Factors affecting The Occurrence of Tuberculosis Destroyed Lung

Retno Ariza Soeprihatini Soemarwoto[1,2], Anse Diana Mesah[3], Hetti Rusmini[2], Muhammad Arlek[4]

[1]Lecture, Departement of Pulmonology and Respiratory Medicine, Faculty of Medicine, Lampung University, Bandar Lampung 35145, Indonesia, [2] Lecture, Faculty of Medicine, Malahayati University, Bandar Lampung 35152, Indonesia, [3]Lecture, Departement of Radiology, Menggala's General Hospital, Tulangbawang 34693, Indonesia, [4]Student, Faculty of Medicine, Malahayati University, Bandar Lampung 35152, Indonesia

Abstract

Introduction: Pulmonary Tuberculosis (TB) disease remains a public health. In recent years, the prevalence of TB has increase. Dangerous complication of Pulmonary TB can destroy lungs. In 83.3% cases of destroyed lung, the patient are found to have a history of pulmonary tuberculosis. **Objective:** The aimed of this study was to identify factors affecting the occurrence of Tuberculosis Destroyed Lung in Lampung Province, Indonesia in 2017. **Method:** This study is an analytic observation with a case control design. The sample were obtained through total sampling. Primary and secondary data were obtained from interview and medical records. The samples were taken from 64 patients in several hospitals in Lampung, Indonesia. **Results:** The results showed the relationship between age with destroyed lung (p = 0.897), gender with destroyed lung (p = 0.511), education level with destroyed lung (p = 0.754), occupation with destroyed lung (p = 0.060), income with destroyed lung (p = 0.482), cigarette smoking with destroyed lung (p = 0.013), and the *presence* of multiple *diseases* with destroyed lung (p = 0.748). **Conclusions:** There is a significant relationship between Cigarette Smoking to the incidence of destroyed lung.

Keywords: *Tuberculosis Lung, Destroyed Lung, cigarette smoking*

Introduction

Tuberculosis (TB) is an infectious disease caused by an infection of the bacterium Mycobacterium tuberculosis. Six countries lead 60% of new cases wich are India, Indonesia, China, Nigeria, Pakistan and South Africa. Worldwide, the rate of decline in the incidence of TB was 1.5% in 2014-2015. In this case it is necessary to intensify 4-5% of annual decline by 2020 to reach the first indicator of the TB settlement Strategy. The World Health Organization (WHO) reported that about one third of the world's population has been infected with M. tuberculosis, but only about 5-15% of the 2-3 billion peoples infected will develop active TB disease. It was estimated that in 2015 there were 10.4 million new cases of TB in the world, of which 5.9 million (56%) were men, 3.5 million (34%) were women, and 1 million (10%) were children. In addition around 1.4 million people died of TB in 2015. Although the death rate from TB decreased by 22% between 2000 and 2015, TB was still in the top 10 causes of death in the world in 2015 [(1)]. The number of cases reported is a number that shows the number of new patients found and recorded among 100,000 residents in a particular area. This number is useful for showing a tendency in increase or decrease findings in the region. The number of notifications of the new cases of bacteriologically confirmed pulmonary tuberculosis in 2015 in Indonesia amounted to 74 per 100,000 population. It decreased compared to 2014 which amounted to 77 per 100,000 population. meanwhile the incident of all tuberculosis cases in 2015 amounted to 130 per 100,000 population, it increased compared to 2014 which amounted to 129 per 100,000 population [(2)].

The incidence of all tuberculosis cases in Lampung Province in 2015 was 105 per 100,000 population, ranked the lowest 6 of all provinces in Indonesia and also ranked the highest with treatment success rates of 95.2% according to the standard set by WHO 85% [(2)]. One of the complications of Pulmonary Tuberculosis is Destroyed Lung. A study in India showed that 83.3% of cases of pulmonary lesions has a history of

pulmonary tuberculosis [3]. Pulmonary tuberculosis in advanced conditions can cause progressive, extensive and irreversible destruction of pulmonary parenchyma and damage to pulmonary function [4].

