Original Research

# Determinants Of Treatment Adherence In Drug-Sensitive Tuberculosis Patients During The Covid-19 Pandemic

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## ABSTRACT

*Background: During the COVID-19 pandemic in Surakarta, there were patients who were absent, failed, and dropped out of treatment. This study aims to analyze factors associated with treatment adherence of drug-sensitive tuberculosis patients (TB-SO) during the COVID-19 pandemic at the Surakarta City Public Health Center.*

*Methods: This research method combines quantitative research with cross-sectional research. A sample of 105 patients from 10 Public Health Center (Puskesmas) in Surakarta City was obtained using a total population sampling based on inclusion and exclusion criteria. This research was conducted from April to June 2022. The research instrument used was a questionnaire, and the data was analyzed univariate and bivariate with the chi-square.*

*Results: This study showed that more patients were adherere (79%) than non-adherent (21%). Factors related to treatment adherence were the role of health professionals (p = 0.045) and Treatment Supervisors (Pengawas Menelan Obat/PMO) support (p = 0.035).*

*Conclusion: The role of health workers and the support provided by the PMO to patients related to adherence to treatment for TB-SO patients Therefore, it is expected that health professionals need to keep a good relationship with patients through personal counseling and need to provide socialization to PMOs.*

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## INTRODUCTION

Tuberculosis, often called TB, is a disease that is transmitted due to infection by the bacterium Mycobacterium tuberculosis (TB St. Carolus, 2017). Patients with TB have a 5–10% risk of developing TB in their lifetime. More than 95% of TB cases and deaths from TB in the world occur in developing countries.

Various ways have been tried globally to tackle TB, but these efforts have undergone drastic changes since the Coronavirus Disease-2019 (COVID-19) pandemic (WHO, 2021). According to the WHO, the COVID-19 pandemic caused deaths from tuberculosis to increase for the first time in more than a decade (WHO, 2021). COVID-

19 is an infectious disease. Most people will experience respiratory illness after being infected with the virus.

COVID-19 is spread through the mouth or nose of an infected person when coughing, sneezing, and talking. COVID-19 is spreading in countries around the world, including Indonesia (WHO). In April 2020, President Joko Widodo declared that COVID-19 had become a national disaster (BNPB, 2020). The emergence of the COVID-19 pandemic affected health programs that had been planned because the focus was shifted to handling the COVID-19 outbreak, one of which had an impact on the TB treatment program. In 2020, there will be major changes due to obstacles in accessing TB diagnosis and treatment due to the COVID-19 pandemic (WHO, 2021).

In the WHO Global Report 2020, Indonesia ranks second in the world with the highest TB cases per capita after India. It is estimated that 845,000 people are suffering from TB in Indonesia, with a death rate of 98,000, which is equivalent to 11 deaths per hour. By receiving consistent treatment until it is finished, tuberculosis can be cured. In Indonesia, the highest reported number of cases is in the provinces of West Java, East Java, and Central Java.

Tuberculosis cases in these three regions accounted for almost half, or 45%, of all tuberculosis cases in Indonesia. Of the 29 regencies and 6 cities in Central Java in 2019, Surakarta City was ranked 7th with a notification rate of all cases of tuberculosis, or the Case Notification Rate (CNR) of 317/per 100,000 population. However, the success rate of tuberculosis treatment (Treatment Success Rate) in Surakarta City has not reached the target, which is 90% (Indonesian Ministry of Health, 2020).

Based on data from the Surakarta City Health Office, in Surakarta City, there were 1,803 TB cases in 2020. There were 1,136 cases in 2020, and in 2021 there were 1,148 cases. In 2019, in Surakarta City, the treatment success rate for all TB cases was 84%, in 2020 it was 88.4%, and in 2021 it decreased to 51.6%.

Aside from TB cases overall, drug-resistant TB cases are of particular concern. TB-SI is a type of tuberculosis that can be treated with at least five different medications for at least six months while having relatively minor side effects. Drug-resistant tuberculosis is a condition where TB is resistant to one or more types of Anti-Tuberculosis Drugs (OAT). The main causes of drug-resistant TB are patient non-adherence to treatment regimens and mistakes in medication administration, including those involving directions, dose, length of therapy, and drug quality.

