

# Analysis of the Relationship Between The Availability of Trained Health Workers and The Tuberculosis Cure Rate in Indonesia Year 2021

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## ABSTRACT

Tuberculosis is an infectious disease which is one of the ten causes of death in the world. Indonesia is in the third place, in the number of tuberculosis notifications after India and the Philippines in 2019 to 2020. Thus, a global target, the End TB Strategy, was set, with the aim of reducing TB cases by 90% in 2035 and in line with the National TB Management Strategy with a target of reducing incidence TB is 65 cases per 10,000 population in 2030. One of the things that plays a role in achieving the targets is the quality and quantity of trained health workers in the TB program. This study aims to determine the relationship between the availability of trained health workers and the cure rate for tuberculosis treatment in 34 provinces in Indonesia. The method used is quantitative research with a correlation study. The data used is secondary data, analyze with bivariate test and correlation test. Based on statistical tests, it was found that the results of pvalue = 0.00001 and  $r = 0.68$ , meaning that there is a significant relationship between the availability of trained health workers and the cure rate for TB treatment with a positive correlation and strong relationship strength.

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## INTRODUCTION

Tuberculosis is an infectious and communicable disease caused by *Mycobacterium tuberculosis* (Ministry of Health, 2016). Tuberculosis is one of the top ten causes of death worldwide from infectious agents (WHO, 2020). Therefore, the entire world has set a target for tuberculosis elimination in the Sustainable Development Goals (SDGs) through the End TB Strategy. The global target through the End TB Strategy is to reduce tuberculosis incidence by 90% by 2035 (Ministry of Health, 2020). Based on the data from the Global Tuberculosis Report 2022, Indonesia is a country with the highest increase in tuberculosis notification rates, besides India and the Philippines, which occurred from 2019 to 2020 (WHO, 2022).

In line with Indonesia's commitment to the End TB Strategy and referring to the RPJMN 2020-2024, the Indonesian government has designed the National Strategy for Tuberculosis Control in Indonesia 2020-2024 in order to accelerate towards the elimination of Tuberculosis by 2030 and end the Tuberculosis epidemic by 2050. This strategy is implemented to achieve the target of reducing the incidence rate of tuberculosis from 319 per 100,000 population in 2017 to 190 per 100,000 population and to decrease the death rate due to Tuberculosis from 42 per 100,000 population in 2017 to 37 per 100,000 population in 2024. The target for reducing the incidence rate of tuberculosis in Indonesia in 2030 is to approach 65 cases per 10,000 population.

The TB treatment cure rate is a figure that reflects the number of persons who have undergone treatment and have been pronounced cured of tuberculosis infection based on the results of the diagnostic (WHO, 2020). The cure rate is one of the determining factors for tuberculosis treatment success, and it is calculated by adding the total number of recovered tuberculosis cases to the number of complete treatments among all treated and reported tuberculosis cases (Ministry of Health, 2016). To boost the success rate of TB treatment, cross-sectoral assistance is required (Nathavitharana et al, 2018). According to the 2021 Tuberculosis Control Report, the

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indication for treatment success rate with a target of 90% is still not spread uniformly throughout provinces. There are still 24 provinces that have not met the aim, and 7 additional provinces that have.

One of the most critical aspects of administering a program is the availability of enough health staff. To ensure success in the TB control program, skilled health workers must act as a community bridge (Joseph et al, 2018). Efforts to obtain quality health workers can be made by conducting training or workshops to increase knowledge, attitudes, and skills, as well as performance in running the program, in order to increase the achievement of work programs, including increasing the cure rate for treatment in the context of combating tuberculosis.

Other studies have found a link between health personnel who have been educated in delivering instruction on medication adherence for TB patients and the ability to increase the cure rate for TB therapy (Netty, 2018). On the other hand, research on TB understanding and knowledge has a good influence on TB prevention, and the engagement of health professionals in receiving training and information is critical to attaining success in TB control programs (S. Main et al, 2022). West Kalimantan research has also shown that one factor driving TB cure rates to differ throughout provinces is a lack of skilled personnel in conducting screening, resulting in TB cases not being recognized at the outset (Luqman et al, 2022).

This information generated the concept of determining the effect or relationship of elements that might enhance indications of successful TB therapy, which are closely tied to cure rates. The purpose of this study is to examine the association between the availability of educated health professionals and the cure rate for TB therapy in 34 Indonesian regions.