Pulmonary tuberculosis in sustainable conditions can cause progressive, extensive and irreversible destruction of pulmonary parenchyma and damage to pulmonary function [4]. The term of destroyed lung is usually used to describe damage to the pulmonary parenchyma caused by the sequelae of pulmonary TB that occurs for many years, and is caused by chronic airway obstruction. Radiology can be found in a picture of shrinkage of lung volume, the presence of cavities, bronchiectasis and fibrosis. The response of the fibrosis network can make retraction of the hilum and mediastinum so that it shifts towards damaged lung tissue. Meanwhile other lung parts that are still good compensate for being large [5]. Until now, no treatment guidelines were available for patients with pulmonary TB [4]. There are various factors that influence the incidence of pulmonary tuberculosis such as; age, sex, education level, occupation, income, cigarette smoking and the presence of multiple diseases [6-8]. The researchers aim to determine the factors that influence the incidence of pulmonary tuberculosis in Lampung Province in 2017.

Methods

This study is analytical with case control an approached. This research was conducted at the Bandar Lampung, Indonesia (Dr. H. Abdul Moeloek Hospital, Dr. A. Dadi Tjokrodipo Hospital and Harum Melati Clinic Pringsewu). Time of study was February-March 2017. The sample size was 34 patients with destroyed lung and 30 patients with pulmonary TB as controls. The data of this study are primary and secondary from direct interviews and medical records. Bivariate analysis was done using a Chi square test with $p < 0.05$.

Results

Figure 1a above shows the distribution of clinical diagnosis of 64 patients, in which the number of patients with destroyed lung was 34 (53.1%) and patients with pulmonary tuberculosis is 30 (46.9%). Figure 1b shows that the distribution based on the age of 64 patients in which the number of patients with destroyed lung was 21 (61.8%) in productive age and 13 (38.2%) in unproductive age. It also shows the comparison of patients with pulmonary TB of 19 (63.3%) in productive age and 11 (36.7%) in unproductive age.

Figure 2a shows the distribution of patients by gender of 64 patients in which the number of patients with destroyed lung was 22 (64.7%) male and 12 (35,3%) female. It also compares patients with pulmonary TB of 17 (56.7%) male and 13 (43.3%) female. Figure 2b shows the distribution of patients based on education level from 64 patients in which the number of patients with destroyed lung was 25 (73.5%) in low level education category and 9 (26.5%) in high level education category. It also compares patients with pulmonary TB of 21 (70%) in low level education category and 9 (30%) in high level education category.

Figure 3a shows the distribution of patients based on occupancy of 64 patients; in which the number of patients with destroyed lung was 1 (2.9%) unemployed and 33 (97.1%) employed. It compares patients with pulmonary TB of 5 (16.7%) unemployed and 25 (83.3%) employed. Figure 3b shows the distribution of patients based on income from 64 patients in which the number of patients with destroyed lung was 33 (97.1%) with low income and 1 (2.9%) with high income. It compares the patients with pulmonary TB of 28 (93.3%) with low income and 2 (6.7%) with high income.

Figure 4a shows the distribution of patients based on cigarette smoking from 64 patients in which the number of patients with destroyed lung was 23 (67.6%) regular smoker and 11(32.4%) lifelong non smokers. It compares patients with pulmonary TB of 11 (36.7%) regular smoker and 19 (63.3%) lifelong nonsmoker. Figure 4b shows the distribution of patients based on the *presence* of multiple *diseases* from 64 patients in which the number of patients with destroyed lung was 3 (8.8%) accompanied by other diseases and 31 (91.2%) not accompanied by other diseases. It compares patients with pulmonary TB of 2 (17.7%) accompanied by other diseases and 28 (82.3%) not accompanied by other diseases. Details of statistical analysis can be seen in table 1.

Table 1. Analysis of the Relationship between Pulmonary Tuberculosis and Destroyed Lung

Variable	OR	95% CI	p
Age	9.35	0.34 – 2.58	0.897
Gender	1.402	0.51 – 3.84	0.511
Education Level	1.190	0.40 – 3.54	0.754
Occupational	0.152	0.02 – 1.38	0.060
Income	2.357	0.20 – 27.39	0.482
Cigarette Smoking	3.612	1.28 – 10.15	0.013*
Presence of Multiple *Diseases*	1.355	0.21 – 8.71	0.748