According to data from Surakarta City Health Office, according to information from the Surakarta City Health Office, in 2021 there were 9 patients who were lost to follow up, 7 patients failed to seek treatment, and 7 patients dropped out. Of the 9 MDR-TB cases that were reported in 2020, 5 patients passed away. Out of the 4 MDR-TB cases that were reported in 2021, 1 patient discontinued treatment and 1 patient passed away during treatment. MDR-TB offers a new challenge for programs that manage tuberculosis because of its challenging diagnosis, high rates of treatment failure, and mortality (Janan, 2019).

The COVID-19 pandemic has changed people's attitudes toward seeking out medical care in addition to having an effect on health programs. At the beginning of the COVID-19 epidemic, the government's lockdown or social restrictions may have affected the tuberculosis program and made it challenging for patients to access the Public Health Center (Puskesmas) (Janan, 2019) (Cilloni et al., 2020). There are a number of reasons why TB patients refuse to take their medication as prescribed, including poor patient education, a lack of recovery motivation, a distance from medical

facilities, financial considerations, adverse treatment effects, lack of family support, and the role of health professionals.

Adherence to medicine use is important for patients since it aims to cure, improve patient productivity, minimize the risk of transmission, avoid relapse cases, and prevent the emergence of drug-resistant TB, which is more expensive and causes side effects than TB-SO (Janan, 2019)(Maria, 2016). The purpose of this study was to analyze factors related to adherence to treatment for TB-SO patients during the COVID-19 pandemic in Surakarta City.

## MATERIALS AND METHOD

The type of research is a quantitative study with a cross-sectional. The population of this study was all TB-SO patients in 10 Public Health Center (Puskesmas) working areas of Surakarta City from January 2021 to March 2022. The sampling technique used total population sampling in determining the sample based on the inclusion criteria, namely TB-SO patients aged over 15 years who received treatment and the exclusion of patients who were not willing to become respondents so that a sample of 105 patients was obtained.

The research instrument used was a questionnaire. The dependent variable related to medication adherence of TB-SO patients used a Morisky Medication Adherence Scale-8 (MMAS-8) questionnaire and the independent variable used a questionnaire consisting of favorable and unfavorable questions with a Likert scale of 1-4. Furthermore, data analysis was carried out by means of univariate and bivariate.

Bivariate analysis using the chi-square test to determine the relationship between variables. This research has passed the ethical test and has met the research requirements of the Health Research Ethics Commission of the Faculty of Public Health, Diponegoro University, with the code of ethics reference number 155/EA/KEPK-FKM/2022.

## RESULTS

Table 1 shows that most of the respondents are male (59%), adults aged 20–60 years (81%), have a high school education (51.4%), work as employees (35.2%), and have an income under the minimum wage (46.7%).

**Table 1.** Respondents Characteristics

| Characteristics | N | % |
|---|---|---|
| **Gender** | | |
| Female | 43 | 41 |
| Male | 62 | 59 |
| **Age** | | |
| 15-19 years | 10 | 9,5 |
| 20-60 years | 85 | 81 |
| > 60 years | 10 | 9,5 |
| **Education** | | |
| Elementary-Junior High School | 40 | 38,1 |
| Senior High School | 54 | 51,4 |
| Diploma-Bachelor Degree | 11 | 10,5 |
| **Job** | | |
| Employee | 37 | 35,2 |

| Characteristics | N | % |
|---|---|---|
| Entrepreneur | 16 | 15,2 |
| Housewife | 15 | 14,3 |
| Student | 9 | 8,6 |
| Doesn't work | 19 | 18,1 |
| Etc | 9 | 8,6 |
| **Income** | | |
| Doesn't have income | 34 | 32,4 |
| Under Regional Minimum Wage | 49 | 46,7 |
| Above Regional Minimum Wage | 22 | 21 |

Table 2 shows that of the 105 respondents of TB-SO patients, the treatment adherence variable with the largest percentage was in the adherence category (79%). The knowledge variable with the largest percentage is in a good category (81.9%). Attitude variables with the largest percentage in the good category (60%).