## **MATERIALS/METHOD**

This study has a quantitative design based on a correlation study technique. This analysis drew on secondary data from the Tuberculosis Management Program's 2021 Annual Report. The dependent variable, the cure rate for tuberculosis therapy in 34 Indonesian provinces, was included in the data collected. The number of health professionals in Indonesia's 34 provinces serves as the independent variable in this study.

The data was analyzed using univariate and bivariate analysis in the SPSS software program. A descriptive univariate analysis was performed to evaluate the distribution and frequency of TB treatment cure rates as well as the number of skilled health professionals. Then, with a significant level of 5%, a bivariate analysis was performed to analyze the relationship between the availability of health workers and the cure rate for tuberculosis treatment. If the p-value is 0.05, the hypothesis is accepted; if the p-value is 0.05, the hypothesis is rejected, indicating that there is no relationship between the two measured variables. The study's premise is that there is a substantial association between the number of trained health personnel and the cure rate for TB treatment.

Then, using Spearman's rho, a correlation test was conducted. Correlation because the data utilized was not regularly distributed. The correlation test findings are used to assess the degree or closeness of a relationship. The degree of closeness of this variable association runs from 0 to +1. The closer to +1, the closer or stronger the link between the two variables. In contrast, the closer to zero the connection between the two variables. According to Colton, the intensity of the association between the two variables may be categorized into four categories (Hastono, 2016):

$r = 0.00 - 0.25$  (no/weak relationship)

$r = 0.26 - 0.50$  (moderate relationship)

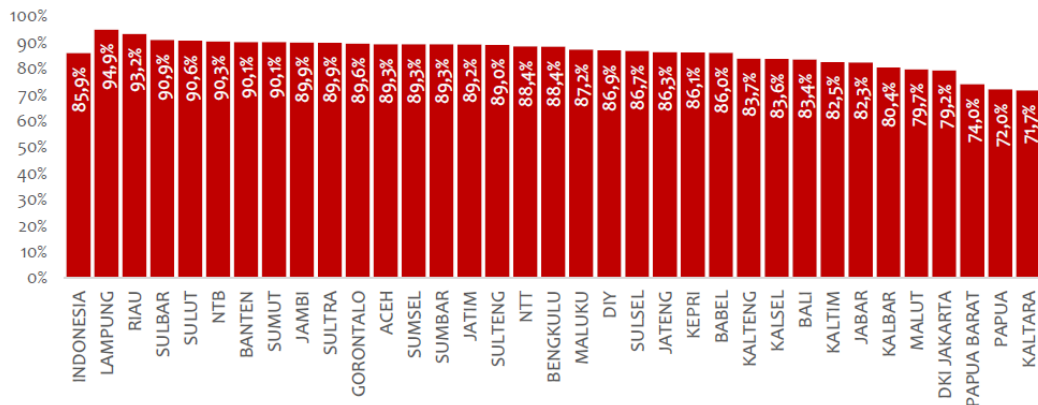
$r = 0.51 - 0.75$  (strong relationship)

$r = 0.76 - 1.00$  (extremely strong/perfect relationship)

## **RESULTS AND DISCUSSION**

According to the 2021 Tuberculosis Control Annual Report, the number of tuberculosis cases in Indonesia continues to rise. Due to the acceleration of the TB case detection program across all multi-sectors, there has been a surge in tuberculosis case detection during the previous four years (2018-2021). The number of TB cases in 2018 was 570,289, followed by 568,987 cases in 2019, a decline of 393,323 cases in 2020, and a rise of 443,235 cases in 2021 (Ministry of Health, 2022).

One of the major metrics and target indicators of Indonesia's TB Control Program is the success rate of TB treatment. The following is the TB treatment success rate in 2021:



Picture 1: Tuberculosis Treatment Success Rate in 2021

Source: Annual Report on Tuberculosis Control 2021

The tuberculosis treatment success rate is the total of all TB cases that have been cured and fully treated out of all TB cases that have been treated and reported. As a result, this figure is the sum of the cure rates for all cases and the complete treatment rates for all cases, with the cure rates for all cases determining the success rate for tuberculosis treatment and involving other variables, such as the availability of trained health workers in each province. Doctors, nurses, and skilled laboratory assistants work at Puskesmas and hospitals as trained health workers.

The following are the findings of univariate analysis in the form of an illustration of the distribution of TB treatment cure rates and the availability of qualified health professionals across Indonesia's 34 provinces:

### 1. Tuberculosis Treatment Cure Rate Frequency Distribution by Province

Table 1. Distribution of tuberculosis treatment cure rates by province.

