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# Environment Factors and Host Factors Associated with Incident of Leprosy in Jeneponto District

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***Abstract***

*Leprosy is an infectious disease which feared by the community. This disease can be transmitted from one person to another with an inclusion period of 40 days to 40 years, an average of 3-5 years. This study aims to analyze environmental factors and host factors related to the incidence of leprosy in Jeneponto District. This research used a case control design. A total of 31 leprosy patients and 31 non lepers were sampled in this study. The primary data consists of data on environmental factors variables obtained through observation at the house of lepers (cases) and houses non lepers (control). Host factor variable data were obtained through questionnaires. Statistical analysis of Chi square test was used to determine the relationship between environmental factors and host factors with the incidence of leprosy.*

*The results showed that there was a significant relationship between environmental factors namely environmental hygiene with the incidence of leprosy (p value = 0.002 <0.05) and the room temperature with leprosy (p = 0.004 <0.05). In addition, there was a significant relationship between host factors, namely the contact history with the incidence of leprosy (p = 0.007 <0.05). but different with knowledge variable. the knowledge did not have a significant relationship with the incidence of leprosy, (p = 0.203> 0.05). There needs to be attention to environmental factors to prevent leprosy transmission in the community. Health promotion is needed to educate people to better protect the environment to improve their health.*

***Keywords:*** *environment factors, host factors, leprosy.*

## Introduction

Leprosy is an infectious disease which feared by the community. This disease is still one of the problems faced by the world community because it can cause very complex problems. The problem in question is not only in medical terms but extends to social, economic, cultural and national resilience problems[1]. If it is not handled carefully, leprosy can cause disability and this condition is a barrier for leprosy patients in living social life to meet their socioeconomic needs[2]. This disease is one of the real pictures of poverty in Indonesian society, because in reality most leprosy sufferers come from weak economic groups.

Epidemiological problems are still unsolved, the method of transmission is not yet known with certainty only based on classical assumptions, namely through direct and close skin contact. The second assumption is inhalation, because M. leprae can still live several days in droplets. The budding period varies greatly, from 40 days to 40 years, an average of 3-5 years. Leprosy is not a hereditary disease. Enis Gancar's research showed that M. leprae was able to live outside the human body and can be found in soil or dust around the patient's home environment[3]. Determinant epidemiology include environmental factors, host factors and agent factors can be predictif factor of leprosy in the community. Environmental factors include environmental hygiene, house cleanliness, occupancy density and temperature. Rismawati's Reseach showed that there was a relationship between the habit to clean the floor of the house, bathing habits, hair washing habits, hand washing habits with multibacillary leprosy[4]. This was supported by Yuniarasari's research showed there was relationship between the level of knowledge, personal hygiene, type of work,with the incidence of leprosy[5].

Host factors include knowledge, education, age, gender and a history of contact with patients. The research by Mukhlis showed that there was a significant relationship between the level of knowledge as a part of behavior and the process of transmission and healing in lepers. People who have high

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knowledge about leprosy will certainly try to distance themselves from the factors that can be a source of transmission of this disease[6]. In addition, knowledge of the disease must also be in line with one's hygiene behavior in their daily lives. The high incidence of leprosy in people have household contact was almost ten times compared than those who do not have household contact[7].

According to official reports received from 138 countries from all WHO regions, the global prevalence of leprosy registered globally by the end of 2015 was 176 176 cases (0.2 cases per 10,000 people). The number of new cases reported globally in 2015 was 211 973 (2.9 new cases per 100,000 people). In 2014, 213 899 new cases were reported, and in 2013, 215 656 new cases. The number of new cases shows the rate of transmission of infections that continues[8].

In Indonesia, lepers are found in almost all regions with uneven spread. Leprosy sufferers 90% live among families they and only a few percent live in leprosy hospitals, shelter colonies or leprosy villages. In 2015, 17,202 new cases of leprosy were reported with 84.5% of cases including Multi Basiler (MB) type. Whereas according to gender, 62.7% of new leprosy sufferers were male and 37.3% were female (Ministry of Health, 2016) . In 2015, there were 1220 in South Sulawesi Province new cases with a prevalence of 1.36 per 10,000 population[1]. Jeneponto health departement recorded a new case in 2015 of 67 cases and increased to 72 cases in 2016[9].

## Materials and methods

This study used observational descriptive research with a Case Control approach. This study aims to analyze the influence of environmental factors and host factors on the incidence of leprosy in Jeneponto District. In addition the researchers matched the type of house between cases and controls. This research was conducted in the work area of the Health Office in Jeneponto District from January to Juni 2018 . The sample of cases in this study were leprosy patients living in the working area of Public Health Center in Jeneponto District and recorded in medical records . The control sample is not a leper who lives in Jeneponto district at the time of the study. A total of 31 leprosy patients and 31 non lepers were sampled in this study. The primary data consists of data on environmental factors variables obtained through observation at the house of lepers (cases) and houses non lepers (control). Host factor variable data were obtained through questionnaires. Statistical analysis of Chi square test was used to determine the relationship between environmental factors and host factors with the incidence of leprosy

## Result

### Description of environment factors

Environmental factors include environmental hygiene, humidity and room temperature with 62 respondents consisting of 31 case respondents and 31 control respondents in Jeneponto district.