The vulnerability variable with the largest percentage is in the high category (52.4%). The drug side effect variable with the largest percentage was in a severe category (52.4%). The variable perception of the role of health professionals with the largest percentage was in a good category (55.2%).

The variable perception of support for the Treatment Supervisor (PMO) with the largest percentage in the good category (56.2%).

**Table 2.** Distribution of Respondents Based on Research Variables

| Variable | Category | N | % |
|---|---|---|---|
| Treatment Adherence | Non Adherence | 22 | 21 |
| | Adherence | 83 | 79 |
| Knowledge | Low | 19 | 18,1 |
| | Good | 86 | 81,9 |
| Attitude | Low | 42 | 40 |
| | Good | 63 | 60 |
| Vulnerability | High | 55 | 52,4 |
| | Low | 50 | 47,6 |
| Side Effects of Drugs | Severe | 55 | 52,4 |
| | Slight | 50 | 47,6 |
| The Role of Health Professionals | Low | 47 | 44,8 |
| | Good | 58 | 55,2 |
| PMO Support | Low | 46 | 43,8 |
| | Good | 59 | 56,2 |

Table 3 shows that there is a significant relationship between the perception of the role of health professionals and adherence to treatment for TB-SO patients with a p-value of 0.045. Then there is a significant relationship between the perception of support from the Pengawas Menelan Obat (PMO) or Treatment Supervisors and adherence to treatment for TB-SO patients with a p-value of 0.035. Meanwhile, from the variables of knowledge of TB-SO patients, attitudes of TB-SO patients, susceptibility of TB-SO patients, and experience of drug side effects, there was no significant relationship with treatment adherence of TB-SO patients. This is indicated by a p-value greater than 0.05.

**Table 3.** The Relationship of the Independent Variables of the Study with Treatment Adherence of TB-SO Pasien Patients

| Variable | Category | Treatment Adherence of TB-SO Patients | | | | Total | | p-value |
| | | Less Adherence | | Adherence | | | | |
| | | f | % | f | % | f | % | |
| Knowledge | Poor | 5 | 26,3 | 14 | 73,7 | 19 | 100 | 0,540 |
| | Good | 17 | 19,8 | 69 | 80,2 | 86 | 100 | |
| Attitude | Poor | 11 | 26,2 | 31 | 73,8 | 42 | 100 | 0,282 |
| | Good | 11 | 17,5 | 52 | 82,5 | 63 | 100 | |
| Vulnerability | High | 11 | 20 | 44 | 80 | 55 | 100 | 0,801 |
| | Low | 11 | 22 | 39 | 78 | 50 | 100 | |
| Side Effects of Drugs | Severe | 10 | 18,2 | 45 | 81,8 | 55 | 100 | 0,464 |
| | Slight | 12 | 24 | 38 | 76 | 50 | 100 | |
| The Role of Health Professionals | Poor | 14 | 29,8 | 33 | 70,2 | 47 | 100 | 0,045 |
| | Good | 8 | 13,8 | 50 | 86,2 | 58 | 100 | |
| PMO Support | Poor | 14 | 30,4 | 32 | 69,6 | 46 | 100 | 0,035 |
| | Good | 8 | 13,6 | 51 | 86,4 | 59 | 100 | |

## DISCUSSION

Adherence to taking medication is very important for TB patients because it aims to cure and restore patients life productivity, prevent the death rate from TB from getting higher (WHO, 2021), prevent relapse cases, reduce the risk of transmission, and have a significant impact on preventing the occurrence of MDR-TB. Treatment costs are higher and cause more severe drug side effects than TB-SO of treatment success rate (Maria, 2016) (Janan, 2019). The success rate is the main indicator used to assess the success of tuberculosis treatment. It is also used to evaluate the effectiveness of Anti Tuberculosis Drugs (OAT).

