Factors Related to Compliance in Taking Medication in Tuberculosis Patients in The Work Area of Tanjung Morawa Community Health Center, Deli Serdang Regency in 2024

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ARTICLE INFO	**ABSTRACT**
	Background: Tuberculosis (TB) remains one of the main causes of death globally. One of the main challenges in TB control is low compliance with treatment, which is often due to limited patient knowledge. This research aimed to investigate the connection between the level of knowledge among patients and their compliance with TB treatment at the Tanjung Morawa Health Centre in Deli Serdang Regency. **Methods:** This study employs an analytic quantitative design with a correlational approach and a cross-sectional cut. Data were collected simultaneously for both independent and dependent variables from 68 TB patients in the working area of the Tanjung Morawa Health Centre. A structured questionnaire was used to evaluate the level of knowledge and compliance with treatment. Data were analysed using the Chi-Square test to determine the connection between variables. **Results:** The research results show that there is no significant relationship between age (p=0.077), gender (p=0.098), level of education (p=0.410), and health officers (p=0.509) with compliance to treatment. However, there are significant relationships between employment (p=0.026), family support (p=0.008), and medication supervision (p=0.005) with compliance to treatment. The variable of medication supervision has the highest Exp(B) value (7.800), indicating that this variable is the most influential factor regarding treatment compliance. **Conclusion:** The presence of medication supervision and strong family support play an important role in increasing compliance with TB treatment. These findings emphasise the need for a health strategy that strengthens the community's patient supervision system and encourages family involvement to optimise TB treatment outcomes.

BACKGROUND

Tuberculosis (TB) remains one of the world's deadliest infectious diseases, despite the availability of effective treatments. According to the Global Tuberculosis Report 2021, the number of TB cases has increased globally to 10.6 million, with Indonesia contributing 8.4% of the total cases, making it the country with the third highest TB burden in the world. The death rate from TB has also shown improvement, reaching 1.6 million in the same year. In Indonesia, TB mostly affects men, as well as individuals with low levels of education, limited access to health services, and low levels of treatment adherence. Surveys show that the incidence of TB in Indonesia is recorded as being three times higher in men than women, with a prevalence reaching 759 per 100,000 population aged 15 years and above.

Adherence to treatment is a major challenge in TB control. Non-adherence can lead to drug resistance, worsen patient conditions, and increase transmission in the community. Drug-resistant tuberculosis (MDR-TB) often occurs as a consequence of premature discontinuation of treatment, which

is usually caused by the long duration of treatment, drug side effects, and lack of patient motivation. Previous studies have shown that internal factors such as age, gender, education, and occupation, as well as external factors such as family support, health workers, and Drug Supervisors (PMO), have a major influence on the level of treatment compliance. Ulfah (2018) stated that patient perception and external support are very important to increase patients' desire to complete therapy completely.

In Deli Serdang Regency, North Sumatra Province, TB is still a serious health problem for the community. Data from 2020 to 2023 show fluctuations in the number of cases, with the highest spike occurring in 2022 (4,964 cases). Tanjung Morawa Health Center is one of the largest contributors to cases. An initial survey conducted by researchers on 20 TB patients at the Health Center showed that as many as 75% of patients were not compliant in taking their medication. Most of the non-compliant patients were men over 40 years old, had low education, did not have permanent jobs, and received less support from family and health workers.

This study is important to identify factors related to drug adherence in TB patients, especially in areas with lower to middle socio-economic characteristics. The results of this study are expected to be the basis for designing more effective health interventions to improve the success of TB treatment and reduce the number of transmissions.

METHODS

This study is an analytic quantitative study with a cross-sectional design. Data collection was carried out at one time to measure the connection between independent variables (age, gender, level of education, employment status, family support, health officer support, and supervisor medication adherence) and the dependent variable (compliance with medication) in TB patients.

