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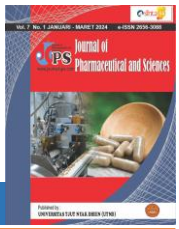

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# Factors Affecting Compliance with Taking Anti-Tuberculosis Drugs at the UPTD Pulmonology Hospital of North Sumatra Province

# Faktor-Faktor Yang Mempengaruhi Kepatuhan Minum Obat Anti Tuberkulosis di UPTD Rumah Sakit Khusus Paru Provinsi Sumatera Utara

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## Abstract

Tuberculosis (TB) is a preventable and usually curable disease. Yet, it remains one of the leading causes of death in the world, especially in high TB-burden countries such as Indonesia. In 2021, there was a significant increase in TB incidence and mortality in Indonesia, especially in North Sumatra province, which reported many TB cases, including drug-resistant TB (MDR-TB). Patient non-adherence to treatment is a significant factor exacerbating this situation, leading to increased drug resistance and broader transmission. Strategic efforts and treatment adherence are needed to address the TB epidemic, in line with the global TB elimination target by 2030. This study aims to determine the factors influencing adherence to anti-tuberculosis drugs at the UPTD Pulmonology Hospital of North Sumatra Province. The study was a quantitative study with a cross-sectional research design. The sample in this study was 37 people, with sampling using accidental sampling, and the data were analysed univariate, bivariate with the Chi-Square test at $\alpha$ = 5% level, and multivariate with multiple logistic regression test. The results of this study showed that there was an influence of knowledge on adherence to taking anti-tuberculosis drugs (p-value = 0.038), employment (p-value = 0.018), access to health services (p-value = 0.003), and family support (p-value = 0.006). There was no influence of medication's side effects on adherence to anti-tuberculosis drugs (p-value = 1) at the UPTD Pulmonology Hospital of North Sumatra Province. The dominant factor in this study was family support, which tended to be more compliant with taking anti-tuberculosis drugs by 19 times compared to respondents who received less family support. This study recommends that the UPTD Pulmonology Hospital of North Sumatra Province increase family involvement and education in supporting the treatment of tuberculosis patients, including family assistance programs, counselling on the importance of family support, and providing information related to drug side effects so that families can provide proper motivation and understanding to patients.

***Keywords*: Adherence to medication; knowledge; occupation; side effects; access to health services; family support.**

## Abstrak

Tuberkulosis (TB) adalah penyakit yang bisa dicegah dan biasanya bisa disembuhkan, namun tetap menjadi salah satu penyebab kematian utama di dunia, terutama di negara-negara dengan beban TB tinggi seperti Indonesia. Pada tahun 2021, terjadi peningkatan signifikan dalam insiden dan kematian akibat TB di Indonesia, terutama di provinsi Sumatera Utara yang melaporkan banyak kasus TB, termasuk TB resisten obat (MDR-TB). Ketidakpatuhan pasien dalam menjalani pengobatan merupakan faktor utama yang memperburuk situasi ini, menyebabkan peningkatan resistensi obat dan penularan yang lebih luas. Upaya strategis dan kepatuhan terhadap pengobatan sangat diperlukan untuk mengatasi epidemi TB, sesuai dengan target eliminasi TB global pada tahun 2030. Penelitian ini bertujuan untuk mengetahui faktor-faktor yang mempengaruhi kepatuhan minum obat anti tuberkulosis di UPTD Rumah Sakit Khusus Paru Provinsi

Sumatera Utara. Penelitian adalah penelitian kuantitatif dengan desain penelitian *cross sectional*. Sampel pada penelitian ini sebanyak 37 orang, dengan pengambilan sampel menggunakan *accidental sampling*, dan data dianalisis secara univariat, bivariat dengan uji *Chi-Square* pada taraf $\alpha = 5\%$, dan multivariat dengan uji *regresi logistic* ganda. Hasil penelitian ini menunjukkan bahwa ada pengaruh pengetahuan dengan kepatuhan minum obat anti tuberkulosis (*p-value* = 0,038), pekerjaan (*p-value* = 0,018), akses pelayanan kesehatan (*p-value* = 0,003), dukungan keluarga (*p-value* = 0,006), dan tidak ada pengaruh efek samping minum obat dengan kepatuhan minum obat anti tuberkulosis (*p-value* = 1,000) di UPTD Rumah Sakit Khusus Paru Provinsi Sumatera Utara. Faktor dominan pada penelitian ini adalah dukungan keluarga yang cenderung lebih patuh minum obat anti tuberkulosis sebesar 19 kali dibandingkan dengan responden yang kurang mendapat dukungan keluarga. Penelitian ini merekomendasikan supaya pihak UPTD Rumah Sakit Khusus Paru Provinsi Sumatera Utara untuk meningkatkan keterlibatan dan edukasi keluarga dalam mendukung pengobatan pasien tuberkulosis mencakup program pendampingan keluarga, penyuluhan tentang pentingnya dukungan keluarga, serta pemberian informasi terkait efek samping obat agar keluarga dapat memberikan motivasi dan pemahaman yang tepat kepada pasien.

***Kata Kunci:*** *Kepatuhan minum obat; pengetahuan; pekerjaan; efek samping minum obat; akses pelayanan kesehatan; dukungan keluarga.*



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## Introduction

Tuberculosis (TB) is a preventable and usually curable disease. However, in 2022, TB became the world's second leading cause of death from a single infectious agent, after coronavirus disease (COVID-19), and caused nearly twice as many deaths as HIV/AIDS. More than 10 million people contract TB each year. Urgent action is needed to end the global TB epidemic by 2030, a goal that has been adopted by all United Nations (UN) Member States and the World Health Organization (WHO) [1].

TB is caused by the bacterium *Mycobacterium tuberculosis*, which spreads when a person with TB expels the bacteria into the air (for example, through coughing). Of the total number of people who develop TB each year, approximately 90% are adults, with more cases occurring in men than in women. The disease primarily affects the lungs (pulmonary TB), but can also affect other body parts. [2].

In 2020, the largest number of new TB cases, 43%, occurred in the WHO Southeast Asia Region, followed by the WHO African Region with 25% of new cases and the WHO Western Pacific Region with 18%. 86% of new TB cases occurred in 30 high-TB-burden countries. Eight countries accounted for two-thirds of new TB cases: India, China, Indonesia, the Philippines, Pakistan, Nigeria, Bangladesh, and South Africa. (WHO, 2023). Based on the incidence of tuberculosis in Indonesia from 2000 to 2020, there was a decline in TB incidence and TB mortality rates, although not very sharp. However, from 2020 to 2021, an increase was observed. The TB incidence in 2021 rose by 18% (from 819,000 in 2020 to 969,000 in 2021), and the TB mortality rate increased by 55% (from 93,000 in 2020 to 144,000 in 2021) [3]. After West Java, Central Java, East Java, DKI Jakarta, and Banten, North Sumatra Province was recorded as having the sixth-highest number of TB cases in Indonesia in 2021, according to TB data obtained that year [4].

The number of tuberculosis cases by district/city in 2022 shows that the highest cases were reported in Medan City with 10,050 instances, Deli Serdang Regency with 4,170 cases, and Langkat Regency with 1,927



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cases. The lowest cases were reported in Pakpak Bharat Regency with 117 instances, West Nias Regency with 119 cases, and North Nias Regency with 163 cases. [5].

The national strategy for TB elimination in Indonesia has been established through Presidential Regulation of the Republic of Indonesia Number 67 of 2021 concerning Tuberculosis Control. The implementation of the TB elimination strategy includes strengthening the commitment and leadership of the Central Government, Provincial Governments, and District/City Governments; improving access to quality and patient-centered TB services; intensifying health efforts for TB control; enhancing research, development, and innovation in TB control; increasing community participation, stakeholders, and other multisectoral involvement in TB control; and strengthening program management [6].