Based on the results of the study, from 105 respondents, 79% of respondents adhered to treatment and 21% of respondents did not adhere to treatment. The results of this study indicate that most respondents have adhered to treatment during the COVID-19 pandemic (79%). However, based on the results of the answers from respondents to determine adherence with patient treatment during the COVID-19 pandemic, there were respondents who answered that they still missed taking medication.

There were also respondents' answers which indicated that they missed taking their medicine because they forgot (7.6%), felt that their health had improved (6.7%), and/or felt that their condition was getting worse (1%). Treatment for tuberculosis was carried out by taking more than one type of drug, but in fact, there were still respondents who did not always take all the drugs (12.4%). Whereas tuberculosis drugs must be taken completely and continue to be carried out completely for at least 6 months to prevent the occurrence of tuberculosis bacteria resistance to drugs.

The patient's attitude that they are healed and that they have been intensively receiving medical treatment for two months presents a challenge in the treatment of tuberculosis because it may lead the patient to decide not to continue treatment. The patient feels healed because he or she has no symptoms (Ilmu et al., 2020). Therefore, to increase awareness and patients' motivation to undergo treatment, they can meet with TB patients who have recovered to share experiences and encourage each other to

undergo treatment. Patients can also take advantage of the SOBAT TB application to get information regarding the list of TB communities.

In this study, the role of health professionals and PMO support are factors related to adherence to treatment for TB-SO patients. So it is in accordance with the theory of The Five Dimensions of Adherence that the role of health professionals and the social support received by patients can affect patient treatment adherence. Knowledge, attitudes, susceptibility, and side effects of drugs do not show a relationship with treatment adherence of TB-SO patients, so this is not in accordance with the theory of The Five Dimensions of Adherence, which states that the patient's self-knowledge, patient self-attitude, patient susceptibility, and drug side effects experienced by the patient can affect the patient's medication adherence (WHO, 2003).

Good knowledge can help the success of treatment because the higher the respondent's knowledge, the better they will receive information related to TB treatment so that they will seek therapy more frequently (Prihantana & Wahyuningsih, 2016). But the results of the analysis conducted using chi-square showed a p-value of 0.540, so it can be concluded that there is no relationship between the knowledge of TB-SO patients and adherence to treatment for TB-SO patients during the COVID-19 pandemic at the Surakarta City Public Health Center. This can be caused by differences in the characteristics of respondents, as in this study, more respondents aged 20–60 years (81%) and more respondents with good knowledge (81.9%).

The knowledge of respondents in the adult age group has a higher level of knowledge compared to the elderly age group (Fadlilah & Aryanto, 2020). In this research study, it was shown that the majority of health workers had provided information related to TB services during the COVID-19 pandemic (98%), and health professionals gave clear explanations regarding the rules for taking medication (98.1%). This shows that the majority of respondents have good knowledge because of the education factor that has been given by health professionals. Although the majority of patients have good knowledge, it has not become a factor that can influence patients to follow their treatment plan.

In this study, attitude is a factor that is not related to adherence to treatment for TB-SO patients. The results of the analysis conducted using chi-square showed a p-value of 0.282, so it can be said that there is no relationship between the attitude of TB-SO patients and treatment adherence of TB-SO patients during the COVID-19 pandemic at the Surakarta City Public Health Center. The attitude in this study is the respondent's reaction or response in responding to tuberculosis treatment and efforts to prevent tuberculosis during the COVID-19 pandemic.

The results showed that respondents were still afraid to take medicine to the Puskesmas (14.3%) and were afraid to do a sputum examination at the Puskesmas (14.3%) for fear of being sick with COVID-19. However, despite being afraid to go to the Puskesmas, during the COVID-19 pandemic, the Puskesmas ran services that were in accordance with the TB service protocol. The COVID-19 service had a separate room from the TB service, so this provided convenience for TB patients to continue to receive TB services at the Puskesmas.

Results of this study show that although the attitude of the majority of patients was good, it has not become a significant factor regarding patients adherence to treatment because there are other factors, such as the services provided by the Puskesmas, which encourage patients to continue treatment. Although the attitude of the majority of patients is good, it has not become a significant factor regarding patients

adherence to their treatment. Because there are other factors, such as the services provided by the Puskesmas, that encourage patients to continue treatment.