The study was implemented in the work area of Tanjung Morawa Health Centre, Deli Serdang Regency, North Sumatra. The study period commenced in September 2023 and will continue until March 2024. The population for this study consists of all tuberculosis patients undergoing treatment in the work area of Tanjung Morawa Health Centre in 2023, amounting to 68 patients. The sample was determined using a total sampling technique, whereby the entire population was included in the study sample according to the inclusion criteria, namely, patients willing to become respondents.

The instruments used in this study were structured questionnaires compiled by the researchers based on the operational definitions of the variables. Primary data were obtained through direct interviews with TB patients using the questionnaire, while secondary data were sourced from the medical records available at Tanjung Morawa Health Centre. Data collection was conducted by the researchers with the assistance of health centre officers who had been trained in the procedure for completing the questionnaire.

Data analysis was performed in three stages:

a. Univariate analysis was conducted to describe the characteristics of each variable using frequency distribution and proportion.

b. Bivariate analysis was performed using the Chi-square test to determine the connection between each independent variable and compliance with medication (with significance determined at $p < 0.05$).

c. Multivariate analysis was conducted using logistic regression to identify the most dominant variable related to compliance. Variables with a p-value < 0.25 in the bivariate test were included in the multivariate models. An elimination process was carried out for the variable with the highest p-value in a stepwise manner, and changes in the odds ratio (OR) were evaluated to control for confounding effects. The research process began with obtaining permission from the relevant agencies, followed by enumerator training and the implementation of data collection in the field. Respondents were interviewed directly after signing the consent form. The collected data were subsequently checked (editing), coded (coding), cleaned (cleaning), and entered into a computerised device for further analysis.

This study has obtained permission from the relevant institutions as well as ethical approval from the Health Research Ethics Committee. Respondents were provided with information about the goals, benefits, and risks of the research, and were given the opportunity to voluntarily accept or decline participation through informed consent. The confidentiality and identity of respondents were strictly protected during and after the study.

RESULTS

1. **Univariate Analysis**

Analysis univariate done For see distribution frequency age, type gender, education, work, support family, support officer health, Supervisor Medication Ingestion (DIO) and Compliance Treatment for Pulmonary TB patients in the work area Tanjung Morawa Health Center 2024.

Table 1. Frequency Distribution of Age, Gender, Education, Occupation, Support Family, Support Health Officer, Supervisor Medication Ingestion (DIO) and Compliance Treatment for Pulmonary TB Patients in the Work Area Tanjung Morawa Health Center Year 2024.

Dependent and Independent Variables	n	%
Age		
Early Adulthood	28	41.2
Late Adulthood	40	58.8
Total	**68**	**100**
Gender		
Woman	37	54.4
Man	31	45.6
Total	**68**	**100**
Education		
Tall	1	1.5
Intermediate	57	83.8
Low	10	14.7
Total	**68**	**100**
Work		
Doesn't work	38	55.9
Work	30	44.1
Total	**68**	**100**
Family Support		
Enough	32	47.1
Not enough	36	52.9
Total	**68**	**100**
Health Worker Support		
Enough	49	72.1
Not enough	19	27.9
Total	**68**	**100**
Medication Swallowing Supervisor		
There is	42	48.5
There isn't any	35	51.5
Total	**68**	**100**
Treatment Compliance		
Obedient	33	48.5
Not obey	35	51.5
Total	**68**	**100**

Based on Table 4.1, the majority Respondent is in the category mature end (58.8%), female (54.4%), and have level education middle (83.8%). Most of Respondent No working (55.9%) and get support poor family (52.9%). Temporary that, support from officer health generally is in the category sufficient (72.1%), and some big Respondent own supervisor swallow medicine (61.8%). However Thus, the level compliance get medical treatment show that more from half Respondent No compliant (51.5%).

2. Bivariate Analysis

For see connection age, type gender, education, work, support family, support officer health, Supervisor Swallowing Drugs (PMO) with Compliance Treatment for Pulmonary TB patients in the work area Tanjung Morawa Health Center 2024, carried out use analysis bivariate with the chi-square test.