Based on data from the North Sumatra Provincial Health Office, the incidence of MDR-TB cases has increased over two years, with the number of cases rising from 284 cases in 2020 to 347 cases in 2021 and reaching 379 cases by October 21, 2022. Compared to the number of instances that persisted or completed treatment, the number of fatalities due to the incidence continued to rise. In 2020, 137 recovered cases and 56 deaths were due to the incidence, representing nearly half of the ratio.

During pulmonary TB treatment, it is crucial for patients not to stop treatment and to adhere to the prescribed regimen, as consistent treatment provides patients with the opportunity for a complete recovery. Therefore, pulmonary TB patients must comply with their treatment. Adherence is defined as a person's behavior, such as taking medication, following a diet, or making lifestyle changes, by health and treatment recommendations. The level of adherence can encompass all aspects of the recommendations to align with the treatment plan. [7]

Non-adherence to medication in tuberculosis cases is a complex, frequently occurring, and multidimensional healthcare issue related to patients, treatment, and/or healthcare providers. Adherence is the extent to which patients can follow the recommendations for prescribed treatment. As a result, a significant number of patients do not derive optimal benefits from pharmacotherapy, which instead increases cases of drug resistance, such as MDR-TB (Multi-Drug Resistant TB), mortality rates, and social costs. [8].

The burden of tuberculosis continues to grow with the increasing incidence of Multidrug-Resistant Tuberculosis (MDR-TB). MDR-TB refers to TB that is resistant to at least two of the most potent anti-TB drugs (OAT), namely rifampicin and isoniazid, either together or accompanied by resistance to other first-line anti-TB drugs such as ethambutol, streptomycin, and pyrazinamide (Indonesian Ministry of Health, 2018). MDR-TB has become the biggest challenge in the global and national fight against TB. The main issues faced by MDR-TB patients include the difficulty and high cost of treatment, high mortality rates, and the potential to transmit drug-resistant bacteria to others. [9]. According to the CDC (2020), resistance to anti-TB drugs (ATD) can occur when the drugs are misused or mismanaged. For example, when patients do not complete their full course of treatment, healthcare providers prescribe the wrong medication, incorrect dosage, or incorrect duration of therapy, when the necessary drugs are unavailable, or when the drugs used are of poor quality.[10].

Indonesia is designated as one of the 27 high-burden Multidrug-Resistant Tuberculosis (MDR-TB) countries by the World Health Organization (WHO) Global Report due to the consistent emergence of new MDR-TB cases reported each year. [1].

Based on data from the Medan City Health Office, it was found that many TB patients still drop out of treatment. In 2022, 377 TB patients decided to stop their treatment. This, of course, can lead to an increase in drug resistance rates and a higher risk of transmission to other individuals. [11].

Based on the preliminary survey conducted by the researcher at the UPTD Special Lung Hospital of North Sumatra Province, it was found that the number of patients who had dropped out in 2022 was 75 people, and in 2023, it was 87 people. The researcher also conducted brief interviews with nurses at the UPTD Special Lung Hospital of North Sumatra Province. Several reasons identified for patients' non-adherence to medication and their return to collect medication include: the considerable distance to healthcare facilities, patients' work schedules conflicting with medication pickup times, lack of patient awareness about the consequences of stopping treatment (leading some patients to return for medication only after experiencing TB symptoms), side effects of the medication such as nausea, vomiting, and hair loss, and insufficient family support, as evidenced by some patients coming alone to collect medication without family accompaniment.

Based on the above background, the researcher is interested in conducting a study titled "*Factors Influencing Adherence to Anti-Tuberculosis Medication at the UPTD Special Lung Hospital of North Sumatra Province*".



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## Experimental Section

### Research Design

The type of research used in this study is quantitative. This research was conducted using a cross-sectional approach. Cross-sectional research is a study designed to examine the dynamics of the correlation between risk factors and effects through an observational or data collection approach. In cross-sectional research, observations are made only once, and measurements of the variables are taken at the time of the study.

### Location and Time of Research

This research was conducted at the UPTD Special Lung Hospital of North Sumatra Province. The selection of this location is based on the fact that the UPTD Special Lung Hospital of North Sumatra Province is one of the referral hospitals in North Sumatra that specifically handles pulmonary TB patients. The research was carried out during the period from June to August 2024.

### Research Population and Sample

The population in this study consisted of all patients at the UPTD Special Lung Hospital of North Sumatra Province, with an average number of pulmonary TB patients from January to June 2024 totaling 106 people.

This study used an accidental sampling technique to determine the sample. According to Sugiyono (2016), unintentional sampling is a technique where the sample is determined based on chance, meaning any patient who coincidentally meets the researcher can be used as a sample, provided they are deemed suitable as a data source at the UPTD Special Lung Hospital of North Sumatra Province. [12]The inclusion criteria in this study include pulmonary TB patients who are undergoing treatment or visiting the UPTD Special Lung Hospital of North Sumatra Province, patients who have undergone treatment for at least three months, and patients who are willing to participate as respondents. Based on the research conducted, the sample size in this study was 37 people.

### Data Collection Techniques

Primary data is obtained directly from respondents through research instruments in the form of questionnaires. Meanwhile, secondary data is collected from the North Sumatra Provincial Pulmonary Specialty Hospital, including the average number of pulmonary TB patients from January to June 2024. Additionally, tertiary data is sourced from various valid references, such as journals, books, and published research findings.

### Validity Test

A validity test is conducted to determine whether the measuring instrument that has been designed is truly capable of measuring what it is intended to measure. The validity of each item is tested using item analysis, which involves correlating the score of each item with the total score (corrected item-total correlation). The results can be analyzed using SPSS software. A questionnaire is considered valid if it can genuinely measure the intended construct. Instrument items are deemed valid if the correlation coefficient (calculated r) exceeds the table r value.

In this study, the adherence questionnaire was adopted from Anthony Wiranata's (2019) research titled "*Hubungan PMO (Pengawas Menelan Obat) dengan Kepatuhan Minum Obat Pada Pasien Tuberkulosis di Wilayah Kerja Puskesmas Dimong Kabupaten Madiun"*. This study utilized the MMAS-8 adherence questionnaire. Maulidia tested the validity of the MMAS-8 instrument in Wiranata's research, where the validity test results showed a calculated r value of 0.355, indicating that the questionnaire was proven to be valid ( [13] .

The knowledge and healthcare access questionnaire was adopted from Agnes Herna M Rajagukguk's (2019) research titled "*Faktor Yang Memengaruhi Kepatuhan Pengobatan Pasien TB Paru di Puskesmas Bunturaja Kabupaten Dairi Tahun 2019*." The questionnaire was tested on 20 people outside the UPT Health Center Lae Parira sample. The table value of r was 0.444 in the study. [14].

The family support questionnaire was adopted from Devi Mewynda Sitorus' (2019) research titled *"Faktor Yang Memengaruhi Kepatuhan Pengobatan Penderita Tuberkulosis Paru Di Puskesmas Sipintuangin Kabupaten Simalungun Tahun 2019"*. The test was conducted at the Aek Nauli Health Center in Siantar Selatan District, Pematang Siantar City, with 20 participants for the validity test. The table value of r in this study was


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0.444. [15].

**Reliability Test**

The reliability test aims to determine whether the data collection instrument demonstrates accuracy, precision, stability, or consistency in revealing specific symptoms from a group of individuals, even when conducted at different times. In determining the reliability level of a research instrument, reliability in the range of > 0.60 to 0.80 is considered good, while a range of > 0.80 to 1.00 is considered very good. Testing was conducted using the SPSS software with Cronbach's Alpha formula to determine the reliability of statement items for each variable. An instrument with a Cronbach's Alpha value > 0.60 is reliable.