In this study, the vulnerability was not related to adherence to treatment for TB-SO patients. The results of the analysis conducted using chi-square showed a p-value of 0.801, so it can be concluded that there is no relationship between the vulnerability of TB-SO patients and adherence to treatment for TB-SO patients during the COVID-19 pandemic at the Surakarta City Public Health Center. According to this study, a respondent's condition can raise their risk of becoming sick or make their existing condition worse, such as socio-economic, psychological, and comorbid conditions.

The results of the respondents' answers indicate that respondents who suffer from comorbidities other than tuberculosis are mostly people with diabetes mellitus (15.24%). Patients with diabetes mellitus are more prone to suffering from tuberculosis because diabetes causes the body's immune system to decrease (KNCV Indonesia, 2020). The results of respondents' answers still show the high vulnerability of respondents related to the respondent's fear of being a tuberculosis sufferer if infected with COVID-19 (60%), so this shows that the majority of respondents feel the psychological impact as TB-SO sufferers.

However, although they are afraid of contracting COVID-19, respondents are not afraid to socialize due to the stigma of tuberculosis in the community (75.2%), so this shows that the majority of respondents have no social disturbances. In this study, the majority of respondents experienced psychological vulnerability. The role of the family in providing care and psychosocial support to people with TB is very important.

The support and care provided by family members has an impact on TB control. Although family members do not have the expertise that can replace professional health workers, the presence of the family is very helpful in caring for and supervising medication adherence so as to reduce the rate of errors and treatment failures. In addition, the family also plays a very important role in terms of social and emotional support, as well as motivation to complete treatment (Iksan et al., 2020).

From an economic point of view, the condition found at the Surakarta City Public Health Center is that patients get anti-tuberculosis drugs (OAT) for free as part of one of the government programs for TB elimination, so that patients ability to receive therapy won't be limited by their financial situation. In this study, the vulnerability was not related to patient medication adherence. This can happen because even though respondents experience high vulnerability, they get the motivation to adhere to their treatment from health workers and PMOs, who in this study are mostly from families, so high vulnerability is not a more significant factor than the role of health workers and PMO support.

In this study, drug side effects were not associated with medication adherence of TB-SO patients. The results of the analysis conducted using chi-square showed a p-value of 0.464, so it can be concluded that there is no relationship between drug side effects and adherence to treatment for TB-SO patients during the COVID-19 pandemic at the Surakarta City Public Health Center. This is also shown from the results of respondents' answers, where the majority of respondents who do not comply with treatment are respondents who experience mild drug side effects, so the severity or severity of drug side effects has not been shown as a factor affecting the adherence of TB-SO patients undergoing treatment.

According to the theory of The Five Dimensions of Adherence by WHO, drug side effects as a unique characteristic of therapy do not have an influence beyond the

general factors that affect adherence but rather modify them so that interventions that are tailored to the patient's needs related to the therapy they are undergoing can work to their maximum (WHO, 2003). The role of health workers is a factor related to adherence to the treatment of TB-SO patients. The results of the analysis conducted using chi-square showed a p-value of 0.045, so it can be concluded that there is a relationship between the perception of the role of health professionals and adherence to treatment for TB-SO patients during the COVID-19 pandemic at the Surakarta City Public Health Center.

Patients who have good relationships with health professionals have higher medication adherence and a healthier quality of life than patients who do not have good relationships with health workers (Qiu et al., 2019). Patients who have good relationships with health professionals have higher medication adherence and a healthier quality of life than patients who do not have good relationships with health workers (Qiu et al., 2019). According to the Indonesian Ministry of Health, (2013) counseling has proven to be effective in improving patient behavior in preventing TB transmission.

Personal counseling can help patients find solutions to their problems and understand their character and behavior. The implementation of good personal counseling needs to be supported by health workers. Health workers need to monitor the patient's medical record to find out the problems that occur.

According to Purba et al., (2019), the role of health workers is very important to support the success of treatment for pulmonary TB patients. One of their roles is providing information about TB disease, motivating patients to be patient while undergoing a long treatment process, and reminding patients to take TB treatment drugs and screen for pulmonary tuberculosis (Pola, 2019). Adherence to treatment can be influenced by patient satisfaction with the communication provided by health service providers.