**Table 1.** Frequency distribution of environmental factors in Jeneponto Regency (N = 62)

| No. | Environment Factor | Leprosy | | | |
|---|---|---|---|---|---|
| | | Case | | Control | |
| | | N | % | N | % |
| 1 | environmental Hygiene | | | | |
| | At risk | 22 | 35.5 | 10 | 16.1 |
| | Not risky | 9 | 14.5 | 21 | 33.9 |
| 2 | Room temperature | | | | |
| | At risk | 17 | 27.4 | 6 | 9.7 |
| | Not risky | 14 | 22.6 | 25 | 40.3 |

Source: Primary data (2018).

Table 1 showed that most leprosy cases have risky environmental hygiene as many as 22 respondents (35.5%) and room temperature was risky as many as 17 respondents (27.4%). While in the control group, most of the cleanliness of the environment was not at risk, as many as 21 respondents (33.9) and as many as 25 resopondens (40.3%) had room temperature that is not risky.

## Description of host factors

Host factors include knowledge and contact history on 62 respondents consisting of 31 case respondents and 31 control respondents in Jeneponto district.

**Table 2.** Host factor frequency distribution in Jeneponto District (N = 62)

| No. | Host factors | Leprosy | | | |
|---|---|---|---|---|---|
| | | Case | | Control | |
| | | N | % | N | % |
| 1 | Knowledge | | | | |
| | Good | 12 | 19.4 | 17 | 27.4 |
| | Less | 19 | 30.6 | 14 | 22.6 |
| 2 | Contact History | | | | |
| | Yes | 15 | 24.2 | 5 | 8.1 |
| | No. | 16 | 25.8 | 26 | 41.9 |

*Source: Primary data (2018)*

Table 2 shows that most leprosy cases were less knowledge as many as 19 respondents (30.6%) and a contact history of 15 respondents (24.2%). Unlike the control case, most of them had good knowledge as many as 17 respondents (27.4%) and had no contact history as many as 26 respondents (41.9%).

### The relationship of environmental factors with the incidence of leprosy

**Table 3.** Relationship between environmental factors and leprosy incidence in 2018

| | Variable | Leprosy | | | | Total | | P |
|---|---|---|---|---|---|---|---|---|
| | | Case | | K | | | | |
| | | N | % | N | % | N | % | |
| **1** | environmental Hygiene | | | | | | | |
| | At risk | 22 | 35.5 | 10 | 16.1 | 32 | 51.6 | 0.002 |
| | Not risky | 9 | 14.5 | 21 | 33.9 | 30 | 48.4 | |
| 2 | Room temperature | | | | | | | |
| | At risk | 17 | 27.4 | 6 | 9.7 | 23 | 37.1 | 0.004 |
| | Not risky | 14 | 22.6 | 25 | 40.3 | 39 | 62.9 | |

Source: Primary data (2018)

Based on table 3, the results of the study with Chi square statistical tests showed that there was a significant relationship between environmental factors, namely environmental hygiene (p = 0.0 02 <0.05), and the room temperature (p = 0.04 <0.05) with the incidence of leprosy.

## The relationship between host factors and the incidence of leprosy

**Table 4.** Host factor relationship with leprosy incidence in 2018

| | Variable | Leprosy | | | | Total | | P |
|---|---|---|---|---|---|---|---|---|
| | | Case | | K | | | | |
| | | N | % | N | % | N | % | |
| **1.** | Knowledge | | | | | | | |
| | Good | 12 | 19.4 | 17 | 27.4 | 29 | 46.8 | 0.203 |
| | Less | 19 | 30.6 | 14 | 22.6 | 33 | 53.2 | |
| 2. | Contact History | | | | | | | |
| | Yes | 15 | 24.2 | 5 | 8.1 | 20 | 32.3 | 0.007 |
| | No. | 16 | 25.8 | 26 | 41.9 | 42 | 67.7 | |

Source: Primary data (2018)

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Based on table 4 , the results of the study with Chi square statistical tests showed that there was a significant relationship between host factors, namely the contact history with the incidence of leprosy (p = 0.0 07 <0.05).Different with knowledge does not have a significant relationship with the incidence of leprosy, with value of p = 0, 203 > 0.05

## Discussion

Relationship between environmental factors and the incidence of leprosy in Jeneponto Regency include environment hygiene and room temperature.The environment hygiene includes the cleanliness of the yard, cleanliness in the house and the cleanliness of personal hygiene of the people in the environment. The results showed there were 35.5% of respondents who had environmental hygiene at risk of leprosy, while there were 33.9 respondents who were not at risk in the control group. Statistical test results show that there was a significant relationship between environmental hygiene and the incidence of leprosy with a value of p = 0.0 02 <0.05 . According to Blum influencing factors health status is environment, behavior, descent, and service health. Healthy behavior is all health behaviors carried out on basic awareness of which behavior or activity is related to efforts to maintain and improve health, and include behavior in prevention of avoiding various kinds of diseases, causes illness or health problems to improve health of sociaty[10].

