District characteristics: Household economic status of families diagnosed with tuberculosis in Indonesia

Ema Novita Deniati,[1] Pandu Riono,[2] Muhammad Noor Farid[2]

[1]Department of Public Health, Faculty of Sports Science, Universitas Negeri Malang, Malang, East Java; [2]Department of Biostatistics and Population, Faculty of Public Health, Universitas Indonesia, Depok, West Java, Indonesia

Abstract

The 2016 Global TB Report stated that only 35.3% of people with TB were reported in Indonesia from around 1,020,000 estimated incidents. This of course makes the risk of people with TB who have not been found to transmit the disease will increase. Of all districts in Indonesia, not all of them have good TB case finding coverage rates. Many factors lead to this, resulting in inequality in the discovery and reporting of TB cases. It is important to know the characteristics of districts with households diagnosed with TB. The research using secondary data analysis using Riskesdas 2013 data and 2014 Podes data studied the characteristics of districts with households diagnosed with TB in Indonesia. The results showed that there was an influence of district characteristics with the proportion of low economic households (0.6%) on the characteristics of districts with households diagnosed with TB. This study suggests strengthening programs related to TB prevention and control efforts in at-risk households and as a basis for sharpening intervention priorities based on the level of TB epidemics in districts/cities.

Introduction

Currently, Indonesia is in the second place with the most pulmonary TB after India. According to the 2016 Global TB Report data, only 35.3% of people with pulmonary TB were found/reported in Indonesia from around 1,020,000 estimated incidences in 2016.[1] This certainly makes the risk of people with Pulmonary TB who have not been found to transmit the disease to increase. The results of the 2013 Riskesdas, the prevalence of the Indonesian population diagnosed with pulmonary TB by health workers was 0.4%. Riskesdas in 2013 also showed that only 44.4% of all people with pulmonary TB were treated with program drugs.[2]

In 2016 the Indonesian Ministry of Health has issued a healthy Indonesia program with a family approach.[3] This shows that the role of the family is very large in realizing the status of a healthy Indonesia. The role of the family in the prevention of pulmonary TB is very important, because one of the tasks of the family is to take care of sick family members and prevent transmission to sick family members.[4] A household is a group of people who inhabit part or all of a physical building or census and usually live and eat from one kitchen and may consist of one or more households. Eating from one kitchen means financing needs if the daily needs are managed together, while a physical building is a shelter that has walls, floors, and roofs, both permanent and temporary, whether used for residence.[5]

In fact, people with pulmonary TB cannot be identified easily when seen directly in the community, so steps are needed to investigate the possibility of people with pulmonary TB who have not been found by looking at the characteristics of households with pulmonary TB sufferers. This is done to determine the characteristics of households with pulmonary TB patients which can be used as an initial basis to investigate the possibility of unreported people with pulmonary TB in households that were not previously categorized as households with pulmonary TB sufferers.

Of all districts in Indonesia, not all of them have good coverage of pulmonary TB case finding. Many factors lead to this, resulting in inequality in the discovery and reporting of pulmonary TB cases. Characteristics of districts with people diagnosed with pulmonary TB are important to know so that when there are other districts that have similar characteristics, it can be suspected that there may be people diagnosed with pulmonary TB in that district even though no cases of pulmonary TB have been found. Based on these data, the authors want to study the characteristics of households diagnosed with TB in districts in Indonesia. In addition to using household characteristics, it is important to know the district and provincial characteristics of people with pulmonary TB, so far not many studies have identified these characteristics. Characteristics of districts with people diagnosed with pulmonary TB are important to know so that when there are other districts that have similar characteristics, it can be suspected that there may be people

diagnosed with pulmonary TB in that district even though no cases of pulmonary TB have been found. By knowing the characteristics of districts with high cases of pulmonary TB, appropriate actions/policies can be taken to provide special interventions in these areas more intensively.