No	Nama Provinsi	Frekuensi (f)
1	Aceh	963
2	Sumatera Utara	3.489
3	Sumatera Barat	1.888
4	Riau	1.690
5	Kepulauan Riau	477
6	Jambi	705
7	Sumatera Selatan	2.040
8	Bangka Belitung	295
9	Bengkulu	259
10	Lampung	2.887
11	Banten	3.399
12	DKI Jakarta	3.683
13	Jawa Barat	10.990
14	Jawa Tengah	8.112
15	DIY Yogyakarta	513
16	Jawa Timur	10.414
17	Kalimantan Barat	1374
18	Kalimantan Tengah	499
19	Kalimantan Selatan	616

20	Kalimantara Timur	394
21	Kalimantan Utara	136
22	Sulawesi Utara	1.472
23	Gorontalo	553
24	Sulawesi Tengah	467
25	Sulawesi Selatan	3.179
26	Sulawesi Barat	429
27	Sulawesi Tenggara	759
28	Bali	742
29	Nusa Tenggara Barat	2.106
30	Nusa Tenggara Timur	883
31	Maluku	469
32	Maluku Utara	258
33	Papua	1.307
34	Papua Barat	172
Jumlah		67.619

*Source: Annual Report on Tuberculosis Control 2021*

**2. In 2021, the frequency distribution of available trained health workers by province**

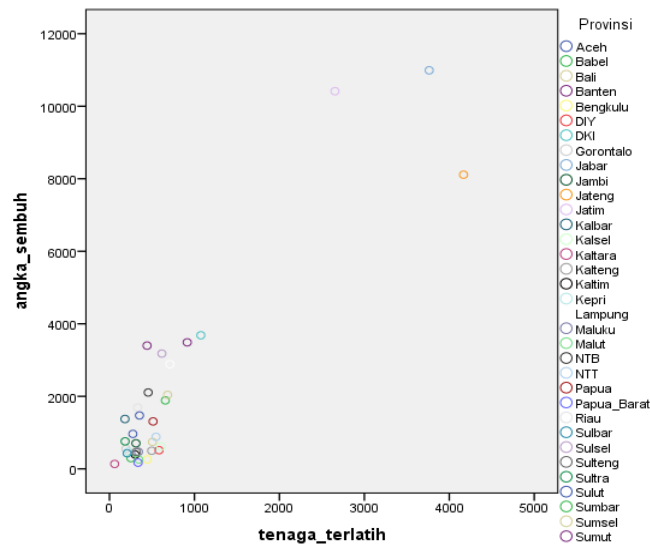
The amount of trained health professionals at Puskesmas and hospitals includes trained physicians, nurses, and laboratory assistants.

Table 2. Distribution of the Availability of Trained Health Workers by Province

No	Nama Provinsi	Frekuensi (f)
1	Aceh	275
2	Sumatera Utara	915
3	Sumatera Barat	657
4	Riau	332
5	Kepulauan Riau	222
6	Jambi	311
7	Sumatera Selatan	684
8	Bangka Belitung	253
9	Bengkulu	445
10	Lampung	711
11	Banten	442
12	DKI Jakarta	1.075
13	Jawa Barat	3.763
14	Jawa Tengah	4.168
15	DIY Yogyakarta	583
16	Jawa Timur	2.654
17	Kalimantan Barat	182
18	Kalimantan Tengah	497
19	Kalimantan Selatan	605
20	Kalimantara Timur	303
21	Kalimantan Utara	61
22	Sulawesi Utara	353
23	Gorontalo	194
24	Sulawesi Tengah	315
25	Sulawesi Selatan	616

26	Sulawesi Barat	208
27	Sulawesi Tenggara	184
28	Bali	505
29	Nusa Tenggara Barat	455
30	Nusa Tenggara Timur	547
31	Maluku	340
32	Maluku Utara	344
33	Papua	513
34	Papua Barat	336
Jumlah		24.048

Source: Annual Report on Tuberculosis Control 2021



Picture 2. Scatter

Plot of Trained

Health Workers Availability and Recovery Rate in Each Province

Pictures 2 of the scatter plot picture above shows the association between the availability of trained health personnel and the cure rate in each province. The link between the two variables is shown in the figure as positive. When one variable rises, another rises, and so on. This can be observed in the increase in the trained personnel variable, which will be followed by an increase in the cure rate variable. Meanwhile, based on the SPSS statistical test findings, the following conclusions were reached:

**Table 1. Statistical Test Results**

Variabel	r	pvalue
Ketersediaan Tenaga Kesehatan Terlatih	0,68	0,00001

Based on the results of the correlation statistical test between the TB treatment cure rate and the availability of trained personnel, a pvalue of 0.00001 was obtained, indicating that there is a relationship between the dependent variable (tuberculosis treatment cure rate) and the independent variable (availability of trained health workers). The correlation coefficient (r) is thus 0.68, a positive number indicating a very strong link strength.

