The Effect of Education on the Identification of Pulmonary TB Case Findings in the Post-Covid-19 Era at Dukuh Kupang Public Health Center Surabaya

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ABSTRACT

Indonesia is one of the countries affected by the COVID-19 pandemic. In the era of the COVID-19 pandemic, Tuberculosis disease is no longer in focus because the COVID-19 pandemic is the focus of the main problem. TB is one of the diseases that causes death in the world caused by bacterial infection Mycobacterium tuberculosis. TB in the pandemic era is very difficult to diagnose because the diagnosis of respiratory disease is directed at COVID-19 disease. Based on this, this study was conducted with the aim of knowing the impact of the COVID-19 pandemic on the findings of TB cases. The study was conducted using a cross-sectional observational analytic method at the Dukuh Kupang Community Health Center, Surabaya. The results showed a decrease in the number of pulmonary TB cases in recent years. This decrease is due to a decrease in screening and diagnosis of suspected TB, as well as an increase in better understanding in the community regarding the difference in symptoms of COVID-19 and TB and a decrease in the examination of TB sputum samples.

Keywords: COVID-19, Pulmonary, Tuberculosis, Screening.

Introduction

The Covid-19 pandemic has impacted various structures in Indonesia, including health, economic, and social issues. Its impact on healthcare is the high number of coronavirus infections and increased mortality rates due to the coronavirus. Another impact on healthcare is the decline in healthcare services in rural areas due to the focus of services on Covid-19 cases and users becoming more cautious about visiting healthcare facilities.[1]

The consequences of the COVID-19 pandemic can confuse healthcare workers in diagnosing other lung diseases, particularly in diagnosing pulmonary tuberculosis (TB).[2] Pulmonary TB and COVID-19 are often mistakenly diagnosed as the same, and during the COVID-19 pandemic, TB was not given much attention, leading to patients with TB being directly diagnosed as having COVID-19 without undergoing the proper diagnostic process for TB.

TB diagnosis is obtained through several methods, including sputum culture and chest X-ray examinations, which are the same methods used to diagnose COVID-19. The source of transmission for pulmonary TB is through TB patients with positive acid-fast bacillus (AFB) test results (+), when coughing, sneezing, or speaking.[3]

Health profile data from East Java shows that in 2020, there were 7,940 registered and treated TB cases in Surabaya, and 50,840 suspected TB cases receiving treatment.[4] The number of TB cases among children aged 0–14 years was 241 cases in 2020. The city of Surabaya had a cure rate of 2,829 (72.5%), a complete treatment rate of 4,366 (89.3%), and a treatment success rate (SR) of 7,195 (90.6%). The number of deaths during TB treatment was 178 (2.1%).[5]

During a restricted meeting on Accelerating Tuberculosis Elimination at the Merdeka Palace in Jakarta on Tuesday, July 21, 2020, the President stated that the COVID-19 management model currently being implemented by the government could also be applied in efforts to eliminate tuberculosis.[6] Symptoms and signs of pulmonary TB are similar to those associated with respiratory infections, including COVID-19, which can lead to delays in TB diagnosis.[7] Additionally, close coexistence is a risk factor for TB transmission among household contacts. To reduce the risk of transmission, the government has launched urgent measures, including widespread mask use, closure of public spaces, and restrictions on personal mobility.[8]

This explanation highlights that tuberculosis is a critical health issue requiring attention due to its high morbidity and mortality rates, particularly in the context of the COVID-19

pandemic in Surabaya. The objective of this study is to determine the impact of the COVID-19 pandemic on the number of tuberculosis cases detected at the Dukuh Kupang Community Health Center in Indonesia. The results of this study can provide important health information to complement the community health center's database and serve as material for developing tuberculosis treatment strategies appropriate for the post-COVID-19 situation.

Methods

This study was designed with an observational analytic research design with a cross-sectional design. Analytic means that the purpose of this research is to find out how phenomena relate to the population.[9] Observational research only sees and does not interact with research subjects. This study uses the term cross sectional to describe the fact that all data are collected at the same time.[10] This design is the best compared to other research designs to determine the prevalence of a disease. The target population of this study was the total medical records of suspected and diagnosed pulmonary tuberculosis patients in the workplace of the Government Health Center of Dukuh Kupang Subdistrict from 2021-2023, with inclusion criteria, namely patients diagnosed with pulmonary TB and recorded at the Dukuh Kupang Health Center 2021-2023 and having complete medical record data, and exclusion criteria, namely patients with suspected TB and have not received OAT therapy. The sample used was 170 medical records. The independent variable of this study is the data collection period of TB patients. The number of TB case findings per month is included in the dependent variable. The data obtained will then be subjected to univariate and bivariate analysis using the SPSS computer program. The results of the study will be described with the principle of descriptive statistics that displays a cross-tabulation containing the distribution and frequency of the characteristics of the data studied.

Result

Table 1 shows the gender distribution of pulmonary TB patients at Dukuh Kupang Public Health Center during the years 2021–2023. In 2021, the number of male patients (33 cases) was higher compared to female patients (16 cases), with a total of 49 cases. In 2022, there were 23 male patients and 16 female patients, totaling 39 cases. In 2023, the number of cases decreased to 27, consisting of 14 male patients and 13 female patients. Overall, during the three-year period, there were 66 TB cases recorded, of which 37 (56.1%) were male and 29 (43.9%) were female. This indicates that TB cases were more common among males compared to females throughout the observation period.

Table 1. Gender characteristics of TB patients.

