERMINANT ENVIRONMENT BASED DISEASES IN JAMBI PROVINCE 2020

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***ABSTRACT***

**Background :**Environment-based disease is disease phenomena caused by the relationship between humans and environmental factors. The determining factor provision of clean water, healthy latrines and others. Indonesia still has environmental-based infectious diseases that are still prominent, such as DHF, pulmonary TB, malaria, diarrhea, ARI and others.

**Objective :**Analyzing environmental-based disease determinants, namely ARI, TB, DHF and others. with the determinant factors namely the provision of clean water, healthy latrines, temperature and others in Jambi Province in 2020.

**Method :**This research uses the method *quantitative* use *observational design* analytics and approach s*core sectional*. Conducted at the DINKES & BPS Jambi Province in August - September 2022. Using secondary data and total research subjects sampling and bivariate analysis using test pearson and spearman.

**Results :** The results of the Bivariate analysis showed a correlation between the incidence of pneumonia and rainfall with a value of p = 0.019, malaria and clean water p-value = 0.031. Other variables have no correlation with p value≥0,05.

**Conclusion :** There is a significant correlation between the incidence of pneumonia and rainfall, malaria and clean water and other variables that do not have a significant relationship with environmental-based diseases.

***Keywords :****Environmental based disease, Healthy latrines, Clean water, Temperature, Rainfall, Air humidity, Population density*

## PENDAHULUAN

Environmentally based diseases are a serious public health cause and even the leading cause of death. Public awareness of the importance of maintaining cleanliness and health is still low which results in various diseases easily appearing and developing.[1] According to the Environmental Health Program Policy Direction Guidelines in 2008, it was stated that Indonesia still has prominent environmental-based infectious diseases such as DHF, pulmonary TB, malaria, diarrhea, respiratory tract infections, pneumonia, and others.

Hendrik L.Bloom said that degree

of public health is influenced by four factors, namely: 1) lifestyle (life style); 2) environment (social, economic, political, cultural); 3) health services; and 4) genetic factors (heredity), where the environment is the main factor.[2] The scope of basic sanitation includes the provision of clean water, availability of family latrines, waste disposal facilities and waste water disposal facilities.[3]

Acute Respiratory Infection (ARI) is an environment-based disease that is always included in the top 10 diseases in almost all health centers in Indonesia, apart from malaria, Dengue Hemorrhagic Fever (DHF), Pulmonary Tuberculosis (TB), skin diseases, poisoning and complaints due to a bad work environment. There is still a high prevalence of environmental-based diseases, including diseases caused by environmental factors and low levels of clean and healthy living behavior.[4] Jambi Province is one of the endemic areas. The highest malaria morbidity rate per district/city in Jambi Province in 2020 was 0.08 per 1,000 population. The achievement of Jambi Province Treatment Coverage (TC) in 2020 was 21.94%, this figure has not met the minimum target set at 85%. In Jambi Province, the incidence of Dengue Hemorrhagic Fever has spread to all districts / cities. The City of Jambi still recorded the highest cases throughout 2016 to 2020, the Incidence Rate (IR) in 2019-2020 was 57.94 per 100,000 population, while the mortality rate experienced a significant increase in 2019 and tended to be stagnant in 2020, namely 0.68%. The incidence of ARI in Jambi province is 3.15% and is the 18th highest prevalence in Jambi province. In 2017 the incidence of typhoid fever at one of the Jambi health centers was 221 cases and the TB incidence rate in Jambi province in 2020 was 3001 people. [5]

The incidence of environment-based diseases in Indonesia is still high, therefore there are several efforts that can be made to minimize the occurrence of environment-based diseases, including: (1) Sanitation of Clean Water Sources (SAB), which can be carried out through water quality surveillance, Sanitation Inspection of Clean Water Facilities, Checking water quality, and Fostering water user groups. (2) Settlement Environmental Health by monitoring family latrines, Wastewater Sewerage Channels (SPAL), and Waste Management Areas (TPS), Sanitation of Public Places (TTU) including hotels and other lodging places, markets, swimming pools and other public baths, places of worship, public transportation facilities, beauty salons, bars and other entertainment venues. (3) Efforts are made to develop Hospital institutions and other health facilities, educational facilities, and offices. (4) Sanitation of Food Management Places (TPM) which aims to carry out technical guidance and supervision of food and beverage health facilities, preparedness and prevention of outbreaks of poisoning, early warning and

food-borne diseases. (5) Monitoring of mosquito larvae can be carried out by all house owners together with cadres of larva observers (jumantik), sanitation workers at the health center, carrying out inspections of places that may become breeding grounds for mosquitoes and the growth of larvae.[6] The high incidence of environment-based diseases and there is still little research discussing environment-based diseases, the researchers are interested in conducting research on the analysis of the determinants of environment-based diseases in Jambi province.