Materials and Methods

Data resources

The household selection process is carried out by BPS with two stages of sampling, namely the first to select the Census Block (BS) and the second stage to select the Household (Ruta). The household sample in the 2013 Riskesdas was selected based on the 2010 Population Census (SP) listing. The 2013 Riskesdas managed to collect data from 11,986 CBs with 294,959 households, while the unit of analysis for the 2014 Podes census data was villages with a sample of 82,190 villages.

The analysis carried out on this data is up to multivariable analysis so that the relationship between district characteristics through household characteristics and TB households can be described more clearly. The results of the analysis from each district/city can be summarized to describe the condition of the number of TB household cases and the characteristics of at-risk households in the survey district/city. Thus, information is obtained on a district/city which is supported by information on other districts/cities that have similar characteristics.

Ecological bias that can occur in this study. Ecological bias is often associated with updating the unit of analysis (renewal of group variables). In this study, the unit of analysis of the two data has been changed to make them equal. Updating the unit of analysis into districts allows for an ecological bias in which different regional-level backgrounds in Indonesia can generate large amounts of ecological bias. The way to minimize ecological bias is to look back at the unit of analysis of the two data and then equate districts with different numbers in the two data.

Differences in the characteristics of each district/city can make the data at the household level statistically different or the same due to the wide scope of analysis. So the possibility to say a result is meaningful or not is strongly influenced by the level of analysis. It has been discussed above that to compare between districts, equalization must be carried out so that a balanced comparison can be made.

This study uses Village Potential data using Regency/City level analysis so that there is a risk of experiencing ecological bias, but this will be minimized by using an analytical approach that equates districts with different amounts of data. If this is not done, it is possible that there will be errors in the results of the analysis, for example saying meaningful when in fact it is not necessarily or vice versa.

Data analysis

The analysis phase carried out is to see the description of the frequency distribution on each variable in the study and check for missing data and outliers. Then look at the difference in the proportion of each variable and assess the influence between the independent variables on the dependent variable. After that, the risk value of the independent variable on the dependent variable was calculated using a fractional regression test. This analysis was performed on each variable.

Ethics approval

The study was approved by the Committee for Research Ethics and Public Health Service, Faculty of Public Health University of Indonesia (Reference Number 577/UN2.F10/PPM.00.02/2018).

Results

The mapping analysis of districts with the proportion of TB households in Indonesia shows that in general the distribution of districts with the proportion of TB households in Indonesia varies in each region, including the western, central, and eastern parts of Indonesia. However, it can be seen that districts with the proportion of TB households in the range of 0.02-0.03 and the proportion of TB households above 0.03 are focused on areas in Java Island for western Indonesia and areas in Papua Island for eastern Indonesia (Figure 1)

The mapping analysis of districts with low economic household proportions in Indonesia shows that in general the distribution of the proportion of low economic households in Indonesia varies in each region, including western, central, and eastern parts of Indonesia. However, it can be seen that districts with low economic household proportions in the range of 0.7 to 0.9 and above 0.9 are focused on the eastern part of Indonesia (Figure 2).

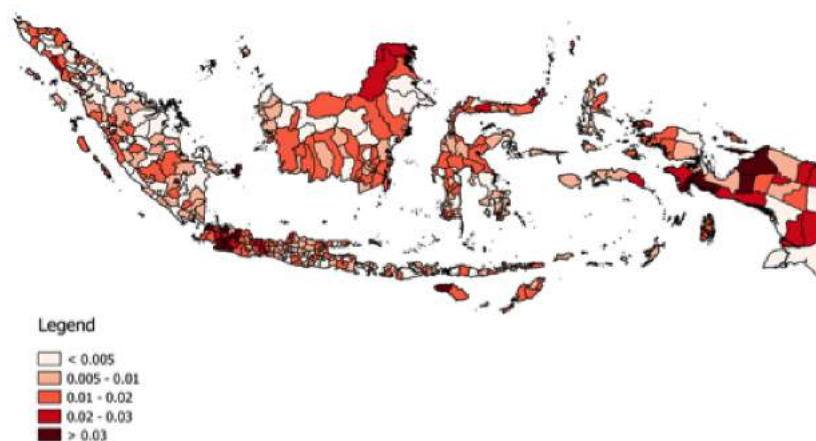There are 34 districts/cities in the proportion interval of 0.02 to 0.03 and as