Table 2. Cross Tabulation between Age with Compliance Treatment for Pulmonary TB Patients in the Work Area Tanjung Morawa Health Center Year 2024

Variables Independent	Treatment Compliance				Amount		p.value
	Obedient		Not obey				
	n	%	n	%	n	%	
Age							
Early Adulthood	10	35.7	18	64.3	28	100	0.077
Late Adulthood	23	57.5	17	42.5	40	100	
Amount	**33**	**48.5**	**35**	**51.5**	**68**	**100**	

Based on Table 2, results tabulation cross show that in the category mature initial, as many as 35.7% of respondents obedient seek treatment and 64.3% do not obedient. While in the category mature end, 57.5% compliant seek treatment and 42.5% do not obedient. However, the results analysis statistics with the chi-square test showing p value = 0.077 (p > 0.05), which means No there is significant relationship between age and compliance treatment for pulmonary TB patients in the work area Tanjung Morawa Health Center 2024.

Table 3. Cross Tabulation between Genders with Compliance Treatment for Pulmonary TB Patients in the Work Area Tanjung Morawa Health Center Year 2024

Variables Independent	Treatment Compliance				Amount		p.value
	Obedient		Not obey				
	n	%	n	%	n	%	
Gender							
Woman	18	48.6	19	51.4	37	100	0.983
Man	15	48.4	16	51.6	31	100	
Amount	**33**	**48.5**	**35**	**51.5**	**68**	**100**	

Table 3 show that from 37 respondents of women, as many as 48.6% complied seek treatment and 51.4% do not obey. While that, from 31 respondents men, 48.4% compliant seek treatment and 51.6% do not obedient. The results of the chi-square test show p value = 0.983 (p > 0.05), which means in a way statistics No there is connection between type gender and compliance treatment for pulmonary TB patients in the work area Tanjung Morawa Health Center 2024.

Table 4. Cross Tabulation between Education and Compliance Treatment for Pulmonary TB Patients in the Work Area Tanjung Morawa Health Center Year 2023

Variables Independent	Treatment Compliance				Amount		p.value
	Obedient		Not obey				
	n	%	n	%	n	%	
Education							
Tall	1	100	0	0	1	100	
Intermediate	26	45.6	31	54.4	57	100	0.410
Low	6	60	4	40	10	100	
Amount	**33**	**48.5**	**35**	**51.5**	**68**	**100**	

In Table 4, the results tabulation cross show that Respondent with education tall completely (100%) compliant treatment. Respondent with education intermediate showed 45.6% complied and 54.4% did not obedient, while in education low, 40% comply and 60% do not obedient. Although there is variation proportion, the results of the chi-square test show p value = 0.410 (p > 0.05), so in a way statistics No there is connection between level education and compliance treatment for pulmonary TB patients in the work area Tanjung Morawa Health Center 2024.

Table 5. Cross Tabulation between Work with Compliance Treatment for Pulmonary TB Patients in the Work Area Tanjung Morawa Health Center Year 2024

Variables Independent	Treatment Compliance				Amount		p.value
	Obedient		Not obey				
	n	%	n	%	n	%	
Work							
Doesn't work	23	60.5	15	39.5	38	100	0.026
Work	10	33.3	20	66.7	30	100	
Amount	**33**	**48.5**	**35**	**51.5**	**68**	**100**	

Table 5 show that of the 38 respondents who did not work, as many as 60.5% comply seek treatment and 39.5% do not obey. While That is, of the 30 respondents who worked, only 33.3% were compliant. seek treatment and 66.7% do not obedient. Analysis results with the chi-square test showing p value = 0.026 (p < 0.05), which means in a way statistics there is significant relationship between work and compliance treatment for pulmonary TB patients in the work area Tanjung Morawa Health Center 2024.

