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Risk Attribute Analysis and Risk of Adherence to Taking Medication for Pulmonary TB Patients at the Jayapura Regency Office

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A R T I C L E I N F O

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A B S T R A C T

This study aims to analyze the Risk Attributes and risks of medication adherence in patients with pulmonary TB. Type of survey research designed by cross sectional. A sample of 81 people was taken using the purposive sampling technique. The results of the study were with the variable value of RA = -21%, RP=1(0.19-5.9), gender RA=18%, PR 1.7(0.9-3.3), education RA=-16%, PR =0.57. Work RA = 19%, RP = 2.12 (0.72-6.22). TB MDR RA =62%, RP=16 (5.2-48.4). Side effects of RA Drug = 30%, PR = 2.5 (1.2-4.88), History of Comorbidities RA = 61%, PR = 3.6(2.02-6.6), duration of treatment RA = 50% PR = 3.8 (2-7). The variable that contributes the most to medication adherence is MDR TB status.

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INTRODUCTION

Tuberculosis (TB) is a chronic infectious disease that occurs due to infection with Mycobacterium tuberculosis (M. tuberculosis), which is a bacillus-shaped bacterium that is acid-resistant. Tuberculosis is one of the leading causes of death worldwide. Before the COVID-19 pandemic, Tuberculosis ranked first in the highest number of deaths. After COVID-19, the number of newly diagnosed people with TB worldwide was reported to be 7.5 million people in 2022 compared to 7.1 million in 2019 and 6.4 million in 2020 (WHO, 2023).

India, Indonesia, and the Philippines accounted for a large portion (≥60%) of the world's decline in the number of people newly diagnosed with TB in 2020 and 2021, all recovering to exceed 2019 figures in 2022. Globally in 2022, TB caused about 1.30 million deaths. This figure fell by 1.4 million in 2020 and 2021 and almost returned to the 2019 figure (WHO, 2023).

At the same time, there is dual immunity of TB germs to anti-TB drugs so that it can cause new problems, namely drug-resistant (RO) consisting of multidrug-resistant tuberculosis (MDR TB), rifampicin-resistant tuberculosis (TB RR) which is rifampicin-resistant-and-TB-Extensively drug resistant. Globally, an estimated 410,000 - 450,000 will suffer from multidrug-resistant or rifampicin-resistant (MDR/RR-TB) in 2022. The number of people diagnosed and starting treatment is much lower: 175,650 people in 2022, equivalent to about two out of five of those in need and still below pre-pandemic levels of 181,533 people in 2019 (WHO, 2023).

Indonesia is one of the countries with the second-highest number of pulmonary TB cases in the world. The report of Tuberculosis cases in Indonesia from 2021 found that the number of Tuberculosis cases was 360,565 people with a total recovery of 49.01%, complete treatment of 50.99% of people where the success of treatment reached 77.57%. This is still far from the target of achieving TB treatment success in the strategic plan of the Ministry of Health of the Republic of Indonesia in TB control of 85% (Ministry of Health of the Republic of Indonesia, 2022).

The prevalence of pulmonary TB in Papua Province in 2020 was 2,721 (64.3%) and in 2021 reached 2,772 (64.9%). Currently, Papua has 14 TB RO referral health facilities, with the number of MDR TB patients in 2021 – July 2023 finding as many as 537 confirmed patients based on the results of the rapid molecular test (Prov. Papua, 2023).

Analyzing risk attributes and knowing the size of risk factors for medication adherence in patients with pulmonary TB is very important because by knowing how many risk attributes of variables affect medication adherence, we will find out what proportion of the contribution of independent variables affects medication adherence, which of course can help in developing pulmonary TB treatment as well as optimal promotive-preventive efforts. Based on this description, the author is interested in knowing and analyzing "Factors Related to Drug Compliance for Tuberculosis Patients at the Jayapura Regency Health Office, Papua Province".

THEORETICAL REVIEW

Compliance theory

Compliance theory is a theory in which one of the aspects assessed is social psychology which discusses how individuals or groups can be influenced to follow set demands, rules, or standards. Compliance is a form of compliance or approval given by an individual to follow a request, instruction, or rule from another person, especially an authority or group, even though they may not fully believe or support it. According to the theory of adherence, five factors encourage and inhibit a person to comply with medication (Hidayat et al., 2020).

The five factors that affect compliance include:

1. Demographic Factors: A patient's age, gender, education, and socioeconomic status can affect the level of compliance.
2. Psychological Factors: Motivation, stress level, and trust of the patient in medical personnel.
3. Social Factors: Support from family and community.
4. Environmental Factors: Access to health services and medicines.
5. Medical Factors: Complexity of drug regimen, duration of treatment, and side effects of medication (Hidayat et al., 2020).