## METHOD

This research was conducted in Jambi province starting from August to September 2022. This research used a quantitative method using an analytic observational design and a cross sectional approach. The population in this study consisted of all cases of environment-based diseases namely ARI, DHF, TB, Malaria, Pneumonia and Diarrhea in Jambi Province with the number of samples consisting of all cases of environment-based diseases namely ARI, DHF, TB, Malaria, pneumonia and Diarrhea in the Province in 2020 so this research was total sampling.

The variables in this study are divided into dependent variables in the form of environmental-based disease events and independent variables in the form of clean water supply, healthy latrines, air temperature, air humidity, rainfall and population density.

Secondary data in this study were obtained based on data from the Central Statistics Agency (BPS) which included data on the amount of clean water supply, healthy latrines, air temperature, air humidity, rainfall and population density. The data obtained is then collected and seen for its completeness.

The data analysis technique used in this study is univariate analysis which is used to find out a descriptive picture of the dependent variable, namely the incidence of environment-based diseases and to find out a descriptive picture of the research variables including: the occurrence of environment-based diseases, the provision of clean water, healthy latrines, air temperature, air humidity, rainfall and population density. Second, bivariate analysis to determine the relationship between the independent variables (characteristic factors and determinants) and the dependent variable (environment-based disease incidence). Used by using the Correlation test with a degree of confidence of 95% (CI) and $\alpha = 0.05$.

## RESULT

Based on the Table.1, from the results of the correlation test that has been carried out there is no correlation between the incidence of ARI and healthy latrines, clean water, temperature, rainfall, air humidity and population density in Jambi province in 2020.

**Tabel.1 ARI Correlation with Healthy Latrines, Clean Water, Temperature, Air Humidity, Rainfall and Population Density in Jambi Province in 2020**

| Variable | | Describe | |
|---|---|---|---|
| Dependent | Independent | R | *p value* |
| Acute Respiratory Infection (Y) | Healthy Latrines (X1) | 0,469 | 0,145 |
| | Clean Water (X2) | 0,488 | 0,128 |
| | Temperature (X3) | 0,480 | 0,135 |
| | Air Humidity (X4) | 0,161 | 0,636 |
| | Rainfall (X5) | 0,436 | 0,180 |
| | Population Density (X6) | 0,228 | 0,500 |

Based on Table 2, it can be concluded that there is no significant correlation between TB incidence and healthy latrines, clean water, temperature, rainfall, air humidity and population density in Jambi province in 2020.

**Table 2. Correlation of TB with Healthy Latrines, Clean Water and Temperature in Jambi Province in 2020**

| Variable | | Describe | |
|---|---|---|---|
| **Dependent** | **Independent** | **R** | ***p value*** |
| Tuberculosis (Y) | Healthy Latrines (X1) | 0,361 | 0,276 |
| | Clean Water (X2) | 0,399 | 0,225 |
| | Temperature (X3) | 0,259 | 0,441 |
| | Air Humidity (X4) | 0,152 | 0,656 |
| | Rainfall (X5) | -0,145 | 0,670 |
| | Population Density (X6) | -0,.96 | 0,779 |

Based on Table , it can3 be concluded that there is a significant correlation between the incidence of pneumonia and rainfall in Jambi province in 2020.