The reliability test results showed that medication adherence had a reliability score of 0.729, knowledge 0.933, access to healthcare services 0.875, and family support 0.807.

**Data Analysis Techniques**

**Univariate** analysis is conducted to describe each variable using frequency distribution tables based on the collected data. A chi-square ($\chi^2$) statistical test is performed for Bivariate analysis to examine the influence of independent and dependent variables. The decision-making process is compared using a 95% confidence level (0.05). Independent variables that show a significant relationship with the dependent variable are included in the **multivariate** analysis, while those that do not show a significant relationship are excluded. Multivariate analysis aims to determine which independent variable has the most significant impact on the dependent variable. This study's **multivariate** analysis examines independent variables such as knowledge, occupation, medication side effects, and access to healthcare services that affect adherence to anti-tuberculosis medication. **Multiple logistic regression** analysis is used to identify the most influential factor on patient adherence among these four variables.

## Results and Discussion

**Description of the Research Location**

The UPTD Special Pulmonary Hospital, located at Jalan Setia Budi No. 84, Medan, is a healthcare facility owned by the Provincial Government of North Sumatra. Under the supervision of the North Sumatra Provincial Health Office, this hospital is committed to becoming a leading centre for dignified pulmonary health services. Its primary role is to address pulmonary health issues, including COPD and Tuberculosis (TB). The UPTD Special Pulmonary Hospital provides comprehensive and integrated healthcare services, utilising appropriate technology and supported by active community participation, cross-program, and cross-sector collaboration.

The specialised clinics include the smoking cessation clinic, pulmonary clinic, asthma/COPD clinic, pulmonary infection clinic, MDR-TB clinic, pediatric clinic, VCT clinic, obstetrics and gynaecology clinic, general clinic, and pulmonary function clinic.

The UPTD Special Pulmonary Hospital of North Sumatra Province accepts general and BPJS healthcare participants. There are no specific criteria for patient admission; however, general patients diagnosed with TB will be advised to continue treatment at the nearest public health centre (Puskesmas) or the closest healthcare facility. BPJS patients will be directed to obtain their medication according to the healthcare facility registered in their BPJS coverage.

**Univariate Analysis**

This study was conducted in August 2024. Data were collected from 37 respondents (patients who collected medication or visited the UPTD Special Pulmonary Hospital of North Sumatra Province) and will be presented as follows:

**a. Frequency Distribution of Respondents**

Table 1 presents the characteristics of the respondents, which consist of education, age, gender, and occupation.



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**Table 1.** Frequency Distribution of Respondent Characteristics at the UPTD North Sumatra Provincial Pulmonary Specialty Hospital.

| Respondent Characteristic | | f | % |
|---|---|---|---|
| **Gender** | Male | 14 | 37,8 |
| | Female | 23 | 62,2 |
| | **Total** | **37** | **100,0** |
| **Age** | 25-30 years | 6 | 16,2 |
| | 31-40 years | 13 | 35,1 |
| | 41-50 years | 13 | 35,1 |
| | > 50 years | 5 | 13,5 |
| | **Total** | **37** | **100,0** |
| **Education** | No schooling | 3 | 8,1 |
| | SD/Equivalent | 5 | 13,5 |
| | SMP/Equivalent | 2 | 5,4 |
| | SMA/Equivalent | 17 | 45,9 |
| | Higher Education | 10 | 27,0 |
| | **Total** | **37** | **100,0** |
| **Occupation** | Housewife/Not Working | 14 | 37,8 |
| | Civil Servant (PNS) | 2 | 5,4 |
| | Private Employee | 3 | 8,1 |
| | Entrepreneur | 10 | 27,0 |
| | Laborer/Farmer | 8 | 21,6 |
| | **Total** | **37** | **100,0** |

Based on Table 1, the majority of respondents in this study were female, accounting for 62.2%. The most common age groups were 31–40 and 41–50, comprising 35.1% of respondents. Most respondents had a high school or equivalent education, totalling 45.9%, and the most common occupation was housewife or unemployed, accounting for 37.8% of respondents.

**b. Frequency Distribution of Medication Adherence**

**Table 2.** Frequency Distribution of Medication Adherence at the UPTD North Sumatra Provincial Pulmonary Specialty Hospital.

| No | Medication Adherence | f | % |
|---|---|---|---|
| 1 | Adherent | 26 | 70,3 |
| 2 | Non-adherent | 11 | 29,7 |
| | Total | 37 | 100,0 |

Table 2 shows that 70.3% of respondents took anti-tuberculosis medication in this study, while 29.7% did not.

**c. Frequency Distribution of Knowledge**

**Table 3.** Frequency Distribution of Knowledge at the UPTD North Sumatra Provincial Pulmonary Specialty Hospital.

| No | Knowledge | f | % |
|---|---|---|---|
| 1 | Good | 27 | 73,0 |
| 2 | Poor | 10 | 27,0 |
| | Total | 37 | 100,0 |

Table 3 shows that 73.0% of respondents in this study had good knowledge, while 27.0% had less knowledge.



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**d. Distribusi Frekuensi Pekerjaan**

**Table 4.** Frequency Distribution of Occupation at the UPTD North Sumatra Provincial Pulmonary Specialty Hospital.

| No | Occupation | f | % |
|---|---|---|---|
| 1 | Not Working | 25 | 67,6 |
| 2 | Working | 12 | 32,4 |
| | Total | 37 | 100,0 |

Table 4 shows that 67.6% of respondents in this study were unemployed, while 32.4% were employed.

**e. Frequency Distribution of Medication Side Effects**

**Table 5.** Frequency Distribution of Medication Side Effects at UPTD Special Lung Hospital of North Sumatra Province

| No | Side Effects of Taking Medication | f | % |
|---|---|---|---|
| 1 | None | 7 | 18,9 |
| 2 | Yes | 30 | 81,1 |
| | Total | 37 | 100,0 |

Table 5 shows that in this study, 18.9% of respondents did not experience side effects from taking medication, while 81.1% experienced side effects.

**f. Frequency Distribution of Healthcare Access**

**Table 6.**Frequency Distribution of Healthcare Access at UPTD Rumah Sakit Khusus Paru, North Sumatra Province.

| No | Access to Health Services | f | % |
|---|---|---|---|
| 1 | Easy | 27 | 73,0 |
| 2 | Difficult | 10 | 27,0 |
| | Total | 37 | 100,0 |

Table 6 shows that 73.0% of respondents in this study stated that access to healthcare services was easy, while 27.0% stated it was difficult.

**g. Distribution of Family Support Frequency**

**Table 7.** Distribution of Family Support Frequency at UPTD Special Lung Hospital, North Sumatra Province.

| No | Family Support | f | % |
|---|---|---|---|
| 1 | Supporting | 24 | 64,9 |
| 2 | Less supporting | 13 | 35,1 |
| | Total | 37 | 100,0 |

Based on Table 7, it is known that in this study, 64.9% of respondents received family support, while 35.1% of respondents received less family support.



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**Bivariate Analysis**

**a. Cross Tabulation of Knowledge and Medication Adherence**

**Table 8.** Cross Tabulation of Knowledge and Medication Adherence at UPTD Rumah Sakit Khusus Paru Provinsi Sumatera Utara

| | | Medication Adherence | | | | Total | | *p-value* |
|---|---|---|---|---|---|---|---|---|
| | | Adherent | | Non-Adherent | | | | |
| | | f | % | f | % | f | % | |
| Knowledge | Good | 22 | 59,5 | 5 | 13,5 | 27 | 73,0 | 0,038 |
| | Poor | 4 | 10,8 | 6 | 16,2 | 10 | 27,0 | |
| Total | | 26 | 70,3 | 11 | 29,7 | 37 | 100,0 | |

Table 8 shows that among the 73.0% of respondents with good knowledge, 59.5% adhered to anti-tuberculosis medication, while 13.5% did not. Meanwhile, among the 27.0% of respondents with poor knowledge, 10.8% adhered to anti-tuberculosis medication, whereas 16.2% did not. The statistical test results showed a p-value of 0.038, less than 0.05, indicating that knowledge influences medication adherence at UPTD Rumah Sakit Khusus Paru Provinsi Sumatra Utara.