The implementation of communication, information, and education in today's era can be done using telephone media. Telephone media can reduce costs for education and can monitor the condition of the patient's illness without having to come to health care facilities. The selection of technology media can help treat patients who need long-term treatment, with the use of technology virtually helping to connect with patients (Pratiwi et al., 2021).

The Sub-Directorate of Tuberculosis of the Ministry of Health, together with the KNCV Indonesia Foundation, launched the SOBAT TB application, which can help provide education, independent screening, and monitoring of patient drugs during the pandemic through digital media based on android applications. In addition, SOBAT TB also provides a list of healthcare facilities to carry out TB examinations and treatment, as well as a list of TB communities. So this application is not only useful for patients but also useful for the general public, such as the patient's family (Septiani et al., 2022).

The results show that there are still health workers who have not kept their distance from patients. Therefore, there is a need for supervision from the Puskesmas to monitor the performance of health workers when carrying out services so that they keep their distance from patients when providing services to prevent disease transmission, both of tuberculosis and COVID-19. Personal counseling has been shown to improve the behavior of TB patients undergoing treatment; therefore, efforts must be made to improve the quality of personal counseling provided by health workers by ensuring the competence of competent health workers to conduct counseling to patients.

Efforts can be made to the need for a Standard Operating Procedure (SOP) related to the implementation of personal counseling that must be carried out by health workers because the implementation of counseling also supports the Directly Observed Treatment Short-Course (DOTS) policy strategy to improve the knowledge, skills, attitudes, and behavior of health professionals who treat tuberculosis (Ratnasari et al., 2013). Treatment Supervisor (Pengawas Menelan Obat/PMO) support is a factor related to treatment adherence of TB-SO patients. PMOs can come from families, health workers, health cadres, or community leaders.

The results of the analysis conducted using chi-square showed a p-value of 0.035, so it can be concluded that there is a relationship between the perception of PMO support and adherence to treatment for TB-SO patients during the COVID-19 pandemic at the Surakarta City Public Health Center. TB patients who received supervision and support while undergoing treatment showed a higher rate of treatment success. According to Dewanty et al., (2016), the role of PMO is very important to support adherence to treatment for tuberculosis patients undergoing treatment that takes a long time (Dewanty et al., 2016).

The results show the answers of the majority of PMO respondents have provided good support, and the majority of PMOs come from families (82.86%). In this study, the majority of PMOs came from families (82.86%), so the family, as the closest person, has a very helpful role in supporting adherence to treatment for TB-SO patients during the COVID-19 pandemic. Strong social support for patients, especially from the family, really helps the TB disease healing process (Noveyani & Martini, 2014).

I was able to supervise and provide support during the COVID-19 pandemic due to living with patients. Families have an active role in protecting sick family members. Families have the ability to influence the behavior of their members to solve family health problems. Families can be a source of social support such as emotional support, concrete support, information support, and reward support.

According to Videbeck, (2018) family support can strengthen the patient's confidence in making decisions. This confidence fosters a sense of security and courage in the patient so that it can influence the decision to be more cooperative in undergoing treatment (Anita & Sari, 2022). However, questions related to the role of health workers indicate that there are still officers who have not provided socialization to families (5.8%).

Therefore, it is necessary to optimize socialization with families so that PMO officers who come from families can understand the patient's condition and treatment. Optimization of socialization can be carried out in several meetings. The first is when the patient is first tested for TB so that the PMO really understands his duties. Then proceed with training to support interaction with patients (WHO, 2017).

Training can be done through psychoeducational training. Psychoeducational training for families has proven to be beneficial for patients with mental disorders to support the patient's independence while undergoing treatment. In addition, it is also beneficial for families to improve patient recovery because families who are given psychoeducation better understand the disease and how to provide care for their family members (Sulastri & Kartika, 2016). To support the implementation of psychoeducation training, it is necessary to establish a policy that is socialized to TB program holders through discussion meetings between program holders TB in Surakarta City.