*Significant < 0.05

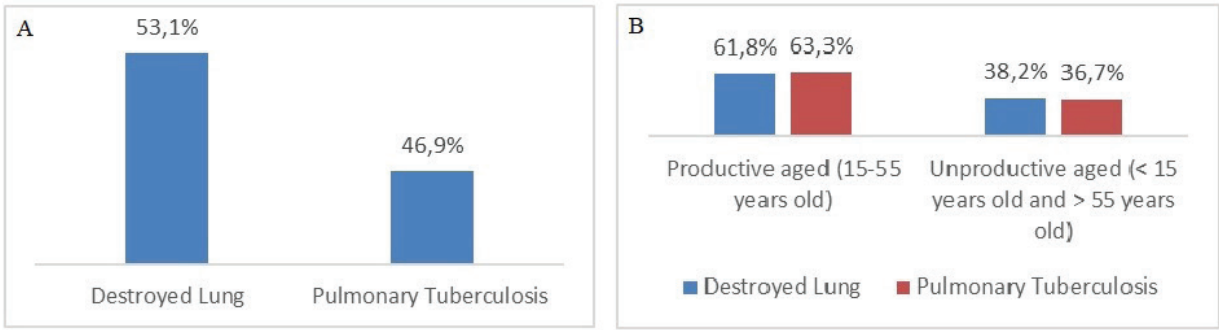

Figure 1. (A) Frequency distribution of clinical diagnosis; (B) Frequency distribution of the age.

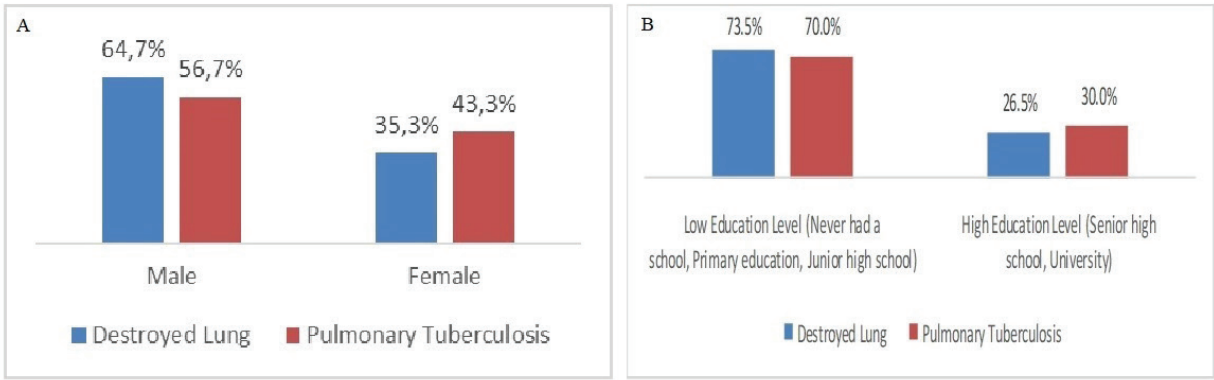

Figure 2. (A) Frequency distribution of the gender; (B) Frequency distribution of the education level.

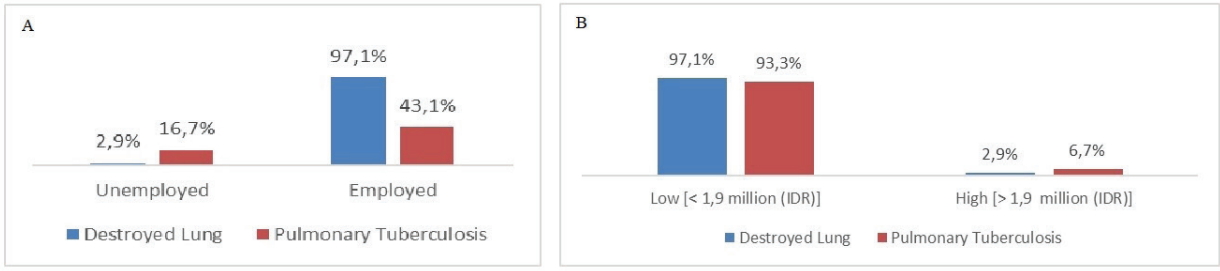

Figure 3. (A) Frequency distribution of the occupational; (B) Frequency distribution of income.

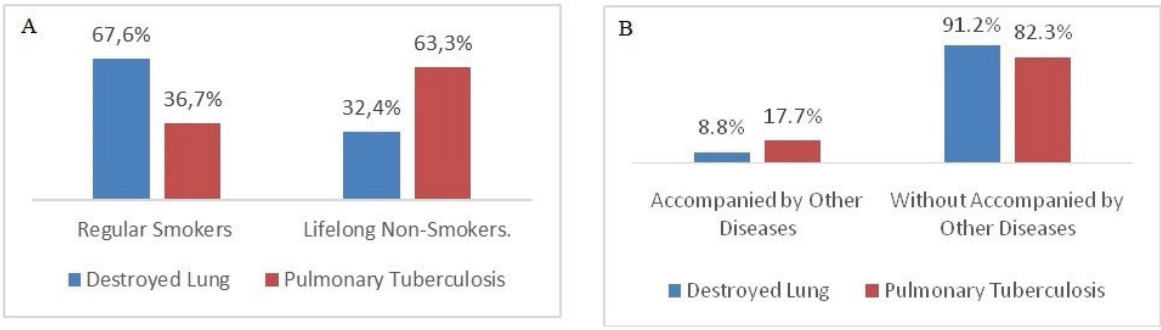

Figure 4. (A) Frequency distribution of cigarette smoking; (B) Frequency distribution of the *presence* of multiple *diseases*.