The compliance process based on the theory of compliance, is greatly influenced by demographic factors, where research has proven that productive age, education, and gender affect medication compliance. According to this theory, it is also explained that compliance involves several processes such as external social pressure, where individuals often comply with requests or instructions to avoid social sanctions, such as disapproval, criticism, or other negative consequences. Adherence to medication in patients with pulmonary TB in this case is greatly influenced by external social pressure such as family members, who of course expect patients with pulmonary TB to obey treatment to recover and not transmit the disease to others (Hidayat et al., 2020).

This theory of adherence also states that motivation, stress levels, family and community support, length of treatment, and side effects of medication, will affect the patient in his treatment to be compliant or not. In this study, the obedience theory used was adopted and modified from Frey's model obedience theory. According to Frey's model compliance theory, a person who becomes compliant is encouraged by public policies that will provide convenience and security guarantees to policies that will motivate a person to be compliant or non-compliant. A person can also become motivated if government policies eliminate incentives thereby reducing a person's motivation to obey. In the theory of adherence Frey's model, it is stated that strong intrinsic motivation and weak extrinsic motivation, coupled with external impulses such as price effects will affect a person's motivation. The following is a modified framework of Frey's model compliance theory.

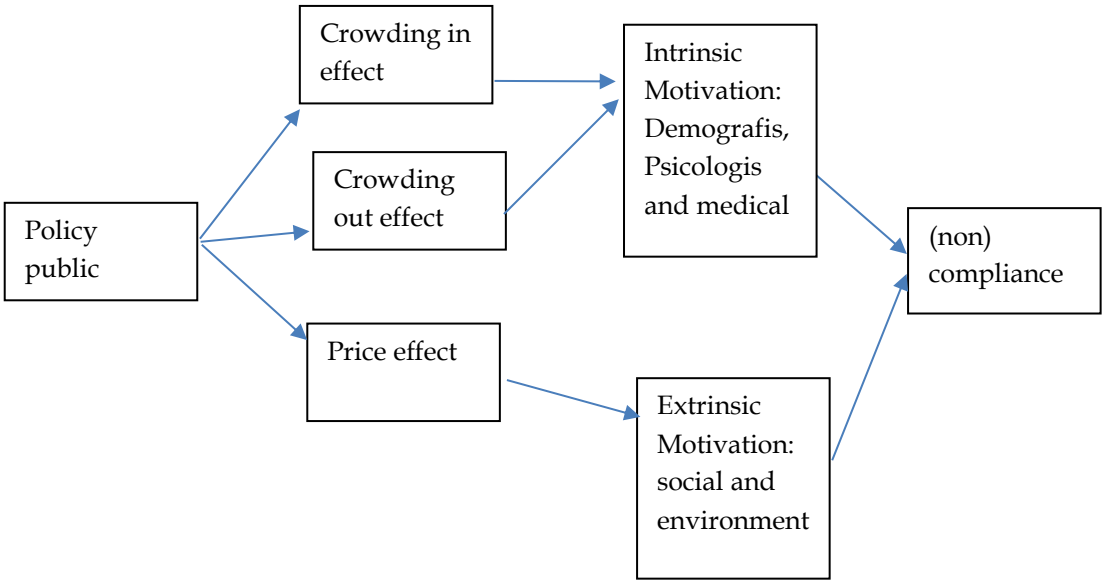

Figure 1. The theoretical framework of the Adherence of the modified Frey's model (Étienne & Wendeln, 2012).

METHODOLOGY

This type of research is a survey with a cross sectional design. The population is all TB patients who underwent treatment for the period of January - December 2023 at the Jayapura Regency Health Office as many as 1,162 people. A sample of 81 people was taken by purposive sampling technique. Data was collected from secondary data from the health center and processed using the help of SPSS and analyzed by the Prevalence Ratio test and Risk Attribute test.

RESEARCH RESULTS

Table 1. Analysis of Risk Attributes, Prevalence Ratio and Chi Square of TB Drug Adherence