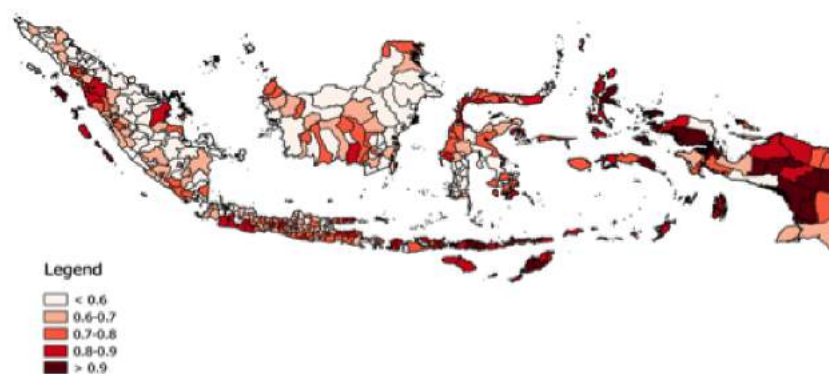**Figure 1. Distribution Map of District Proportion with TB Ohusehold.**

Figure 2. Map of District Distribution with Proportion of Low Economic Households.

many as 15 districts/cities in the proportion interval above 0.03 with proportion of TB households, also there are 55 regencies/cities that are in the interval 0.8 to 0.9 and as many as 42 districts/cities are in the interval above 0.9 with low Proportion of Economic Households.

Districts/cities with proportions above 0.03 for districts with TB households are Mamberamo Raya District (0.03), Purwakarta District (0.03), Bekasi District (0.03), Sukabumi District (0.031), District Belitung (0.032), Serang District 0.033, Waropen District (0.033), Subang District (0.033), Cianjur District (0.034), Maybrat District (0.037), Central Sumba District (0.037), West Sumba District (0.038), Kaimana District (0.41), Paniai Regency (0.52), Yapen Islands Regency (0.062).

The 42 regencies/cities that have a proportion of 0.9 being overcome are South Nias Regency (0.9), South Bolaang Mongondow Regency (0.9), Manggarai Regency (0.9), Ngada Regency (0.9), Halmahera Regency East (0.91), South Sorong Regency (0.91), Mappi Regency (0.91), Southwest Maluku Regency (0.92), Nagekeo Regency (0.92), South Central Timor Regency (0.92), Anambas Islands Regency (0.92), East Seram Regency (0.92), Kupang Regency (0.92), Central Halmahera Regency (0.93), West Nias Regency (0.94), Yahukimo Regency (0.94), Tambrauw Regency (0.95), Teluk Wondama Regency (0.95), Asmat Regency (0.96), South Buru Regency (0.96), Teluk Bintuni Regency (0.96), Sumba Regency Southwest (0.96), Nias Regency (0.96), Sabu Raijua Regency (0.97), Supiori Regency (0.97), Maybrat Regency (0.97), Mamberamo Raya Regency (0.98) Central Sumba Regency (0.98), Raja Ampat Regency (0.98), East Manggarai Regency (0.98), Punc Regency ak Jaya (0.98), Bintang Mountains Regency (0.99), Deiyai Regency (0.99), Yalimo Regency (1), Central

Mamberamo Regency (1), Nduga Regency (1), Tolikara Regency (1), Paniai Regency (1), Puncak Regency (1), Lanny Jaya Regency (1), Dogiyai Regency (1), and Intan Jaya Regency (1)

In Outline, it can be assumed that the higher the density of the proportion of districts with TB households in a district/city, the cases of TB households in that area are also high and the spread is earlier compared to districts/cities with a low density of district proportions with TB households. Of the 497 districts/cities in

Indonesia, it is known that the average proportion of districts with TB households in each district/city is 1% with a variation of 0.01%. The higher the density of the proportion of low-economy households in a district/city, the higher the number of low-economy households in that region. Of the 497 districts/cities in Indonesia, it is known that the average proportion of low-income households in each district/city is 62% with a variation of 4% (Table 1).