**b. Cross Tabulation of Employment with Medication Adherence**

**Table 9.** Cross Tabulation of Employment with Medication Adherence at UPTD Special Pulmonary Hospital of North Sumatra Province

| | | Medication Adherence | | | | Total | | *p-value* |
|---|---|---|---|---|---|---|---|---|
| | | Adherent | | Non-Adherent | | | | |
| | | f | % | f | % | f | % | |
| Occupation | Not working | 21 | 56,8 | 4 | 10,8 | 25 | 67,6 | 0,018 |
| | Working | 5 | 13,5 | 7 | 18,9 | 12 | 32,4 | |
| Total | | 26 | 70,3 | 11 | 29,7 | 37 | 100,0 | |

Table 9 shows that among the 67.6% of unemployed respondents, 56.8% adhered to anti-tuberculosis medication, while 10.8% did not. Meanwhile, among the 32.4% of employed respondents, 13.5% adhered to anti-tuberculosis medication, whereas 18.9% did not. The statistical test results showed a p-value of 0.018, less than 0.05, indicating that employment influences medication adherence at UPTD Rumah Sakit Khusus Paru Provinsi Sumatra Utara.

**c. Cross Tabulation of Medication Side Effects and Medication Adherence**

**Table 10.** Cross Tabulation of Medication Side Effects and Medication Adherence at UPTD Special Lung Hospital of North Sumatra Province

| | | Medication Adherence | | | | Total | | *p-value* |
|---|---|---|---|---|---|---|---|---|
| | | Adherent | | Non-Adherent | | | | |
| | | f | % | f | % | f | % | |
| Side Effects of Taking Medication | None | 5 | 13,5 | 2 | 5,4 | 7 | 18,9 | 1,000 |
| | Yes | 21 | 56,8 | 9 | 24,3 | 30 | 81,1 | |
| Total | | 26 | 70,3 | 11 | 29,7 | 37 | 100,0 | |

Table 10 shows that among the 18.9% of respondents who did not experience side effects from taking medication, 13.5% adhered to anti-tuberculosis medication, and 5.4% did not. Meanwhile, among the 81.1% of respondents who experienced side effects, 56.8% adhered to anti-tuberculosis medication, whereas 24.3% did not. The statistical test results showed a p-value of 1, more significant than 0.05, indicating that medication side effects do not influence medication adherence at UPTD Rumah Sakit Khusus Paru Provinsi Sumatra Utara.



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**d. Cross Tabulation of Healthcare Service Access and Medication Adherence**

**Table 11**. Cross Tabulation of Healthcare Service Access and Medication Adherence at UPTD Special Pulmonary Hospital of North Sumatra Province

| | | Medication Adherence | | | | Total | | *p-value* |
|---|---|---|---|---|---|---|---|---|
| | | Adherent | | Non-adherent | | | | |
| | | f | % | f | % | f | % | |
| Access to Health Services | Easy | 23 | 62,2 | 4 | 10,8 | 27 | 73,0 | 0,003 |
| | Difficult | 3 | 8,1 | 7 | 18,9 | 10 | 27,0 | |
| Total | | 26 | 70,3 | 11 | 29,7 | 37 | 100,0 | |

Based on Table 11, it was found that among the 27 respondents (73.0%) who had easy access to healthcare services, 62.2% adhered to taking anti-tuberculosis medication, while 10.8% did not. Furthermore, among the 27.0% of respondents who faced difficulties in accessing healthcare services, 8.1% adhered to the medication regimen, whereas 18.9% did not. The statistical test results showed a p-value of 0.003, less than the significance threshold of 0.05 ($p < 0.05$). Therefore, it can be concluded that access to healthcare services significantly influences medication adherence at the UPTD Special Pulmonary Hospital of North Sumatra Province.

**e. Cross Tabulation of Family Support and Medication Adherence**

**Table 12.** Cross Tabulation of Family Support and Medication Adherence at UPTD Pulmonary Specialty Hospital of North Sumatra Province**.**

| | | Medication Adherence | | | | Total | | *p-value* |
|---|---|---|---|---|---|---|---|---|
| | | Adherent | | Non-adherent | | | | |
| | | f | % | f | % | f | % | |
| Family Support | Support | 21 | 56,8 | 3 | 8,1 | 24 | 64,9 | 0,006 |
| | Less supportive | 5 | 13,5 | 8 | 21,6 | 13 | 35,1 | |
| Total | | 26 | 70,3 | 11 | 29,7 | 37 | 100,0 | |

Based on Table 12, it was found that among the 64.9% of respondents who received family support, 56.8% adhered to taking anti-tuberculosis medication, while 8.1% did not. Furthermore, among the 35.1% of respondents who received less family support, 13.5% adhered to the medication regimen, whereas 21.6% did not. The statistical test results showed a p-value of 0.006, less than the significance threshold of 0.05 ($p < 0.05$). Therefore, it can be concluded that family support is a significant factor influencing medication adherence at the UPTD Special Pulmonary Hospital of North Sumatra Province.

**Multivariate Analysis**

**a. Selection of Candidate Variables**

The selection of candidate variables included in the multivariate analysis was carried out through selection in the bivariate analysis with a p-value < 0.25. Based on the logistic regression test, the model fit is presented in Table 13:

**Table 13.** Model Fit Test Results

| No | Variables | *p-value* | Description |
|---|---|---|---|
| 1 | Knowledge | 0,038 | Eligible to Enter the Logistic Regression Model |
| 2 | Occupation | 0,018 | Eligible to Enter the Logistic Regression Model |
| 3 | Side Effects of Taking Medication | 1,000 | Not Eligible to Enter the Logistic Regression Model |
| 4 | Access to Healthcare | 0,003 | Eligible to Enter the Logistic Regression Model |
| 5 | Family Support | 0,006 | Eligible to Enter the Logistic Regression Model |



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**b. Logistic Regression Test**

**Table 14:** Logistic Regression Test Results

| Variables | | B | Sig. | Exp(B) | 95% C.I.for EXP(B) | |
|---|---|---|---|---|---|---|
| | | | | | Lower | Upper |
| **Selection 1** | Knowledge | -19,642 | 0,999 | 0,000 | 0,000 | |
| | Occupation | 2,815 | 0,028 | 16,702 | 1,345 | 207,327 |
| | Access to Healthcare | 21,814 | 0,999 | 11,264 | 1,588 | 79,877 |
| | Family Support | 2,815 | 0,028 | 16,702 | 1,345 | 207,327 |
| | Constant | -12,131 | 0,003 | 0,000 | | |
| **Selection 2** | Occupation | 2,733 | 0,032 | 15,378 | 1,261 | 187,521 |
| | Access to Healthcare | 2,379 | 0,030 | 10,798 | 1,254 | 92,975 |
| | Family Support | 2,960 | 0,021 | 19,293 | 1,562 | 238,270 |
| | *Constant* | -12,445 | 0,002 | 0,000 | | |

Based on Table 14, the final selection results show that occupation has an influence of 15 times (OR = 15.378) on adherence to anti-tuberculosis medication, access to healthcare services has an influence of 10 times (OR = 10.798) on adherence to anti-tuberculosis medication, and family support has an influence of 19 times (OR = 19.293) on adherence to anti-tuberculosis medication.