**Table 3. Pneumonia correlation with healthy latrines, clean water and temperature in Jambi province in 2020**

| Variable | | Describe | |
|---|---|---|---|
| **Dependent** | **Independent** | **R** | ***p value*** |
| Pneumonia (Y) | Healthy Latrines (X1) | 0,555 | 0,076 |
| | Clean Water (X2) | 0,348 | 0,295 |
| | Temperature (X3) | 0,326 | 0,327 |
| | Air Humidity (X4) | 0,023 | 0,947 |
| | Rainfall (X5) | 0,691 | 0,019 |
| | Population Density (X6) | 0,237 | 0,482 |

Based on Table 4, it can be concluded that there is no significant correlation between the incidence of DHF and healthy latrines, clean water, temperature, humidity, rainfall and population density in Jambi province in 2020.

**Table 4. DHF Correlation with Healthy Latrines, Clean Water, Temperature, Air Humidity, Rainfall and Population Density in Jambi Province in 2020**

| Variable | | Describe | |
|---|---|---|---|
| **Dependent** | **Independent** | **R** | ***p value*** |
| Dengue Hemorrhage Fever (Y) | Healthy Latrines (X1) | 0,209 | 0,537 |
| | Clean Water (X2) | 0,291 | 0,385 |
| | Temperature (X3) | 0,009 | 0,979 |
| | Air Humidity (X4) | -0,179 | 0,598 |
| | Rainfall (X5) | 0,373 | 0.259 |
| | Population Density (X6) | 0,228 | 0,500 |

Based on Table 5, it can be concluded that there is a significant correlation between the incidence of malaria and clean water. in Jambi province in 2020.

**Table 5. Correlation of Malaria with Healthy Latrines, Clean Water, Temperature, Air Humidity, Rainfall and Population Density in Jambi Province in 2020**

| Variable | | Describe | |
|---|---|---|---|
| **Dependent** | **Independent** | **R** | ***p value*** |
| Malaria (Y) | Healthy Latrines (X1) | 0,563 | 0,072 |
| | Clean Water (X2) | 0,648 | 0,031 |
| | Temperature (X3) | 0,363 | 0,272 |
| | Air Humidity (X4) | 0,063 | 0,855 |
| | Rainfall (X5) | 0,153 | 0,654 |
| | Population Density (X6) | -0,374 | 0,258 |

Based on Table 6, it can be concluded that there is no significant correlation between the incidence of diarrhea and healthy latrines, temperature, humidity, rainfall and population density in Jambi province in 2020.

**Table 6. Correlation of Diarrhea with Healthy Latrines, Clean Water, Temperature, Air Humidity, Rainfall and Population Density in Jambi Province in 2020**

| Variable | | Describe | |
|---|---|---|---|
| **Dependent** | **Independent** | **R** | **P value** |
| Diarrhea (Y) | Healthy Latrines (X1) | 0,458 | 0,156 |
| | Clean Water (X2) | 0,467 | 0,148 |
| | Temperature (X3) | 0,441 | 0,175 |
| | Air Humidity (X4) | 0,193 | 0,569 |
| | Rainfall (X5) | 0,500 | 0,117 |
| | Population Density (X6) | 0,306 | 0,306 |

**DISSCUSION**

From the results of the correlation test, it can be seen that there is no significant correlation between the incidence of ARI and healthy latrines in Jambi province in 2020 with a p=0.146. This is in line with research conducted by Sabila et al (2021), with the results of the statistical test results showing that there was no relationship between ISPA and healthy jamjam with p=0.389.[7]

The results of the correlation test show that the value of p=0.128 means that there is no significant correlation between the incidence of ARI and clean water in Jambi province in 2020. This research is in line with research conducted by Sabila et al (2021), using the Fisher's exact analysis method with a result of p=0.155, concluding that there is no significant relationship between clean water facilities and the incidence of ARI in toddlers. In this study, most of the community's clean water facilities met health requirements. Most people already have their own clean water facilities, either in the form of dug wells or pumping wells, which are > 10m from the safety tank. This is in accordance with RI Minister of Health Regulation No. 32 of 2017 concerning clean water requirements.[7]

The results of the correlation test show that the p value = 0.135 with the conclusion that there is no significant correlation between the incidence of ARI and temperature in Jambi Province in 2020. This is in line with research conducted by Kartini et al (2019), where the results showed that there was no effect between house temperature and the incidence of ARI in children aged 1-12 years.[8]