The results showed that there were still PMOs who did not routinely monitor patients and monitor the side effects of drugs experienced by patients, so to ensure the

supervision carried out by PMOs, they could create a recording form to monitor the patient's TB treatment. This form can be used as reporting material to health workers regarding the course of treatment and side effects of drugs experienced by patients. If health professionals can check the form every time a patient comes to get services at the Puskesmas, and if the PMO shows that they are not routinely doing the monitoring, then the PMO may take further action.

**CONCLUSION**

Even though the patient's knowledge is good, the patient's attitude is good, the patient's susceptibility is high, and the drug side effects experienced are severe, they are not factors related to adherence to treatment for TB-SO patients but are more influenced by the role of health workers and the support provided by the PMO to the patient. Suggestion for further research it is necessary to develop research using qualitative methods so that it can better describe the managerial aspects and implementation of policies related to efforts to comply with TB-SO patient treatment at the Puskesmas in more detail. Also, it is necessary to develop research by adding several new variables that have not been studied so it can explain more of the factors related to patient treatment adherence.

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**REFERENCES**
Anita, N., & Sari, R. P. (2022). Faktor-Faktor Kesembuhan Penderita TB Paru Dengan Penyakit Penyerta Diabetes Melitus. *Adi Husada Nursing Journal*, *7*(2), 51. https://doi.org/10.37036/ahnj.v7i2.197

Badan Nasional Penanggulangan Bencana (BNPB). (2020). *Presiden Tetapkan COVID-19 Sebagai Bencana Nasional*. https://bnpb.go.id/berita/presiden-tetapkan-covid19-sebagai-bencana-nasional#:~:text=JAKARTA - Presiden Joko Widodo secara,-19) Sebagai Bencana Nasional.

Cilloni, L., Fu, H., Vesga, J. F., Dowdy, D., Pretorius, C., Ahmedov, S., Nair, S. A., Mosneaga, A., Masini, E., Sahu, S., & Arinaminpathy, N. (2020). The potential impact of the COVID-19 pandemic on the tuberculosis epidemic a modelling analysis. *EClinicalMedicine*, *28*(March), 100603. https://doi.org/10.1016/j.eclinm.2020.100603

Fadlilah, S., & Aryanto, E. (2020). Faktor yang Berhubungan dengan Pengetahuan TB Paru dan Dukungan Sosial Pasien RS Khusus Paru Respira. *Jurnal Ilmiah Keperawatan Sai Betik*, *15*(2), 168. https://doi.org/10.26630/jkep.v15i2.1804

Iksan, R. R., Muhaimin, T., & Anwar, S. (2020). *Fungsi-Fungsi Keluarga dengan Hasil Pengobatan Tuberkulosis Program DOTS*. *3*, 638–647.

Ilmu, S., Negara, A., Publik, J. A., Ilmu, F., Ilmu, S., Negara, A., Publik, J. A., & Ilmu,

F. (2020). *Implementasi Kebijakan Penanggulangan Tuberkulosis Dengan Strategi Directly Observed Treatment Short Course (DOTS) di Puskesmas Kecamatan Bangsal Kabupaten Mojokerto*. 201–214.

Janan, M. (2019). Faktor-Faktor Risiko yang Berhubungan dengan Peningkatan Prevalensi Kejadian TB MDR di Kabupaten Brebes Tahun 2011-2017. *Jurnal Kebijakan Kesehatan Indonesia : JKKI*, *8*(2), 64–70. https://tbindonesia.or.id/informasi/tentang-tbc/situasi-tbc-di-indonesia-2/

Indonesian Ministry of Health. (2020). *Profil Kesehatan Indonesia Tahun 2019*. https://doi.org/10.5005/jp/books/11257_5

Maria, L. (2016). *Identifikasi Faktor Risiko Terjadinya TB MDR pada Pasien TB di Madiun*. 10–28.

Osterberg, L., & Blaschke, T. (2005). Adherence to Medication. *New England Journal of Medicine*, *353*(5), 487–497. https://doi.org/10.1056/NEJMra050100

Pola, S. (2019). *Indonesia Bebas Tuberkulosis* (R. Awahita (ed.); First). CV Jejak.