**The Influence of Knowledge on Medication Adherence to Anti-Tuberculosis Treatment at the UPTD Special Pulmonary Hospital of North Sumatra Province**

Table 8 shows that of the 73.0% of respondents with good knowledge, 59.5% adhered to anti-tuberculosis medication, while 13.5% of other respondents did not comply with the medication. This study shows that the better a person's knowledge of tuberculosis, the more likely they are to adhere to anti-tuberculosis medicines. This aligns with the findings of Rani et al. (2023), who argued that knowledge is related to medication adherence in TB patients, as good knowledge influences positive actions, one of which is adherence to tuberculosis medication. [16]. Therefore, when patients have a good understanding, the application of this knowledge is expected to be good. In this study, 13.5% of respondents did not adhere to medication despite having good knowledge. Based on the questionnaire results distributed to the respondents, the researcher assumes that this may occur due to one of the factors, which is occupation. These five respondents work as farmers/laborers and entrepreneurs who have to work from morning until evening, leaving them with no time to take their medication. Entrepreneurs in this study are respondents who have to run their businesses from morning until evening/night, with some being traders who have to leave early in the morning and return late in the evening, leaving no time to collect their medication. Laborers/farmers in this study must work from morning, as this occupation has become part of their daily routine and livelihood, demanding that they work from morning until evening.

Of the 27.0% of respondents with poor knowledge, 10.8% of respondents adhered to anti-tuberculosis medication, while 16.2% of respondents did not adhere to the medication. In the questionnaire results distributed to the respondents, on average, they answered incorrectly regarding the transmission of TB, as some respondents still did not separate eating utensils from other family members. Additionally, respondents were unaware of the bacteria causing TB and did not know that smoking impacts TB disease. This study's results show that some respondents adhere to the medication despite having poor knowledge. The adherence to medicines in these four respondents (10.8%) can be influenced by various factors, including family support, as investigated in this study.

Based on the statistical test results, a p-value of 0.038 < p-value (0.05) was obtained, allowing us to conclude that knowledge influences medication adherence at the UPTD North Sumatra Provincial Pulmonary Specialty Hospital. A study conducted on tuberculosis patients in the working area of Puskesmas Pahandut also showed a relationship between the level of knowledge and medication adherence (p-value = 0.000). The better the patients know TB (including its definition, symptoms, transmission methods, and complications if not promptly treated), the more likely they are to adhere to medication [17]. This study is also in line with the


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research conducted by Apriyanti AR et al. (2024), which explains that there is a relationship between knowledge and medication adherence (p-value = 0.000) [18].

Based on these results, the researcher assumes that although knowledge about tuberculosis (TB) is significantly related to medication adherence, other factors such as occupation and social habits also influence adherence. The researcher observed that some respondents with good knowledge still did not adhere to medication, possibly due to time constraints caused by their work, such as laborers/farmers and entrepreneurs who must work throughout the day. Additionally, the researcher assumes that other factors, such as family support, influence respondents with poor knowledge but who still adhere to medication.

**The Effect of Occupation on Medication Adherence to Anti-Tuberculosis at the UPTD North Sumatra Provincial Pulmonary Specialty Hospital**

Based on Table 9, it is known that of the 67.6% of respondents who are not working, 56.8% adhered to anti-tuberculosis medication, while 10.8% of other respondents did not comply with the medication. The results of this study show that respondents who are not working are more adherent to their medication compared to those who are working. The researcher assumes that this happens because respondents who are not working have more time, from collecting the medication to taking it, than those who are employed. This aligns with a study by Tri Kusmiyani et al. (2024), which states that respondents forget to take their medication according to the prescribed schedule when they are too busy with work. [19]In this study, 10.8% of respondents who were not working still did not adhere to anti-tuberculosis medication. Based on the researcher's results, this occurred due to the factor of healthcare access, as some respondents lived far from healthcare facilities, making it difficult for them to collect their medication. The healthcare access referred to here is the transportation issue respondents face when picking up their medication.

Of the 32.4% of respondents who are employed, 13.5% adhered to anti-tuberculosis medication, while 18.9% of other respondents did not adhere to the medication. This study found that some respondents still adhered to anti-tuberculosis medicines despite being used. The researcher assumes this may be due to the respondents' motivation to recover. The five respondents in this study who adhered to the medication were employed as civil servants (PNS) and private employees, so they were encouraged and motivated by their surrounding environment, which increased their desire to recover. This aligns with Supriyadi et al. (2023), who found that employment status is related to medication adherence and encourages individuals to be more confident and responsible in addressing health issues, thereby increasing their self-confidence. [20]. TB patients who are employed tend to have the ability to adjust their lifestyle and have experience in adhering to the signs and symptoms of the disease. Employment helps TB patients become more accustomed to managing and utilizing their time effectively to pick up their anti-TB medication on schedule, even during working hours.

Based on the statistical test results, a p-value of 0.018 < p-value (0.05) was obtained, allowing us to conclude that occupation influences medication adherence at the UPTD North Sumatra Provincial Pulmonary Specialty Hospital. This study aligns with Salsabila et al. (2022), where the statistical test results showed a p-value of 0.002 < $\alpha$ (0.05), indicating a relationship between employment status and the level of medication adherence in patients. [21]. The results of this study are not in line with the research conducted by Samory et al. (2022), which found no relationship between knowledge of TB and medication adherence in pulmonary TB patients at the Urei-Fasei Health Center (URFAS), with a p-value of 0.610 [22].

The researcher's assumption from this study is that respondents who are not employed tend to adhere more to anti-tuberculosis medication than those who are employed, as they have more time to pick up and take the medication regularly. The researcher assumes that work-related busyness can lead to forgetting or difficulty adhering to the medication schedule, as observed in most employed respondents. However, it was also found that a small number of respondents who are not employed still did not adhere to their medication, which the researcher assumes is due to factors such as limited access to healthcare services, including transportation issues. These results indicate that, besides occupation, personal motivation and access to healthcare services are essential factors in medication adherence.

**The Influence of Medication Side Effects on Adherence to Anti-Tuberculosis Treatment at the UPTD Special Pulmonary Hospital of North Sumatra Province**

Table 10 shows that of the 18.9% of respondents who did not experience side effects from taking medication, 13.5% adhered to anti-tuberculosis medicines. In comparison, 5.4% of other respondents did not comply with the medication. The results of this study indicate that respondents who did not experience side



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effects from taking medication were more likely to adhere to anti-tuberculosis medicines than those who experienced side effects. This is in line with the study by Syahrina et al. (2024), which states that patients with mild side effects tend to adhere to their medication 26.81 times more than patients with severe side effects, suggesting that the risk of non-adherence is higher among patients who experience severe side effects. [23]However, in this study, 5.4% of respondents did not adhere to the medication despite not experiencing any side effects. Based on the questionnaires distributed by the researcher, both respondents in this study were employed as civil servants (PNS). They occasionally forgot to bring their medication when traveling or leaving home, intentionally skipped their medication, and felt disturbed by the ongoing treatment they were undergoing.

The results of this study showed differences in the side effects experienced by each respondent. These included itching, nausea, hair loss, and changes in urine color. According to a study by Rasdianah et al. (2022), gastrointestinal side effects such as nausea, vomiting, anorexia, and constipation can be caused by the use of rifampicin, isoniazid, and pyrazinamide. [24]. Other side effects reported by patients include itching on the skin. Not all patients experience the side effects of itching and redness on the skin, as this depends on the individual patient's skin sensitivity. Itching caused by anti-tuberculosis drugs (ATD) typically disappears quickly with antihistamines. The itching experienced by patients is likely due to an allergic reaction that occurs after taking the medication. Meanwhile, the reddish color in the urine experienced by patients undergoing TB treatment is not harmful, as it results from the metabolism of rifampicin.