The results of the ARI correlation test with air humidity p=0.636, it can be seen that there is no significant relationship between the incidence of ARI and air humidity. This is supported by research conducted by Suryani et al (2015) where the results showed that there was no relationship between air humidity and the incidence of ARI. 9 The results of the correlation test showed that there was no significant relationship between the incidence of ARI and rainfall with a value of p = 0.180. This research is in line with research conducted by Layli et al (2020). The results of the Pearson product moment correlation test showed a value of p = 0.325 (p > 0.05), meaning that there was no significant relationship between rainfall and the incidence of ARI in Banjarmasin City in 2012-2016.[1]

The results of the correlation test between the incidence of ARI and the population density of p = 0.500, it can be seen that there is no significant relationship between the incidence of ARI and population density. This is different from a study conducted by Nova et al (2017) where the results were between population density and the incidence of ARI in toddlers. This study showed that the number of ARI cases in toddlers in Puwatu Village contained 98 ISPA sufferers and

Puwatu Village was a complaint with a fairly high population density.

**TB incidence with healthy latrines, clean water, temperature, humidity, rainfall and population density**

The results of the correlation test with a p value = 0.276, it can be seen that there is no significant relationship between the incidence of TB and healthy latrines in Jambi province in 2020. This is in line with research conducted by Kustanto (2020), where the research results showed no significant relationship between healthy latrines in TB cases.[11]

The results of the correlation test for the incidence of TB with the clean water variable yielded a value of p = 0.225, it can be seen that there is no significant relationship between the incidence of TB and clean water in Jambi province in 2020. This research is not in line with research conducted by Armiatin (2023), which obtained the results that there is a relationship between clean water facilities and the incidence of pulmonary tuberculosis (pulmonary TB) where the p value = 0.00.68. The results of the correlation test for TB incidence and temperature yielded a value of p = 0.441. It can be seen that there is no significant relationship between TB incidence and temperature in Jambi province in 2020. This research is not in line with research conducted by Wildany (2021).[12]

The results of the correlation test for TB incidence and rainfall obtained a value of p = 0.670. It can be seen that there is no significant relationship between TB incidence and rainfall in Jambi province in 2020. Based on research conducted by Andhy (2022), it is different from the results of this study which stated that there was a significant relationship between TB incidence and rainfall. Higher rainfall results in increased TB sufferers.[13]

The results of the correlation test between TB incidence and population density yielded a value of p = 0.779. It can be seen that there is no significant relationship between TB incidence and population density in Jambi province in 2020. This research is in line with research conducted by Wildanny (2021). The results of the analysis using the Chi-square test showed a p-value = 0.258, which means that there is no effect between residential density and pulmonary tuberculosis (p-value> 0.05).[12]

**Pneumonia incidence with healthy latrines, clean water, temperature, humidity, rainfall and population density**

The results of the correlation test for the incidence of pneumonia with healthy toilets yielded a value of p = 0.076, it can be seen that there is no significant relationship between the incidence of pneumonia and healthy latrines in Jambi province in 2020. Research conducted by Periselneris (2020), Pneumonia is an inflammation of the lung parenchyma where the acinus is filled with inflammatory

fluid with or without accompanied by infiltration of inflammatory cells into the walls of the alveoli and interstitial cavities which is characterized by coughing accompanied by fast breathing and/or shortness of breath in children under five.[14]

The results of the correlation test for the incidence of pneumonia with clean water obtained a value of p = 0.295, it can be seen that there is no significant relationship between the incidence of pneumonia and clean water in Jambi province in 2020. Research conducted by Naseer in Pakistan shows that behavior is one of the factors that can influence the incidence of pneumonia in children under five. There is a relationship between clean and healthy living behavior and the incidence of pneumonia in toddlers in Srimartani Village, the working area of the Piyungan Health Center with a value of  = 0.000.

The results of the correlation test for the incidence of pneumonia with temperature yielded a value of p = 0.327. It can be seen that there is no significant relationship between the incidence of pneumonia and temperature in Jambi province in 2020. The results of this study are in line with research conducted by Halimah (2019), with a value of p = 0.722 which means there is no significant correlation between the incidence of pneumonia and temperature.[15]

The results of the correlation test for the incidence of pneumonia with air humidity yielded a value of p = 0.947. It can be seen that there is no significant relationship between the incidence of pneumonia and humidity in Jambi province in 2020. This research is not in line with research conducted by Halimah (2019). The correlation coefficient (r) value of air humidity is 0.250 (positive correlation direction), which means that the number of pneumonia events will increase if the air humidity increases.