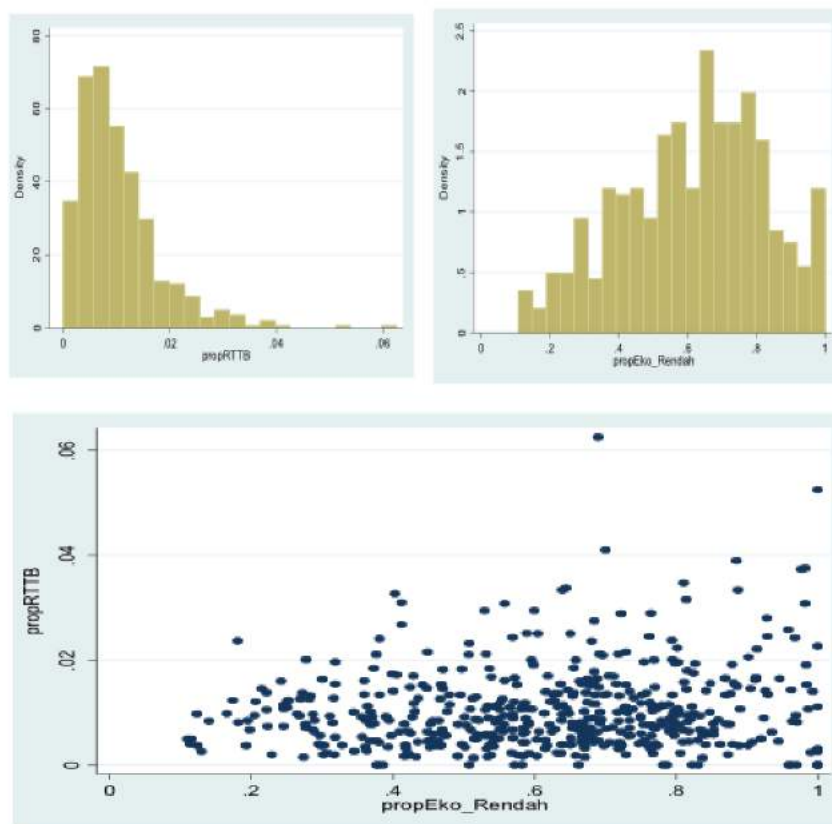A weak or poor economy affects a person getting pulmonary TB disease, due

Figure 2. Map of District Distribution with Proportion of Low Economic Households.

Table 1. Average proportion of district characteristics of predictor factors in households and villages.

Predictor	Mean	SD	Min	Max	Variance
Districts with Proportion of TB Households	0,01	0,01	0	0,06	0,0001
Districts with Low Proportion of Economic Households	0,62	0,21	0,11	1	0,04

Table 2. District prediction model with proportion of TB households by district with low economic proportion..

District with Proportion of TB Households (y)	Coef		dy/ex		District Prediction Model with Proportion of TB households
	Coef	95% CI	dy/ex	95% CI	
Districts with Low Economic Proportion (x)	0,512	0,173 − 0,851	0,003	0,000 − 0,005	E (y|x) = 0,003x

to low body resistance, as well as the need for decent housing that is not available, coupled with crowded and crowded residents. This situation will facilitate the transmission of diseases, especially respiratory tract diseases such as pulmonary TB. A simple analysis shows that districts with a low proportion of economic households have an effect on increasing the proportion of districts with TB households. Each 10% increase in the proportion of low-income households will increase the risk of an increase in the district with the proportion of TB households by 3% (Table 2). For every 10% increase in the proportion of low-income households, the risk of an increase in districts with the proportion of TB households will increase by 0.6%. The analysis to see the distribution of districts with the proportion of TB households and districts with the proportion of low economic households is carried out by making a scatter based on the proportions of the two variables. The picture that can be seen from the scatter results is that there is an even distribution for districts/cities with the value of the proportion of TB households and low economic households from the range of 0.6 to 0.8 (Figure 3).