The difference in side effects in this study is also based on the method of drug administration, either using Fixed Dose Combination (FDC) or the combination pack. According to the survey by Maharani et al. (2024), the use of Fixed Dose Combination (FDC) anti-tuberculosis drugs tends to increase the occurrence of side effects compared to the combination pack anti-tuberculosis drugs [25]. This is because the Fixed Dose Combination (FDC) dosage is determined based on a weight range. In contrast, the dosage for the anti-tuberculosis drugs in the combination pack is calculated according to the patient's body weight. UPTD Rumah Sakit Khusus Paru Provinsi Sumatra Utara administers the medication in Fixed Dose Combination (FDC). In the study by Wu et al., a patient with a body weight of 40 kg receives Isoniazid in the FDC formulation at 225 mg/day, whereas in the combination pack formulation, it is 200 mg/day. This difference means that Isoniazid in the Fixed Dose Combination (FDC) form carries a higher risk of side effects, such as nausea and hepatotoxicity. [26]. Meanwhile, the difference in the number of drugs in the FDC and combination pack can also affect the occurrence of side effects. In a single tablet of Fixed Dose Combination (FDC), several anti-tuberculosis drugs (Rifampicin, Isonazid, Pyrazinamide, and Ethambutol) are consumed together. In contrast, the drugs can be taken separately at different times in the combination pack formulation. This difference in the administration of the medicines can influence how the body reacts and potentially increase the risk of side effects. [27].

Of the 81.1% of respondents who experienced side effects from taking medication, 56.8% adhered to taking anti-tuberculosis medication, while 24.3% of the remaining respondents did not adhere. This result indicates that despite experiencing side effects from the medication, the respondents still adhered to their treatment regimen. The researcher assumes that this could be due to the respondents' motivation to recover, which drives them to continue taking their medication despite the side effects. The respondents' knowledge about the side effects of the medication also provides them with the understanding to continue consuming the medication, even with the side effects caused by the anti-tuberculosis drugs. This aligns with Anjani in Syahrina et al. (2024), who stated that information about the side effects of medications is helpful for the public to recognize the unwanted effects when using the drugs [23]. The researcher assumes that knowledge influences the respondents' adherence to taking medication, especially regarding the side effects they may experience. This is in line with Adam (2020), who stated that non-adherence to medication among patients is due to a lack of understanding about the importance of the treatment program.[28]. This is due to the lack of knowledge among patients regarding the disease and the tuberculosis treatment program. In addition, the body's reaction to the medication, such as side effects like vomiting, nausea, itching, dizziness, and bone pain, can trigger the patient to feel that their condition is worsening, leading to a reluctance to comply with tuberculosis medication.

Based on the statistical test results, a p-value of 1 > p-value (0.05) was obtained, so it can be concluded that the medication's side effects are not a factor influencing adherence to medication at the UPTD Rumah Sakit Khusus Paru Provinsi Sumatra Utara. This result is consistent with the findings of Fakhrul et al. (2024), which found no relationship between medication side effects and medication adherence. This is because side effects are not a triggering factor affecting all patients or respondents regarding non-adherence to medication.



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[29]. Using Fisher's Exact Test, a p-value of 0.636 (> $\alpha$ 0.05) was obtained. The results of this study are not in line with the research conducted by Seniantara et al. (2018), where the Spearman rank correlation test yielded a p-value of 0.000 < $\alpha$ 0.05, indicating a significant relationship between the influence of anti-tuberculosis drug side effects and adherence to medication in TB patients. [30] .

The researcher assumes that medication side effects may not be the primary factor influencing medication adherence. Although respondents who experienced side effects such as itching and nausea tended to be adherent, the motivation to recover and knowledge about side effects seem to play a more significant role in determining adherence.

**The Influence of Healthcare Service Access on Medication Adherence to Anti-Tuberculosis Treatment at the UPTD Special Pulmonary Hospital of North Sumatra Province**

Table 11 shows that among 73.0% of respondents with easy access to healthcare services, 62.2% adhered to tuberculosis medication, while 10.8% did not. This study indicates that the easier the access to healthcare services, the more likely respondents are to adhere to tuberculosis medication. Conversely, respondents are less likely to adhere when access to healthcare services is difficult. However, this study also found that despite having easy access to healthcare services, 10.8% of respondents still did not adhere to tuberculosis medication. Based on the researcher's questionnaire analysis, these four non-adherent respondents were over 50. The study by Yuda (2018) found that individuals aged 50-65 tend to be more resigned to their condition. Respondents over the age of 50 are more likely to forget to take their tuberculosis medication and sometimes stop taking it when they feel their body is healthy. [31].

Of the 27.0% of respondents who had difficulty accessing healthcare services, 8.1% were compliant in taking their tuberculosis medication, while 18.9% were not compliant. In this study, based on the questionnaire given to respondents, healthcare access referred to the distance, time, and transportation needed to collect the medication. The road conditions for almost all respondents on the way to the healthcare facility were categorized as good. However, the lack of available transportation became a barrier to obtaining the medication, which required additional costs. Respondents could use online transit or public transportation (angkot). While online transportation was slightly more expensive, public transportation (angkot) required patients to walk approximately 10 minutes to reach the healthcare facility. This is in line with the study by Siswanti in Tukayo et al. (2020), which found that the unavailability of transportation to healthcare facilities and the lack of financial resources to access healthcare services far from the patient's residence can be obstacles to medication adherence. [32]. A person who does not utilize the available healthcare services at the community health center (puskesmas) may not necessarily do so because they are unaware of the dangers of their illness or do not trust the facility, but rather due to difficulties in accessing healthcare services. In this study, 8.1% of respondents adhered to taking their tuberculosis medication despite having limited access to healthcare services. This may be attributed to the support they received from their families. Based on the questionnaire results, the three adherent respondents had strong family support. Most of their responses to the family support-related questions indicated that their families consistently reminded them to pick up and take their tuberculosis medication, accompanied them during medical check-ups, and received motivation and praise from their families.

Based on the statistical test results, a p-value of 0.003 was obtained, which is less than the significance level of 0.05. Therefore, it can be concluded that access to healthcare services influences medication adherence at UPTD Rumah Sakit Khusus Paru Provinsi Sumatra Utara. This study is in line with the research by Mujamil et al. (2021), where the bivariate statistical test results showed a relationship between access to healthcare services and TB medication adherence at the Community Health Centers (Puskesmas) in Kendari City, with a p-value of 0.004 < 0.05 [33]. The results of this study are not in line with the research by Pratiwi et al. (2017), where the Chi-Square test obtained a p-value of 0.588 (p > 0.05) [34]. This indicates no relationship between the affordability of healthcare access and patient adherence to treatment.

The researcher assumes that easy access to healthcare facilities improves medication adherence. However, even with easy access, advanced age can affect adherence due to psychological factors. Difficult access, such as distance and transportation costs, also hinders adherence.

**The Influence of Family Support on Medication Adherence to Anti-Tuberculosis Treatment at the UPTD Special Pulmonary Hospital of North Sumatra Province**

Based on Table 12, it was found that among the 64.9% of respondents who received family support, 56.8% adhered to taking anti-tuberculosis medication, while the remaining 8.1% were non-adherent. These


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findings indicate that the better the family support, the higher the adherence to tuberculosis medication. The respondents' medication adherence is closely linked to the role of the family as a Medication Supervisor (PMO). A study by Febrina et al. (2018) found that family members, as medication supervisors, play a crucial role in providing motivation and encouragement to ensure patients adhere to their treatment regimen until recovery. The Medication Supervisor (PMO) at the UPTD Special Pulmonary Hospital of North Sumatra Province is typically the patient's closest relative or someone living in the same household, such as a spouse or child. [35].

However, in this study, 8.1% of respondents were found to be non-adherent to taking anti-tuberculosis medication despite receiving family support. The researcher assumes this is due to several factors, such as the side effects of the drug experienced by the respondents. Based on the questionnaire distributed by the researcher, these three respondents reported experiencing side effects, including itching all over the body and nausea every time they took the medication. According to secondary data obtained from the UPTD Special Pulmonary Hospital of North Sumatra Province, these three respondents also had a history of treatment interruption caused by the side effects they experienced.