As seen in picture 1, the graph of TB treatment cure rates above, not all provinces have met the 90% treatment success objective. Treatment success rates ranged from 71.7% to 94.9% depending on province. Lampung, Riau, West Sulawesi, North Sulawesi, and West Nusa Tenggara are the provinces with the greatest proportion of treatment success.

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According to the findings of a univariate study of TB treatment cure rates, the five provinces with the greatest cure rates were West Java (10,990), East Java (10,414), Central Java (8,112), DKI Jakarta (3,683), and North Sumatra (3,489). This occurs because the success rate is the sum of the cure rates for all cases and the total treatment rate for all cases (RI Ministry of Health, 2022). While the results of the univariate analysis of the availability of trained health workers in five provinces revealed that Central Java (4,168), West Java (3,763), East Java (2,654), DKI Jakarta (1,075), and North Sumatra (915) had the highest distribution of TB program trained health workers.

According to the findings of the univariate analysis, the five provinces in Indonesia with the greatest number of TB program trained health professionals and TB treatment cure rates were all in Java. This is due to variances in population growth that are not uniformly distributed between Indonesian provinces. Furthermore, Indonesia continues to have issues in providing health services that are equitably spread throughout all provinces. As a result, the availability and distribution of health-care services, particularly in dealing with tuberculosis (TB), remains a challenge in disadvantaged communities, borders, and islands (Ministry of National Development Planning/Bappenas RI, 2020). Then, norms in the availability of health personnel cannot be met adequately (Gani & Budiharsana, 2018).

The availability of skilled health professionals is an essential component that contributes to the effectiveness of TB treatment in Indonesia, with a distribution that corresponds to the number of cases in each region (Nisa & Budiantara, 2016). Trained health workers may frequently check medication adherence and educate patients and family who suffer symptoms to be able to screen them at the local health care institution so that they can be discovered early (Wulandini, 2020). The quantity of health professionals in a region impacts the success of TB treatment because health workers provide education and monitor tuberculosis patients' adherence to medicine (Friskarini & Manulu, 2010). There is an impact between health professionals' support and medication-taking behavior because health workers play an important role, and it is intended that TB patients will get aid so that they feel cared for (Zelfino, 2014).

Based on the bivariate analysis, the pvalue was 0.00001 ( $p < 0,05$ ), indicating that the study hypothesis, namely that there was a significant association between the number of skilled health professionals and the cure rate for TB therapy, was accepted. The Spearman's rho Correlation ( $r$ ) value of 0.68 was also achieved in the statistical test findings, indicating that there is a positive correlation with the strength of a very strong association between the variable number of trained health professionals and the cure rate for TB therapy. The positive association suggests that as the number of skilled health professionals grows, so will the cure rate for TB therapy. As evidenced by the scatter plot diagram and the correlation statistical test findings. Previous research has discovered an impact between health professionals who were taught to screen for suspected TB and were able to lower treatment rates in a region (Afifatussalamah et al, 2014). Overall, the expertise and attitudes of health professionals in giving education are seen to be extremely successful in lowering TB infection rates in Nepal (Shrestha et al, 2017). However, patients must be educated about tuberculosis so that they can use health-care facilities to diagnose the disease early (Tetshane et al, 2022).

## CONCLUSIONS

The availability of skilled health professionals is an issue that must be considered in order to achieve success indicators in TB treatment by raising treatment cure rates. Trained health workers may have a wide-ranging influence on society, where they can give education and carry out health promotion tasks. In addition to screening and monitoring compliance with TB drug consumption, where routine and comprehensive treatment is the most important component in a person recovering from this contagious infectious illness. According to the findings, there is a substantial association between the number of skilled health personnel and the cure rate for tuberculosis treatment. With a strong and positive relationship, that is, if the availability of skilled health professionals increases, so will the success rate for TB treatment.

The government and other stakeholders are advised to improve health worker training or workshops by employing information technology through online and multi-sectoral training so that they can reach more health professionals in each province. As a result, increasing the number of qualified health professionals is predicted to boost the cure rate for tuberculosis treatment in Indonesia, particularly in each province.

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