The results of the correlation test with a value of p = 0.019 show that there is a significant correlation between the incidence of pneumonia and rainfall in Jambi province in 2020. This research is in line with the research conducted by Kim j et al (2016), which stated that rainfall in Papua New Guenea shows a positive relationship with the incidence of pneumonia in toddlers.[16]

The results of the correlation test carried out obtained the results of the value of p = 0.482 from the incidence of pneumonia to population density. These results state that there is no significant correlation between the incidence of pneumonia and population density in Jambi province in 2020. This research is not in line with research conducted by Fauziyah (2015) with a value of p = 0.038 which states that there is a relationship between the incidence of pneumonia and population density.[17]

**DHF incidence with healthy latrines, clean water, temperature, humidity, rainfall and population density**

The results of the correlation test p = 0.537 show that there is no significant relationship between the incidence of DHF and healthy latrines in Jambi province in 2020. This is different from the research conducted by Rizki and Ammar (2022), where the results showed that healthy latrines had a significant effect on the high number of dengue cases in West Java.[18]

The results of the correlation test show that the value of p = 0.385, that there is no significant relationship between Dengue Hemorrhagic Fever and Clean Water in Jambi province in 2020. In Minister of Health Regulation No. 32 of 2017 it is stated that what is meant by water is the Environmental Health Quality Standard Standard for Water media for Sanitary Hygiene Purposes including physical, biological and chemical parameters which can be in the form of mandatory parameters and additional parameters Water for Sanitary Hygiene Purposes is used to maintain personal hygiene such as bathing and toothbrushing, as well as for other purposes Wash food, cutlery and clothes. In addition, Water for Sanitary Hygiene Purposes can be used as raw water for drinking water.[19]

From the results of the correlation test, it can be seen that the value of p = 0.979 means that there is no significant relationship between DHF incidence and temperature in Jambi province in 2020. This research is in line with research conducted by Almita (2020), through the Spearman rho correlation test for DHF incidence and air temperature, namely (r) = -0.125, which means that the correlation is very weak, the direction of the relationship is negative (-) meaning that the higher the value of one variable will be followed by a decrease in the value of the other variable.

From the results of the correlation test, it can be seen that the value of p = 0.598 indicates that there is no significant relationship between the incidence of DHF and humidity in the Jambi province in 2020. This research is in line with the study of Valentina (2018), with the results of the statistical test p = 0.808. The results of this study stated that there is no relationship between humidity and the incidence of DHF in Bitung City in 2015-2017.[20]

From the results of the correlation test, it can be seen that the value of p = 0.259 indicates that there is no significant relationship between the incidence of DHF and rainfall in Jambi Province in 2020. This research is in line with research conducted by Valentina (2018), showing the results of the correlation test with a value of p = 0.058 stating that there is no relationship between rainfall and the incidence of DHF in Bitung City in 2015-2017.[20]

The results of the correlation test show that the value of p = 0.500 indicates that there is no significant relationship between DHF and population density in Jambi Province in 2020. This research is in line with research conducted by Desty et al

(2020). Based on Spearman's correlation test, a p value of 0.776 was obtained. This means that there is no significant relationship between population density and the incidence of DHF.[21]

**Malaria incidence with healthy latrines, clean water, temperature, humidity, rainfall and population density**

The results of the correlation test p = 0.072 show that there is no significant relationship between the incidence of malaria and healthy latrines in Jambi province in 2020. This is different from the research conducted by Nur (2018) where the results of the study show that there is a relationship between the use of latrines and the incidence of malaria in pregnancy at the Mompang Health Center, North Panyabungan District, Mandailing Natal Regency, 2018.[22]

The results of the correlation test p = 0.031 can be seen that there is a significant relationship between the incidence of malaria and clean water in Jambi province in 2020. This is in line with research conducted by Nur (2018) where the research results show that there is a relationship between the use of clean water and the incidence of malaria in pregnancy at the Mompang Health Center, Panyabungan Utara District, Mandailing Natal Regency in 2018.[22]