No.	Characteristics	Not compliant		Compliant		Total		PR		AR	P Value
		n	%	n	%	n	%	L	U		
1	Age (Years)							PR=1,00			
	>=60	1	33,3	2	66,7	3	100	0,19	5,10	-21%	
	16-59	26	33,3	52	66,7	78	100				1,00
2	Gender							PR=1,7		18%	
	Male	17	42,5	23	57,5	40	100	0,91	3,3		0,13
	Female	10	24,4	31	75,6	41	100				
3	Education							PR= 0,57		-16%	
	Low	6	22,2	21	77,8	27	100	0,26	1,24		0,21
	High	21	38,9	33	61,1	54	100				
4	Work							PR=2,12		19%	
	Work	24	37,5	40	62,5	64	100	0,72	6,22		0,21
	Not Working	3	17,6	14	82,4	17	100				
5	MDR Status							PR=16		62%	
	TB MDR	24	88,9	3	11,1	27	100	5,2	48,4		0,00
	Non MDR	3	27	51	94,4	54	100				
6	Duration of Treatment							PR=3,8		50%	0,00
	> 6 Moon	17	68	8	32	25	100	2	7		
	<= 6 Moon	10	17,9	46	82,1	56	100				

7	Disease History							PR=3,6		61%	0,00
	Yes	16	69,6	7	30,4	20	100	2,02	6,66		
	No	11	19	47	81	58	100				
8	Side Effects							PR=2,5		30%	0,009
	Heavy	18	50	18	50	36	100	1,2	4,88		
	Light	9	20	36	80	45	100				
	Total	27	33,3	54	66,7	81	100				

Source : Primary data, 2024

Based on Table 1 above, it is known that the variables whose Prevalence Ratio is > 1 and are significant sequentially are MDR TB status with Prevalence Ratio =16 CI 95% (5.2-48.4), Length of treatment RP = 3.8 CI 95% (2-7), disease history Prevalence Ratio =3.6 CI 95% (2.02-6.66), Drug side effects Prevalence ratio =2.5 (1.2-4.88). Meanwhile, the variables whose Risk Attributes contributed the highest to non-compliance with medication orders were MDR TB status, which was 62%, disease history 61%, length of treatment 50%, drug side effects 30%, occupation 19%, and gender 18%. Meanwhile, the significant chi-square values were the variables of TB MDR status p-value of 0.00, treatment duration p-value of 0.00, disease history p-value of 0.00, and drug side effects p-value of 0.009.

DISCUSSION

The results of this study were the age variable RA value = -21% which was interpreted that age reduced the risk of non-compliance by 21% and the Prevalence Ratio was not significant to medication adherence. This is in line with the results of research by Pramesti and Nilapsari at Al-Ihsan Hospital, Bandung City, which shows that age is not significant in medication adherence. The results of Pramesti's research found that most of the prevalence of pulmonary TB is at the age of 41–60 years or in adulthood to late adulthood which is a productive age group, but it is not significant. This result is also in line with the findings of Kondoy et al., 2020 that there is no age relationship with medication adherence in Manado City. According to Kondoy, all ages in pulmonary TB patients want to recover from the disease so they will obey TB treatment guidelines, even for a long period of time (Farisi, 2020).

Regarding the gender variable, the results of this study found that the gender of the RA value = 18% which is interpreted that the male sex contributes 18% to non-compliance with taking TB drugs. The value of RP 1.7 is not significant because the lower and upper values include the number 1. These results are not in line with the findings of Pharisee, 2020 which found that men suffer from pulmonary TB more than women. The results of the study are in line with the research of Kondoy et al., in Manado City that the incidence of pulmonary TB in men is higher because men of productive age are more active in going out of the house and have many activities such as earning a living so that they are more at risk of developing tuberculosis. Although the proportion of men suffering from pulmonary TB is higher, this variable has no significant relationship with medication adherence. The results of this study are also the same as the results of a study conducted on 300 patients, of which female patients

are higher, namely 53.33%, and male patients are 46.66%. Compared to Men, women are quite obedient to medication (Pharisa, 2020).

The respondents' education was RA = -16% and RP = 0.57 or education was not significant with medication adherence. The Risk Attribute value is interpreted that the respondent's education reduces the risk of non-compliance or even though the education is only junior high school and below, but the knowledge is good, then they still obey to take medication or vice versa. The results of this study are the same as the results of Nezenega et al., 2020 that education is not significant to medication adherence. According to Nezenega, the higher a person's education, the more adequate his knowledge about Pulmonary TB and the less likely he is to disobey taking medication, although the theory is like that, the relationship between the compliance variable is influenced by many other factors, so it is not significant (Nezenega et al., 2020).

The results of this study found that generally 64 (79%) non-working respondents and RA = 19% and RP = 2.12 (0.72-6.22) values were interpreted that pulmonary TB patients had an insignificant Prevalence Ratio value and for the Risk Attribute value which meant that non-working respondents contributed 19% to non-medication adherence. The results of this study are the same as those found by Yudiana et al., 2022 that the work of the relationship is not significant with medication adherence in patients with pulmonary TB at the Patokbeusi Subang Health Center (Yudiana, Zulmansyah and Garna, 2022).