Year	Gender		Total
	Male	Female	
2021	33	16	49
2022	23	16	39
2023	14	13	27
Total	37	29	66

Table 2 presents the distribution of pulmonary TB case findings by month from 2021 to 2023. In 2021, the highest number of cases was recorded in May (9 cases), followed by June (6 cases) and March and September (5 cases each). In 2022, the peak occurred in March and April with 7 cases each, while the lowest was in November (0 cases). In 2023, the highest number of cases was found in March (6 cases), while no cases were reported in May, July, and December. When analyzed across the three years, the months with the highest cumulative number of cases were March (13 cases) and April (11 cases), followed by September, August, and January (each 6 cases). The lowest total was observed in December (1 case). Overall, 66 TB cases were identified from 2021 to 2023, with a declining trend from 49 cases in 2021, to 39 cases in 2022, and further to 27 cases in 2023. This shows a gradual decrease in TB case findings over the three-year period.

Table 2. Characteristics of TB case findings in 2021-2023.

Month	Year			Total
	2021	2022	2023	
January	2	4	2	6
February	5	2	2	4
March	5	7	6	13
April	4	7	4	11

May	9	3	0	3
June	6	3	2	5
July	3	5	0	5
August	3	3	3	6
September	5	3	3	6
Oktober	3	1	3	4
November	2	0	2	2
Desember	2	1	0	1
Total	49	39	27	66

Table 3 presents the hypothesis testing results of TB case findings during and after the COVID-19 pandemic. The mean number of cases during the COVID-19 pandemic was **13.00 ± 3.586**, which was higher than the mean number of cases after the COVID-19 pandemic (**7.13 ± 2.900**). The Shapiro-Wilk normality test showed that the data were normally distributed ($p > 0.05$), and the Levene's test indicated homogeneity of variance ($p > 0.05$). Based on the unpaired t-test, there was a statistically significant difference between TB case findings during the COVID-19 pandemic and after the COVID-19 pandemic ($p < 0.05$). These findings suggest that the number of TB cases identified significantly decreased after the COVID-19 pandemic compared to during the pandemic.

Table 3. Research hypothesis test.

Group	mean±SD	Normality Test (*shapiro-Wilk*)	Homogeneity Test (*Levane Test*)	*Unpaired T test*
During the COVID-19	13,00±3,586	P>0,05	P>0,05	P<0,05

pandemic				
After the COVID-19 pandemic	7,13±2,900			

Discussion

One of the immutable factors that can increase the risk of developing tuberculosis is gender. Our study found that males had the highest number of diagnosed and treated tuberculosis patients by gender throughout 2021-2023, indicating that males suffer from more tuberculosis than females. From the table we found that males suffered more TB than females between 2021-2023 with a total of 37 cases. When viewed from the incidence of TB per month, in 2021 the highest number was in May with 9 TB cases, while in 2022 March and April were the highest. In 2023, March was the highest with 6 TB cases. The total incidence of TB in 2021 was 49 incidents and then decreased in 2022 to 39 incidents and 2023 to 27 incidents. In this study, normality and homogeneity tests were carried out to determine the type of test to be used next. Table 5.4 shows the results of homogeneity and normality tests on normally distributed data. To test the research hypothesis, researchers used the unpaired T test which showed that there was a significant difference in the number of TB cases found in the Dukuh Kupang puskesmas working area both during the COVID-19 pandemic and after the pandemic. During the pandemic, an average of 13 new patients were found each quarter, but after the pandemic, an average of only 7 new patients were found each quarter.

Perwitasari (2013) found similar results, showing that there were more males than females.[11] Another study by Natalia et al. (2012) also found that there were more males than females.[12] According to the 2019 Indonesian Health Profile published by the Ministry of Health of the Republic of Indonesia (2021), the number of tuberculosis cases in men was 1.4 times higher than that of women in all provinces, even in Aceh and North Sumatra, cases in men were almost double that of women.[13] A report from the Gender and Women's Health Department of the World Health Organization (WHO) states that the incidence and prevalence of tuberculosis in men is higher than in women. Except in childhood, men are the higher sufferers of tuberculosis.[14] This can also be attributed to men's habits, such as smoking and drinking alcohol, which can impair lung health and weaken immunity, making them more susceptible to TB infection.[15]

To the best of our knowledge, this study is the first to be conducted in the Dukuh Kupang puskesmas area in Surabaya and aims to determine the effects of TB and COVID-19 education based on case findings during the pandemic and after the pandemic. The results showed that the average number of TB cases after the pandemic (2023) was 7 cases per quarter, while during the pandemic (2021) there were 13 cases per quarter. Analysis of statistical differences between the number of TB cases treated after and during the pandemic in the puskesmas environment. There was a significant difference in Dukuh Kupang ($P < 0.05$). In addition, these findings support evidence that the number of TB cases has reduced during the COVID-19 pandemic.

A study conducted in Dukuh Kupang sub-district, Surabaya, showed a significant difference in TB prevalence during the COVID-19 pandemic and after the pandemic. The study found that TB prevalence in the Dukuh Kupang area was higher than during the pandemic, with a higher number of reported cases in the area. The study also found that TB prevalence during the pandemic was higher in the DIY sector, with higher CDR and TSR. The study also found that TB prevalence during the pandemic was lower than after the pandemic due to improved health center services during the pandemic and rapid response. The study also found that education after the pandemic was found to be reduced because the level of understanding of the community was adequate.

Conclusion

The results of this study found that the gender of TB patients was mostly found in men. The impact of COVID-19 has led to a significant decrease in the number of TB cases at the Dukuh Kupang health center. The main problem in TB cases during the pandemic is a result of a decrease in screening and diagnosis of TB suspects, as well as a better understanding of the difference between the symptoms of COVID-19 and TB and a decrease in the examination of TB sputum samples.

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