Discussions

It can be concluded that there was no significant relationship between age and destroyed lung. However, the mean age was 55.6 years old. A number of patients with pulmonary TB were in theage of 15-55 years old. It is influenced by the relationship of the age group related to employed in the outside environment and without their awareness in contact with a patient with pulmonary regarding TB germs are transmitted through the air [8].

It can be concluded that there was no significant relationship between sex with patients with destroyed lung. Unrelated results can be caused by the small number of the sample. The incidence of destroyed lung in male is more than in female. It is due to the fact that the number of male smokers number was high and they also have a poor behavior to do self prevention from the transmission of TB germs [8].

It can be concluded that there is no significant relationship between the education level of patients and destroyed lung. Unrelated results can be caused by the small number of the samples. Knowledge is the basis of taking prevention and treatment of tuberculosis. Ignorance of the community will hinder attitudes and actions towards the prevention and eradication of pulmonary TB disease as a sick person so that it can eventually become a source of transmission and spread of pulmonary TB disease to people who are around him. The study of Rohayu et al, with the title of analysis of risk factors for positive smear pulmonary TB incidence in coastal communities at Kadatua Health Center in South Buton Regency in 2016 showed no relationship between knowledge (education level) and incidence of pulmonary TB ($p = 0.018$) [9].

It can be concluded that there is no significant relationship between the patient with destroyed lung and occupation. Unrelated results can be caused by the small number of the samples. The majority of case patients were unemployed. If a patient is unemployed, it will affect the utilization of health services. One's work will also be able to reflect the small amount of information received. That information will affect

someone in making decisions to utilize existing health services, to provide nutritious food, to keep a healthy home environment and to maintain health status. This can have an effect on the body, spiritually, and socially so that if these needs are not met, it can reduce the health status where the immune system decreases so that it is susceptible to pulmonary TB [10].

It can be concluded that there is no significant relationship between the patient with destroyed lung and income. Unrelated results can be caused the small number of samples. In the study of Kurniasari et al in pulmonary TB, it is stated that the lack of economic status causes them not to have the ability to make a healthy or fulfilling house, to obtain health information, to get access to health services and to fulfil nutrition which in turn results in low endurance so it's easy to get an infection [11].

It can be said that patient with pulmonary TB on cigarette smoking are 3.612 times more at risk of developing destroyed lung. The limitations on air flow in patients with pulmonary tuberculosis are most patently caused by smoking. Indoor air pollution from cigarette smoking can increase the risk of severe infection and lung damage. Cigarette smoking contains more than 4,500 chemicals that have various toxic effects, genital and carcinogenic muta [12]. These substances have a proinflammatory and immunosuppressive effect on the immune system of the respiratory tract. Therefore it can increase the risk of destroyed lung. This study is similar with Sayuti on patient with pulmonary TB stating that smoking in the home is associated with the incidence of pulmonary TB in East Lombok Regency with P-Value = 0.0163 and factors can increase the incidence of TB disease due to indoor air pollution [13].

It can be concluded that there is no significant relationship between the patient with the destroyed lung and *the presence* of multiple *diseases*. Unrelated results can be caused by the small number of samples. The results of this study were similar to the research of Izzati et al which concluded that diabetes mellitus was not associated with the incidence of pulmonary TB in the Andalas Community Health Center work area with p-Value = 0.186 [14].

Conclusion

Based on the data taken, it can be seen that the incidence of pulmonary tuberculosis from 64 patients was 34 (53.1%) have destroyed lungs. Those with destroyed lung were 21 (52.5%) of productive age, 22 (56.4%) male, 25 (54.3%) with low education level, 33 (56.9%) employed, 33 (54.1%) low income, 23 (67.6%) smoker, and 31 (52.5%) Not accompanied by other diseases. There was no significant correlation between age, gender, education level, occupation, income and *presence* of multiple *diseases* with destroyed lung in Lampung Province, Indonesia in 2017. A significant association was found between patient with destroyed lung with cigarette smoking.

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