Pratiwi, R. D., Fitriani, D., & Betty, B. (2021). Penggunaan media komunikasi android apps dalam optimalisasi pengawas minum obat (PMO) terhadap tingkat kepatuhan dan kesembuhan penderita tuberkulosis paru. *Holistik Jurnal Kesehatan*, *14*(4), 624–641. https://doi.org/10.33024/hjk.v14i4.3512

Prihantana, A. S., & Wahyuningsih, S. S. (2016). Hubungan Pengetahuan dengan Tingkat Kepatuhan Pengobatan pada Pada Pasien Tuberkulosis di RSUD dr. Soehadi Prijonegoro Sragen. *Farmasi Sains Dan Praktis*, *II*(1), 47. http://journal.unimma.ac.id/index.php/pharmacy/article/view/188%0Ahttps://jour nal.unimma.ac.id/index.php/pharmacy/article/download/188/135/

Qiu, L., Tong, Y., Lu, Z., Gong, Y., & Yin, X. (2019). Depressive symptoms mediate the associations of stigma with medication adherence and quality of life in tuberculosis patients in China. *American Journal of Tropical Medicine and Hygiene*, *100*(1), 31–36. https://doi.org/10.4269/ajtmh.18-0324

Ratnasari, J. D., Makmur, M., & Ribawanto, H. (2013). Pengembangan Kapasitas (Capacity Building) Kelembagaan Pada Badan Kepegawaian Daerah Kabupaten Jombang. *Jurnal Administrasi Publik*, *1*(3), 103–110. file:///C:/Users/user/Documents/Mendeley Desktop/Badan, Daerah, Jombang/Unknown/Badan, Daerah, Jombang - 1999 - Pengembangan kapasitas (.pdf

Septiani, D., Haniifah, F. N., Riswaluyo, M. A., Anwar, N. M., Masyarakat, F. K., Indonesia, U., & Septiani, K. D. (2022). *Penggabungan Aplikasi Telemedicine TB Sebagai Optimalisasi Pelayanan TB Selama Masa Pandemi COVID-19 Merging TB Telemedicine Application as Optimising Tuberculosis Health Care During COVID-19 Pandemic*. *2*, 117–125.

Sulastri, S., & Kartika, Y. (2016). Psikoedukasi Keluarga Meningkatkan Kepatuhan Minum Obat ODGJ di Puskesmas Kedaton Bandar Lampung. *Jurnal Kesehatan*, *7*(2), 323. https://doi.org/10.26630/jk.v7i2.207

Tim Program TB St. Carolus. (2017). *Tuberkulosis Bisa Disembuhkan!* (C. Gautama (ed.)). Kepustakaan Populer Gramedia.

World Health Organization (WHO). (n.d.). *Coronavirus disease (COVID-19)*. Retrieved February 26, 2022, from https://www.who.int/health-topics/coronavirus#tab=tab_1

World Health Organization (WHO). (2003). Adherence to Long-Term Therapies. *Patient Preference and Adherence*, *12*. https://doi.org/10.2147/PPA.S174652

World Health Organization (WHO). (2017). Guidelines for treatment of drug-susceptible tuberculosis and patient care. In *Kekkaku* (Vol. 62, Issue 12).

World Health Organization (WHO). (2021a). *TB treatment and treatment coverage*. https://www.who.int/publications/digital/global-tuberculosis-report-2021/tb-diagnosis-treatment/treatment

World Health Organization (WHO). (2021b). *Tuberculosis Deaths Rise or the First Time in More Than a Decade Due to the COVID-19 Pandemic*. https://www.who.int/news/item/14-10-2021-tuberculosis-deaths-rise-for-the-first-time-in-more-than-a-decade-due-to-the-covid-19-pandemic

KNCV Indonesia. (2020). *Hari Diabetes Nasional : Kaitan Tuberkulosis dan Diabetes Mellitus*. https://yki4tbc.org/hari-diabetes-nasional-kaitan-tuberkulosis-dan-diabetes-melitus/