This research was supported by research conducted by Malaviya showed that leprosy can be minimized by the existence of counseling about hygiene and healthy living behavior. Individual hygiene that is not good will make it easier for the body to be attacked variously diseases, such as skin diseases, infection diseases, oral disease and channel disease digest or even eliminate functions certain body parts, like skin[11]. Especially for people who have access limited to health services, of course precautionary measures need to be put forward. However, if someone able to maintain hygiene, then of course it will related to the level of health as well. Where will the level of health be continue to develop in a better direction. To reduce the impact in leprosy transmission, it is recommended to avoid direct contact with sufferers leprosy. If direct contact cannot avoided, then enough body hygiene guarantee its prevention [12].

Temperature variables are divided into 2 categories: risk if less than 18 ° C and exceed 30 ° C and not contain if between 18 ° - 30 ° C. The results showed that there were 27.4% of respondents who had a risk of leprosy and 40.3% of control respondents who were not at risk. The results of statistical tests using the Chi-square test showed that there was a significant relationship between temperature and the incidence of leprosy in Kab. Jeneponto, p value = 0.004 <0.05. This research was supported by Rismawati's research showedthat there was a relationship between house temperature and multibacillary leprosy incidence with odds ratio (OR) = 4.295 with intervals of 1.420-12.997, which means that respondents with house temperature at risk had a risk of 4,295 times greater suffering from multibacillary leprosy when compared to respondents with house temperature was not risky. Indoor temperature was a factor that influences the growth of bacteria and viruses. Temperature besides affecting growth, also affects propagation and durability. According to the Indonesian Ministry of Health outside the human body (in tropical conditions) leprosy from nasal secretions can last up to 9 days. The optimal growth of in vivo leprosy germs in mice is at a temperature of 27-30 ° C. According to Marwali Harahap outside the host in dry secretions with varying temperatures M. leprae can survive 7-9 days[13].

The relationship between host factors and the incidence of leprosy in Jeneponto District include knowledge and history of contact. People who have knowledge what is high about leprosy will certainly be trying to distance himself from the factor factor which can be a source of transmission this disease[14]. Other than that, knowledge of the disease must also be in line with one's hygiene behavior in everyday life. Based on research, it is known thathygiene behavior has meaningful relationship in disease transmission leprosy[15]. On the other hand , good knowledge should be supported by practice It is also good for eradicating leprosy implemented optimally.

Enhancement community knowledge about leprosy do by optimizing counseling. Health education as one the concept of health education has a purpose to increase knowledge and change unhealthy community behavior becomes healthy[16]. The results showed that there was no relationship between levels knowledge with the incidence of leprosy in Jeneponto District . This result is based on the test

Chi-square, obtained the value of p (0, 203 ) > α (0.05 . According to the researcher assumption this is due to the high stigma and discrimination, so that people's knowledge of leprosy will affect their behavior. Based on research in the field it was found that most respondents had less knowledgeas many as 19 people or 30.6 % in the case group and those have a good knowledge of the control group were 17 or 27, 4%. From these results it can be seen that there are still many respondents who have low knowledge. Most respondents see symptoms of leprosy, however consider symptoms that appear are other skin diseases such as tinea versicolor. So there is a lack of action to check into service health and not a few of them experience treatment delay. Many people know about leprosy from experience of neighbors around those who have been diagnosed with leprosy without knowing how to transmit or prevent it.ThePublic Health Cente already has provided counseling to lepers and the general public through health cadres in several villages but less effective due to leprosy stigma and discrimination .

The results showed a significant association between history of contact with the incidence of leprosy in Jeneponto These results were based on Chi-square test,obtained p = 0.007 <0.05. Transmission of diseases according to some experts through the respiratory tract and skin (long and close direct contact), germs reaching the surface of the skin through hair follicles, sweat glands, and suspected through milk so leprosy can be prevented by improving personal hygiene[12]. This happens because contact is a medium to transmit leprosy in a study of incidence, the rate of infection for lepromatous leprosy contacts varies from 6.2 per 1000 per year in Cebu, the Philippines to 55.8 per 1000 per year in South India. Two exits of M. leprae from the human body are thought to be skin and nasal mucosa. It has been shown that lepromatous cases show a number of organisms in the dermis of the skin. Various things can be done to reduce the impact on leprosy transmission, one of which is recommended to avoid direct contact with lepers. This has been proven to reduce the incidence of leprosy while reducing the incidence of new cases in various regions[12].

## Conclusion and recommendation

Leprosy is an infectious disease with predictive factors for leprosy caused by environmental factors (environmental cleanliness, humidity, temperature) and host factors (contact history. Suggested to Communities need to improve behavior that supports the creation of healthy homes, such as providing adequate ventilation and lighting into the house. There needs to be attention to environmental factors to prevent leprosy transmission in the community. Health promotion is needed to educate people to better protect the environment to improve their health

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