The results of this study found that patients who had drug side effects were 2.5 times more likely to not comply with medication compared to those who did not have side effects. Tilapia RA=30% which is interpreted that pulmonary TB patients who have side effects of the drug contribute 30% to non-compliance with medication. The results of this study are the same as the results of Sukarno et al., 2023, that most TB patients who are in the intensive treatment stage experience mild side effects. Among the 20 types of side effects of anti-tuberculosis drugs (OAT), joint pain and abdominal pain were the most felt and the results showed that there was a significant relationship between joint and abdominal pain and treatment compliance in pulmonary TB patients at the Baja Health Center in Tangerang City (Sukarno et al., 2023).

The results of the study between the TB MDR (Multi-Drug Resistant Tuberculosis) status variables showed a Prevalence Ratio (RP) of 16 with a CI of 95% (5.2-48.4). This suggests that individuals with MDR TB status have a 16 times higher risk of medication non-compliance than those without MDR TB. RA value = 62% which is interpreted as the status of MDR TB patients contributing 62% to non-adherence to medication. The results of this study are similar to the study conducted by Alene et al. (2017) found that patients with MDR TB have a much higher risk of developing complications or unsuccessful treatment compared to non-drug-resistant TB patients, with a similar Prevalence Ratio ranging from 14-17 depending on the population studied. This confirms the importance of more intensive treatment of MDR TB due to the much higher risk of complications.

The length of treatment has a Prevalence Ratio of 3.8 with a CI of 95% (2-7), indicating that the longer a person is on treatment, the greater the risk of non-compliance with medication. RA value = 50% which is interpreted that TB

patients whose treatment > 6 months contribute 50% to non-adherence to medication. This means that the length of treatment is an important risk factor. A study by Dwiningrum et al., 2021 found the same that the length of treatment was significant with medication adherence. (Dwiningrum, et al., 2021). Long-term TB treatment often leads to compliance issues, which can worsen treatment outcomes.

The history of the disease showed a Prevalence Ratio of 3.6 with a CI of 95% (2.02-6.66). This means that the history of the disease, especially the relevant previous disease, increases the risk of observed events by up to 3.6 times compared to those who do not have a history of the disease. RA value = 61% which is interpreted that TB patients who have a history of disease contribute 61% to non-adherence to medication. Similar results were found by Wiratmo et al., 2021 that patients with a significant history of disease with p-value medication adherence ; 0.001. Disease history is often an important predictor of the development of advanced diseases or complications (Wiratmo, Setyaningsih and Fitriani, 2021).

Drug side effects have a Prevalence Ratio of 2.5 with a CI of 95% (1.2-4.88), which suggests that patients who experience drug side effects are 2.5 times more likely to experience other treatment-related complications or disorders. RA value = 30% which is interpreted that TB patients who have a history of disease contribute 30% to non-adherence to medication. Similar results were found by Wiratmo et al., 2021 that patients with drug side effects were associated with an increased risk of treatment failure due to non-medication adherence. Drug side effects such as hepatotoxicity or nephrotoxicity often lead to treatment discontinuation or regimen changes, ultimately affecting the success of therapy (Wiratmo, Setyaningsih, and Fitriani, 2021).

CONCLUSIONS

1. Age Risk Attribute Value (RA) = -21%, PR=1 CI 95% (0.19-5.90).
2. Gender Risk Attribute Value (RA) = 18% and PR 1.7 (0.91-3.30).
3. Education Risk Attribute Value (RA) = -16% and PR = 0.57 (0.26-1.24).
4. Work with Risk Attribute Value (RA) = 19% and PR = 2.12 (0.72-6.22).
5. TB MDR status: Risk Attribute Value (RA)=62% and PR=16 (5.2-48.4).
6. Side effects of the drug Risk Attribute Value (RA)=30% and PR=2.5 CI 95% (1.2-4.88)
7. Disease History: Risk Attribute Value (RA)=61% and PR=3.6, CI 95% (2.02-6.66),
8. Length of treatment: Risk Attribute Value (RA)= 50% and PR = 3.8 CI 95% (2-7)

What contributed the most to non-adherence to medication in pulmonary TB patients was MDR TB status and disease history, which was >60%.

RECOMMENDATIONS

1. Health workers must conduct comprehensive education to patients and families about the importance of compliance in pulmonary TB treatment.

2. Officers must conduct regular monitoring and counseling for patients, so that they can overcome side effects and motivate patients.

ADVANCED RESEARCH

This study only analyzes Risk Attributes and Prevalence Ratios based on secondary data, thus there are many risk factors that cannot be analyzed. Therefore, it is hoped that further research will explore other factors that affect the non-compliance of patients with pulmonary TB.

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