Among the 35.1% of respondents who received less family support, 13.5% remained adherent to anti-tuberculosis medication, while the remaining 21.6% were non-adherent. These findings indicate that, despite receiving limited family support, 13.5% of respondents still complied with their medication regimen. Based on the questionnaire results, it was found that most respondents with low family support lacked motivation and reminders to take their medication on schedule. Family support is members' interpersonal relationships, attitudes, and actions in accepting and caring for their relatives. It plays a crucial role in the treatment process of tuberculosis patients by providing attention, fostering a sense of love and happiness, and preventing feelings of loneliness. Such support can motivate patients to adhere to their treatment regimen and influence their behaviour, helping to reduce anxiety, feelings of helplessness, and despair, ultimately improving their overall health status.[36]. However, in this study, 13.5% of respondents were found to adhere to their medication regimen despite receiving less family support. The researcher assumes that this may be due to the respondents' good knowledge of tuberculosis. Based on the questionnaire results, these five respondents demonstrated a high level of expertise, with an average of nine correct answers. Based on the statistical test results, a p-value of 0.006 was obtained, which is less than 0.05, indicating that family support is a significant factor influencing medication adherence at the UPTD Special Pulmonary Hospital of North Sumatra Province. This finding aligns with the study. [37]A p-value of 0.007 also demonstrated a significant relationship between family support and medication adherence. However, this result contradicts the findings of [38], where the Spearman rank test showed no significant relationship between family support and medication adherence, with a p-value of 0.670 (>0.05).

The researcher assumes family support is crucial in improving tuberculosis patients' adherence to anti-tuberculosis medication. This is evident from the study results, where most respondents with strong family support showed better adherence to treatment. However, some respondents were found to be non-adherent despite receiving support, possibly due to side effects of the medication, such as itching and nausea. While some patients may still adhere to treatment despite receiving less optimal family support, strong family support significantly influences medication adherence.

**Multivariate Analysis**

The family plays a primary role in maintaining the health of each family member [39]. Individuals who can provide social support include spouses, parents, children, relatives, friends, or healthcare teams. Therefore, family support is a crucial factor in the success of pulmonary TB patient treatment. [38]. According to Mantovani et al. (2022), family support can contribute to the regular treatment adherence of pulmonary TB patients. [39]. The better the family support, including emotional, appraisal, informational, and instrumental support, the more compliant pulmonary TB patients will be with their medication. [40]. The support of family members in monitoring patient medication adherence can enhance the patient's motivation to be more compliant in taking their medication. [41]

Based on Table 14, the final selection results indicate that occupation influences tuberculosis medication adherence by 15 times (OR = 15.378), access to healthcare services influences adherence by 10 times (OR = 10.798), and family support has the most decisive influence, increasing adherence by 19 times (OR = 19.293). Therefore, it can be concluded that the family support variable is the most influential factor in tuberculosis medication adherence at the UPTD Special Pulmonary Hospital of North Sumatra Province. With



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an OR of 19.293, this means that respondents who receive family support are 19 times more likely to adhere to their tuberculosis treatment compared to those who receive less family support.

In this study, most of the support received by respondents was appraisal support, where families consistently reminded them to undergo sputum examinations according to the scheduled time. Emotional support, specifically point 7, refers to the motivation provided by family members to the respondents. The lowest level of support families gave was informational support, as indicated in point 6, where most families did not remind respondents to take their medication on time.

## Conclusion

Based on the research conducted at the UPTD Special Pulmonary Hospital of North Sumatra Province, it can be concluded that several factors influence medication adherence. These factors include knowledge, occupation, access to healthcare services, and family support, all of which improve patient adherence to treatment. Meanwhile, the side effects of medication were not found to be a significant factor affecting patient compliance. Family support was identified as the most dominant factor influencing patient adherence to treatment among the various factors studied.

## Conflict of Interest

The author states that this research was conducted independently, without external interference or conflicts of interest that could affect the objectivity and integrity of the results.

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## Supplementary Materials

## Reference

[1] Organization WH. Global Tuberculosis Report 2023.
[2] Menzies NA, Wolf E, Connors D, Bellerose M, Sbarra AN, Cohen T, et al. Progression from latent infection to active disease in dynamic tuberculosis transmission models: a systematic review of the validity of modelling assumptions. Lancet Infect Dis 2018;18:e228 38. https://doi.org/10.1016/S1473-3099(18)30134-8.
[3] Indonesia KKR. Program Penanggulangan Tuberkulosis. 2023. https://doi.org/Jakarta :Kementerian Kesehatan RI.
[4] RI Kesehatan. Laporan Program Penanggulangan Tuberkulosis. Jakarta: Kementerian Kesehatan RI; 2021. https://doi.org/10.20473/imhsj.v5i2.2021.116-126.
[5] Utara DKPS. Profil Kesehatan Provinsi Sumatera Utara. vol.. 5. Medan: 2022.
[6] Perundang-undangan P. Penanggulangan Tuberkulosis 2021.
[7] Wulandini P, Saputra R, Sartika W, Qomariah S, Kedokteran F, Kesehatan I. Relationship of The Supervision of Health Officers on Compliance With TB Patients Consumption in the Region of Kerjapuskesmas Perawang Kec.Tualang, Siak District. Vol. 2020. n.d.
[8] Hassani S, Mohammadi Shahboulagi F, Foroughan M, Nadji SA, Tabarsi P, Ghaedamini Harouni G. Factors Associated with Medication Adherence in Elderly Individuals with Tuberculosis: A Qualitative