Table 6. Cross Tabulation between Support Family with Compliance Treatment for Pulmonary TB patients in the work area Tanjung Morawa Health Center Year 2024

Variables Independent	Treatment Compliance				Amount		p.value
	Obedient		Not obey				
	n	%	n	%	n	%	
Family Support							
Enough	21	65.6	11	34.4	32	100	0.008
Not enough	12	33.3	24	66.7	36	100	
Amount	**33**	**48.5**	**35**	**51.5**	**68**	**100**	

Tabulation results cross show that part big Pulmonary TB patients with support a well -off family tend obedient in undergo treatment (65.6%), while patient with support underprivileged family more many do not obedient treatment (66.7%). Analysis statistics using the chi-square test shows mark significance p = 0.008 (p < 0.05), which indicates existence meaningful relationship between level support family and obedience get treatment. With Thus, support family play a role important in increase compliance Pulmonary TB patients against treatment in the work area Tanjung Morawa Health Center 2024.

Table 7. Cross Tabulation between Support Health workers with Compliance Treatment for Pulmonary TB patients in the work area Tanjung Morawa Health Center Year 2024

Variables Independent	Treatment Compliance				Amount		p.value
	Obedient		Not obey				
	n	%	n	%	n	%	
Support health workers							
Enough	25	51	24	49	49	100	
Not enough	8	42.1	11	57.9	19	100	0.509
Amount	**33**	**48.5**	**35**	**51.5**	**68**	**100**	

Based on results tabulation cross, known that from Respondent with support officer health category sufficient, 51 % compliant seek treatment and 49% do not obedient, while in the category less, 42.1% complied and 57.9% did not obedient. The results of the chi-square test show p value = 0.509 (p > 0.05), so in a way statistics No there is significant relationship between support officer health and compliance treatment for pulmonary TB patients in the work area Tanjung Morawa Health Center 2024.

Table 8. Cross Tabulation between Supervisor Swallowing Medicine with Compliance Treatment for Pulmonary TB patients in the work area Tanjung Morawa Health Center Year 2024

Variables Independent	Treatment Compliance				Amount		p.value
	Obedient		Not obey				
	n	%	n	%	n	%	
PMO							
There is	26	61.9	16	38.1	42	100	0.005
There isn't any	7	26.9	19	73.1	26	100	
Amount	**33**	**48.5**	**35**	**51.5**	**68**	**100**	

Analysis results show that Pulmonary TB patients who have Supervisor Drug Ingestion (DUI) more many are obedient seeking treatment (61.9%) compared to with the not have PMO (26.9%). The chi-square test produced p value = 0.005 (p < 0.05), which indicates existence significant relationship between the existence of PMO with compliance treatment for pulmonary TB patients in the work area Tanjung Morawa Health Center 2024.

3. Multivariate Analysis

Analysis multivariate in study This using multiple logistic regression test. The variables independent that meets criteria the is as following :

Table 9. Variables Independent Fulfilling Criteria Analysis Multivariate

Variables	*p.value*
Age	0.077
Work	0.026
Family Support	0.008
Supervisor Swallowing Medicine	0.005

Based on Table 9, variables independent that meets criteria For analysis multivariate is age, occupation, support family, and supervisor swallow medicine. Fourth variable the Then analyzed more carry on use method regression logistics with Backward: Likelihood Ratio (Backward:LR) approach for identify the most influential factor to compliance treatment for pulmonary TB patients in the work area Tanjung Morawa Health Center 2024.