From the results of the correlation test, it can be seen that the value of p = 0.363 indicates that there is no significant relationship between the incidence of malaria and temperature in Jambi province in 2020. This research is in line with research conducted by Sandy (2019), there was an increase in air temperature from 2011 to 2018. The annual pattern of increase in average air temperature was not followed by a linear pattern of increase or decrease in malaria API rates. Spearman's correlation analysis shows the correlation coefficient R=-0.0l; p=0.97.[23]

From the results of the correlation test, it can be seen that the value of p = 0.855 indicates that there is no significant relationship between the incidence of malaria and humidity in Jambi province in 2020. This research is in line with research conducted by Semuel (2019). The highest humidity occurred in 2011 and decreased until 2015, and humidity rose again in 2016. API malaria data does not follow a graphical pattern of humidity.

From the results of the correlation test, it can be seen that the value of p = 0.855 indicates that there is no significant relationship between the incidence of malaria and rainfall in Jambi province in 2020. This research is in line with research conducted by Semuel (2019), rain on the dependent variable, namely the annual parasite incidence (API malaria) rate, found no significant relationship p = 0.42 and a weak correlation coefficient (R = 0.33).[23]

From the results of the correlation test, it can be seen that the value of p = 0.654 indicates that there is no significant relationship between the incidence of

malaria and the population density of Jambi province in 2020. This research is in line with Andi's research (2017), population density and malaria incidence do not have a significant correlation between the two (p-value = 0.184.[24]

**Malaria incidence with healthy latrines, clean water, temperature, humidity, rainfall and population density**

From the results of the correlation test, it can be seen that the value of p = 0.156 indicates that there is no significant relationship between the incidence of diarrhea and healthy latrines in Jambi province in 2020. The results are in line with research conducted by Sintia et al (2021), with the results of the chi square test p = 0.606 which states that there is no relationship between the incidence of diarrhea and family latrines in toddlers in Waliure village.[25]

From the results of the correlation test, it can be seen that the value of p = 0.148 means that there is no significant correlation between the incidence of diarrhea and clean water in Jambi province in 2020. This research is in line with research conducted by Hasanah (2023) The availability of clean water is not related to the incidence of diarrhea in toddlers with a test result of p = 1,000 concluded that it is not related to the incidence of diarrhea in toddlers in the working area of the Ampana Bara Health Center.[26]

From the results of the correlation test, it can be seen that the value of p = 0.175 means that there is no significant correlation between the incidence of diarrhea and temperature in Jambi province in 2020. This research is in line with research conducted by Padji (2017). The results stated that the variable temperature and cases of diarrhea did not have a significant relationship. This can be seen from the results of statistical analysis with a value of p = 0.9, thus the research hypothesis which states that there is a positive relationship between temperature and the incidence of diarrhea is not proven.[27]

From the results of the correlation test, it can be seen that the value of p = 0.596 means that there is no significant correlation between the incidence of diarrhea and humidity in Jambi province in 2020. The results of this study are in line with research conducted by Padji (2017), in the humidity variable in the same month as the incidence of diarrhea that occurred in Kupang City, there was no statistically significant relationship. The correlation test showed a p = 0.06.[27]

The results of the correlation test in this study can be seen that the value of p = 0.117 means that there is no significant correlation between the incidence of diarrhea and rainfall in Jambi province in 2020. This research is the same as the research conducted by Nuha (2021), showing the results of the correlation test of the rainfall variable and the incidence of diarrhea, there is no significant correlation

with a value of p = 0.589.[28]

The results of the correlation test in this study can be seen that the value of p = 0.360 means that there is no significant correlation between the incidence of diarrhea and population density in Jambi province in 2020. In a study conducted by Haumein (2019), in line with this study, the statistical test results stated that there was no relationship between population density and diarrheal disease p = 0.9850.[29]

## CONCLUSION

The results of the correlation test of the incidence of ARI found a weak relationship and there was a significant correlation between the incidence of pneumonia and rainfall. The results of the correlation test of the incidence of malaria concluded that the relationship was weak and there was a significant correlation between the incidence of malaria and clean water.

The results of the correlation test from the incidence of ARI, TB, DHF, Malaria, Pneumonia, Diarrhea found a weak relationship and no significant correlation with other variables.

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