Electronic ISSN : 2656-3088
Homepage: https://www.journal-jps.com

Study. Canadian Journal of Infectious Diseases and Medical Microbiology 2023;2023. https://doi.org/10.1155/2023/4056548.
[9] RI K kesehatan. Infodatin Tuberkulosis. Pusat Data Dan Informasi Kementerian Kesehatan RI 2018;11:1–7.
[10] CDC. Chapter 2: Transmission And Pathogenesis Of Tuberculosis, in: Tuberculosis. Centers for Disease Control and Prevention (CDC) 2020;5:188 97.
[11] Medan DKK. Dinas Kesehatan Kota Medan. Medan: 2022.
[12] Kuantitatif PP. Metode Penelitian Kunatitatif Kualitatif dan R&D. Alfabeta, Bandung 2016.
[13] Wiranata A. Hubungan PMO (Pengawas Menelan Obat) dengan Kepatuhan Minum Obat Pada Pasien Tuberkulosis di Wilayah Kerja Puskesmas Dimong Kabupaten Madiun. Stikes Bhakti Husada Mulia Madiun, 2019.
[14] Rajagukguk AHM. Faktor Yang Memengaruhi Kepatuhan Pengobatan Pasien TB Paru di Puskesmas Bunturaja Kabupaten Dairi Tahun 2019. 2019.
[15] Sitorus DM. Faktor Yang Memengaruhi Kepatuhan Pengobatan Penderita Tuberkulosis paru di Puskesmas Sipintuangin Kab. Simalungun Tahun 2019. Fakultas Kesehatan Masyarakat Institut Kesehatan Helvetia 2019:218.
[16] Rani R septi, Priyatno AD, Harokan A. Analisis kepatuhan minum obat TB paru pada masa pandemi di puskesmas Sukarami kota Palembang tahun 2022. Jurnal Kesehatan Saelmakers PERDANA 2023;6:179–89. https://doi.org/10.32524/jksp.v6i1.825.
[17] Andriani L, Lestari RM, Prasida DW. Hubungan Tingkat Pengetahuan dan Dukungan Keluarga dengan Kepatuhan Minum Obat pada Penderita Tuberkulosis di Wilayah Kerja Puskesmas Pahandut. Jurnal Surya Medika 2023;9:96–103. https://doi.org/10.33084/jsm.v9i1.5155.
[18] Apriyanti AR, Novitry F. Faktor-Faktor Yang Berhubungan Dengan Kepatuhan Berobat TB Paru. Media Informasi 2024;20:139–53. https://doi.org/10.37160/mijournal.v20i1.325.
[19] Tri Kusmiyani O, Rosela K, Studi Sarjana Keperawatan P, Eka Harap S, Raya P, Tengah K. Analisis Faktor yang Berhubungan dengan Kepatuhan Minum Obat Anti Tuberkulosis pada Pasien TB Paru di Puskesmas Samuda dan Bapinang Kotawaringin Timur Analysis of Factors Related to Compliance with Taking Anti-Tuberculosis Drugs in Pulmonary TB Patients a 2024.
[20] Supriyadi E, Nur Hidayati R, Wicaksono A. Hubungan Peran Pengawas Minum Obat (Pmo) Dengan Kepatuhan Minum Obat Pada Pasien Tuberkulosis Di Puskesmas Sumberpitu Kabupaten Pasuruan. Universitas Bina Sehat, 2023.
[21] Salsabila LZ, Susanti R, Bhakti WK. Analisis Faktor Tingkat Kepatuhan Minum Obat Anti Tuberkulosis pada Pasien TB Paru Rawat Jalan Di Puskesmas Perumnas 1 Kota Pontianak Tahun 2021. Jurnal Mahasiswa Farmasi Kedokteran UNTAN, 2022:1–8.
[22] Samory US, Yunalia EM, Suharto IPS, Nurseskasatmata S. Faktor-Faktor Yang Berhubungan Dengan Kepatuhan Pasien Terhadap Pengobatan Tuberkulosis Paru Di Puskesmas Urei-Faisei (URFAS). Indonesian Health Science Journal 2022;2:37 45. https://doi.org/10.52298/ihsj.v2i1.25.
[23] Syahrina NA, Pandanwangi S, Susanti NP, Utami T. Hubungan Efek Samping Obat Anti Tuberkulosis (OAT) Terhadap Kepatuhan Minum Obat Pada Pasien TB Paru Di Puskesmas Ketanggungan 2024;7:297–311.
[24] Rasdianah N, Madania, Tutoli TS, Abdulkadir WS, Hidayat A, Suwandi TBA. Studi Efek Samping Obat Antituberkulosis ( OAT ) Pada Pasien TB Paru. Journal Syifa Sciences and Clinical Research (JSSCR) 2022;4:707–17.
[25] Maharani W, Yusmaini H, Harfiani E. Hubungan Pemberian Obat Anti Tuberkulosis dengan Kejadian Efek Sampingnya pada Pasien Tuberkulosis Paru di RSUD Sumedang Tahun 2022. Seminar Nasional Riset Kedokteran 2024:35–42.
[26] Wu JT, Chiu CT, Wei YF, Lai YF. Comparison of the safety and efficacy of a fixed-dose combination regimen and separate formulations for pulmonary tuberculosis treatment. Clinics 2015;70:429–34. https://doi.org/10.6061/clinics/2015(06)08.
[27] El-Kholy MM, Sadek SH, Mahran O. Fixed-dose combination versus separate drug formula for pulmonary and extrapulmonary tuberculosis. Egyptian Journal of Bronchology 2018;12:346 51. https://doi.org/10.4103/ejb.ejb_61_17.
[28] Adam L. Pengetahuan Penderita Tuberkulosis Paru Terhadap Kepatuhan Minum Obat Anti Tuberkulosis. Jambura Health and Sport Journal 2020;2:12 8. https://doi.org/10.37311/jhsj.v2i1.4560.


Electronic ISSN : 2656-3088
Homepage: https://www.journal-jps.com

[29] Fakhrul Dg. Siampo, Irsanty Collein, Fitria Masulili. Hubungan Efek Samping Obat dan Pengetahuan dengan Kepatuhan Minum Obat Anti Tuberkulosis Pasien Tuberkulosis Paru. Jurnal Kolaboratif Sains 2024;7:759–62. https://doi.org/10.56338/jks.v5i11.2974.

[30] Seniantara IK, Ivana T, Gabrilinda AY. Pengaruh Efek Samping Oat ( Obat Anti Tuberculosis ) Terhadap Kepatuhan Minum. Jurnal Keperawatan Suaka Insan (Jksi) 2018;3:1–12.

[31] Yuda AA. Hubungan Karakteristik, Pengetahuan, Sikap, Dan Tindakan Penderita Tuberculosis Paru Dengan Kepatuhan Minum Obat Di Puskesmas Tanah Kalikedinding. 2018.

[32] Tukayo IJH, Hardyanti S, Madeso MS. Faktor Yang Mempengaruhi Kepatuhan Minum Obat Anti Tuberkulosis Pada Pasien Tuberkulosis Paru Di Puskesmas Waena. Jurnal Keperawatan Tropis Papua 2020;3:145–50. https://doi.org/10.47539/jktp.v3i1.104.

[33] Mujamil, Sety LOM, Zainuddin A, Kusnan A. Analisis Faktor Yang Berhubungan Terkait Kepatuhan Minum Obat Pasien Tuberkulosis Paru BTA+ di Masa Pandemi Covid 19 di Puskesmas Wilayah Kota Kendari 2021;12.

[34] Pratiwi RI, Perwitasari M. Analisis Faktor-Faktor Yang Mempengaruhi Kepatuhan Pasien Hipertensi Dalam Penggunaan Obat Di RSUD Kardinah. 2nd Seminar Nasional IPTEK Terapan (SEINT) 2017 2017:204–8.

[35] Febrina W, Rahmi A. Analisis peran keluarga sebagai pengawas minum obat (pmo) pasien tb paru (Analysis of family role as drug ingestion observer). Jurnal Human Care 2018;3:118–29.

[36] Akbar H, Fauzan MohR, Langingi ARC, Darmin. Pendidikan Kesehatan Dalam Peningkatan Pengetahuan Penderita Tuberkulosis Di Wilayah Kerja Puskesmas Mopuya. Jurnal Ilmu Dan Teknologi Kesehatan Terpadu 2021;1:38–44. https://doi.org/10.53579/jitkt.v1i1.3.

[37] Herawati C, Abdurakhman RN, Rundamintasih N. Peran Dukungan Keluarga, Petugas Kesehatan dan Perceived Stigma dalam Meningkatkan Kepatuhan Minum Obat pada Penderita Tuberculosis Paru. Jurnal Kesehatan Masyarakat Indonesia 2020;15:19. https://doi.org/10.26714/jkmi.15.1.2020.19-23.

[38] Mando NJ, Widodo D, Sutriningsih A. Hubungan Dukungan Keluarga Dengan Kepatuhan Minum Obat Pada Pasien Tb Di Puskesmas Janti Kota Malang. Jurnal Ilmiah Keperawatan 2018;3:1–10.

[39] Mantovani MR, Ningsih F, Tambunan LN. Hubungan Dukungan Keluarga terhadap Kepatuhan Minum Obat pada Penderita Tuberkulosis. Jurnal Surya Medika 2022;7:72–6. https://doi.org/10.33084/jsm.v7i2.3207.

[40] Hamidah H, Nurmalasari N. Hubungan Dukungan Keluarga dengan Kepatuhan Minum Obat pada Penderita Tuberkulosis Paru Beresiko Tinggi Tuberkulosis Resistan. Jurnal Sehat Masada 2019;13:136–45.

[41] Maulidan M, Dedi D, Khadafi M. Dukungan Keluarga Berhubungan dengan Kepatuhan Minum Obat pada Pasien Tuberkulosis Paru. Jurnal Penelitian Perawat Profesional 2021;3:575–84.



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