Table 10. Multivariate Analysis Results Multiple Logistic Regression

Stage	Variables	Exp.B	Coefficient (B)	p
1	Constants	0.150	-1,898	0.022
	Age	0.762	-0.272	0.667
	Work	2,683	0.987	0.119
	Family Support	6,254	1,833	0.005
	PMO	7,578	2,025	0.003
2	Constants	0.119	-2,127	0.001
	Work	2,960	1,085	0.066
	Family Support	6,417	1,859	0.004
	PMO	7,800	2,054	0.003

Analysis results multivariate in Table 10 show that at this stage first, from four variables analyzed (age, occupation, support) family, and supervisor swallow medicine), variable age own the highest p value (p = 0.667) so eliminated at the stage next. At the stage second, variables Supervisor Drug Ingestion (DIP) indicates highest Exp(B) value of 7,800, which indicates that PMO is the most dominant factor that influences compliance treatment for pulmonary TB patients in the work area Tanjung Morawa Health Center 2024

DISCUSSION

Connection Age with Compliance Get treatment

Analysis show that patient age mature end (57.5%) more obedient compared to mature early (35.7%). However, the chi-square test showed No There is connection significant between age and compliance treatment (p = 0.077). This result in line with Wulandari's research (2015) which also did not find connection meaningful between age and compliance drink drugs in patients with pulmonary TB.

Sex Relations with Compliance Get treatment

There is no difference meaningful between men and women in matter compliance treatment (p = 0.983). Findings This supported by Kondoy et al. (2014), who also reported No existence connection significant between type gender and compliance. However, it is different with the results of Budi et al. (2018) which stated man more at risk Because habit smoking.

Relationship of Education with Compliance Get treatment

Even though the respondents with education tall tend more obediently, in a statistics No found significant relationship between level education and compliance treatment (p = 0.410). Findings This contradictory with Kondoy et al. (2014) who showed that education influential to compliance get medical treatment Because related with level knowledge.

Connection Work with Compliance Get treatment

There is significant relationship between employment status and compliance treatment (p = 0.026), where respondents who did not Work more compliant (60.5%) compared to those who work (33.3%). These results No in line with Zuliana's findings, which stated No There is connection between work and compliance. Busyness and mobility informal work is suspected become factor inhibitor.

Relationship between Family Support and Compliance Get treatment

Support family show significant relationship with compliance treatment (p = 0.008), where patients with support family Enough tend more compliant (65.6%). This is support Friedman's (1998) opinion on importance environment supportive in influence behavior health. However, the results This different with Fajar (2002) and Niven (2002) who found results on the contrary.

Relationship of Support of Health Workers with Compliance Get treatment

Not found significant relationship between support officer health and compliance Pulmonary TB patients (p = 0.509). Although attitude officer rated well, limitations in monitoring and motivation direct Possible become constraints. Findings This different with study Fadlilah (2017), which shows role PMO active is very influential to compliance patient.

Connection Supervisor Swallowing Drugs (PMO) with Compliance Get treatment

There is connection significant between PMO existence and compliance treatment (p = 0.005), with Exp(B) of 7,800, making PMO as factor dominant in study this. This result consistent with Wulandari (2015), Pare et al. (2012), and Prabowo (2014) who emphasized importance role active PMO in push compliance treatment.

Implications Study

Study This confirm importance support social, work, and the existence of PMO in support compliance get medical treatment Pulmonary TB patients. Intervention based on community and education to patient as well as family need enhanced to support success treatment.

Limitations Study, This study only focusing on Pulmonary TB patients category one among informal and unskilled workers evaluate factor condition physique home, so that results No reflect factor environment place possible stay influence compliance patient.

CONCLUSION

Based on results research and discussion, can concluded that No there is significant relationship between age (p = 0.077), type gender (p = 0.983), and education (p = 0.410) with compliance treatment for pulmonary TB patients in the work area Tanjung Morawa Health Center in 2024. On the other hand, there is significant relationship between work (p = 0.026), support family (p = 0.008), and the presence of Supervisor Swallowing Drugs or PMO (p = 0.005) with compliance get medical treatment patient. While that, support officer health No show significant relationship (p = 0.509). From the results analysis multivariate, known that PMO is the most dominant factor that influences compliance patient in undergo treatment, with The Exp(B) value is 7,800, which means the existence of PMO increases possibility compliance get medical treatment until almost eight times.

CONFLICTS OF INTEREST

The authors declare that they have no conflict of interest.

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