Discussion

The results of this study are the results of the analysis of the 2013 Basic Health Research Survey conducted by sampling in all districts/cities in Indonesia and the 2014 Village Potential Census conducted in all districts/cities in Indonesia. The focus of Riskesdas 2013 is to collect community-based data that can be used to evaluate changes in health status at the district/city, provincial, and national levels including IPKM and health MDGs indicators.

Pulmonary TB disease is often associated with the problem of poverty, especially in developing countries. Poverty causes the population to lack the ability to maintain health, thereby increasing the risk of pulmonary TB disease.[6]

Economically, the main cause of the development of tuberculosis germs in Indonesia is due to the low income per head, around US$ 3,544 according to the World Bank in 20011.[7] The socio-economic level itself includes education, income, and employment which are indirect causes of health problems.[8]

The main cause of the development of Mycobacterium tuberculosis bacteria in Indonesia is due to the low per capita income. This is in line with the fact that in general, those who suffer from pulmonary TB are low-income groups. People with high

incomes are better able to use health services for treatment, while someone with a lower income level makes less use of existing health services, perhaps because they don't have enough money to buy medicine or to buy something else. The low amount of family income also triggers an increase in the number of malnutrition among the poor which will have an impact on the immune system and easily arise pulmonary TB disease. People with low incomes often have difficulty getting good health services, so that pulmonary TB is a threat to them.[7] The higher a person's income, the easier it is to get good health services and the fulfillment of good nutrition so as to increase endurance. With a high income, a person will not think twice about spending money for medical treatment or health checks. In contrast to someone with a low income who will spend most of their income to meet their daily needs, they will think twice about spending money to check their health, so most people with low incomes only get their condition checked when the pain is getting worse or can't. recovered by only taking drugs sold in shops and traditional herbal medicine.[9]

A weak or poor economy affects a person getting pulmonary TB disease, due to low body resistance, as well as the need for decent housing that is not available, coupled with crowded and crowded residents. This situation will facilitate the transmission of diseases, especially respiratory tract diseases such as pulmonary TB. A simple analysis shows that districts with a proportion of villages that have households without electricity have an effect on increasing districts with the proportion of TB households in each district/city. Every 10% increase in the proportion of low-income households will increase the risk of an increase in the district with the proportion of TB households by 3%.

Districts/cities in Indonesia have different proportion density levels depending on the characteristics of each region so that the proportion of households diagnosed with TB also varies. Broadly speaking, the higher or denser the proportion of districts with TB households in an area can describe an epidemic of TB cases in that area. This shows that the higher the proportion of districts with households diagnosed with TB in an area, the easier the transmission will occur compared to households with low TB proportions. Of the 497 districts/cities in Indonesia, it is known that the average proportion of districts with TB households in each district/city is 1% with a variation of 0.006%.

The mapping analysis of the proportion of TB households in Indonesia shows that in general the distribution of districts with the proportion of TB households in Indonesia

varies in each region, including the western, central, and eastern parts of Indonesia. However, it can be seen that districts with the proportion of TB households in the range of 0.2 to 0.3 and districts with the proportion of TB households above 0.3 are focused on areas in Java Island for western Indonesia and areas on Papua Island for eastern Indonesia.

In the Healthy Indonesia Program with a Family Approach, rules or things that should be done to households diagnosed with TB in the aspect of economic status. with TB. The analysis that results in the modeling can be used as a basis for designing priority programs implemented in each district/city specifically for the prevention of TB transmission in the community, especially districts/cities with a high proportion of TB and risk factors.

Conclusions

The influence of district characteristics: household economic status (low economy=0.0006) on districts with households diagnosed with TB in Indonesia.

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