Recent Non-Compliance as to Medication in Lung Tuberculosis Sufferers in Timika, Mimika, Indonesia

Andreas C. Ayomi[a], Arwam Hermanus[b], Marlin Jarona[c], Yelli Mardona[d], Jems KR Maay[e], [a,b,c,d,e]Environmental Health Polytechnic School, Ministry of Health Jayapura Papua, Padang, Bulan 2, Hedam, District Heram, Jayapura City, Papua Province, Indonesia, Email: [a*]andreas.ayomi@yahoo.com

Tuberculosis (TB) remains a health problem globally. Not one country is free from it. In 1993, the World Health Organisation declared TB a "Global Emergency", because the situation is worsening particularly for 22 "high burden" countries. Directly Observed Treatment Short-course has proven effective at controlling TB, yet the societal TB burden is still high. There have been many improvements since 2003. However, there are still 9.5 million TB new cases, causing approximately 0.5% of deaths in the world (WHO, 2009). Additionally, around 75% of TB patients are of an economically productive age (in the age group 15-55). This research investigated factors affecting non-compliance as to medication in lung TB sufferers in the work area of Community Health Centre Timika, Mimika Regency in 2017. A cross-sectional study approach was used. The sample was 78 TB sufferers who followed medication at the centre. The data analysis used the statistic test of lambda correlation coefficients. Based on the characteristics of the respondents, the variable of the group at the age of 31-45 was 46.15%; the male percentage showed 52.56%. No-school graduation was 30.77%, whereas unemployment was 47.44%, and family income lower than the regional minimum wage was 91.1%. Bivariate analysis showed some factors affecting the non-compliance medication of lung tuberculosis sufferers. Those factors were related to treatment observers (p: 0.00), health talk (p:0.00), knowledge (p:0.00), attitude (p:0.00), action (p:0.00), distance from house to the community centre (p:0.00), transport availability (p:0.00), and travel expenses (p:0.00). Moreover, multivariate analysis showed that the most affecting factor was knowledge (significant value 0.02), and action (significant value 0.05). So, it can be concluded that the factors affecting non-compliance medication in lung tuberculosis suffers, were treatment observers, health talk, patients' knowledge, patients' actions, distance from

patients' house to the centre, transport availability, and travel expenses. The most affecting factors were knowledge and action. Suggestions are made for the lung TB program officers at the centre to do health talks, use a family approach to lung TB noncompliant patients, and to activate treatment observers.

Introduction

Tuberculosis is an infectious disease with a high prevalence in poor countries, where the low adherence to drugs given by doctors can increase the risk of morbidity, mortality and drug resistance both in patients and in the wider community. (Ministry of Health, 2011). Tuberculosis (TB) is still a global concern, and until now there has not been a single country that is free of TB (Genis, 2008). In 1993, WHO declared TB as a world emergency (global emergency), therefore TB in the world is getting worse in 22 countries classified with large TB problems (countries with high burden). Although the Directly Observed Treatment Short-course (DOTS) strategy has proven to be very effective in controlling TB, the burden of TB in the community is still very high (Ministry of Health, 2011). With estimates approved since 2003, approximately 9.5 million new TB cases and around 0.5 million people have died from TB worldwide (WHO, 2009). More women die from TB than pregnancy, childbirth, and the puerperium. About 75% of TB patients are in the most economically productive age group (15-55 years). Based on WHO's 2015 Global Report, it is estimated that the report (new cases) of TB in the world in 2014 was 9.6 million (range 9.1 million - 10.0 million), equivalent to 133 cases per 100,000 population. The countries with the largest TB case reporting in 2013 were India (range 2.0 million - 2.3 million), China (range 0.9 million - 1.1 million), Nigeria (range 340,000 - 880,000), Pakistan (range 370,000 - 650,000), Indonesia (range 410,000 - 520,000), and South Africa (range 410,000 - 520,000) (Bachti, 2007).

The prevalence (new and old cases) of TB in the world in 2014 was 13 million (range 11 million - 14 million), equivalent to 174 cases per 100,000 population. The prevalence of TB was 647,000 cases (range 513,000 - 797,000 cases) in Indonesia in 2014.

Mortality (death) due to TB in the world, both with HIV negative and with HIV positive in 2014, was estimated at 1.5 million people (in which, died due to HIV negative was 1.1 million people, and died due to HIV positive was 390,000 people). The number of deaths due to TB made up 41,000 people (range 26,000 - 59,000 cases) in Indonesia in 2014.

Meanwhile, the number of TB case findings in 2015 was 1146 cases with 125 non-compliant TB patients in Mimika. The condition that made TB treatment in Mimika worse was the

presence of HIV co-infection. Socio-economic problems will remain a challenge in the future health sector development program in Mimika (Mimika Health Service, 2010). Patient compliance is needed for therapeutic success, especially in the treatment of non-communicable diseases (such as diabetes, hypertension, asthma, cancer, etc.), mental disorders, HIV / AIDS infections, and tuberculosis (Eliska, 2005). Non-compliance by patients in the treatment of this disease can have a very large negative effect, because worldwide these diseases accounted for 54% of all diseases in 2001. This figure is expected to even increase to more than 65% by 2020 (Widoyono, 2005).

According to Simamora's research (2004) conducted at the Binjai City Health Centre, several variables influence the irregularity in treatment of pulmonary TB patients, namely: patient's knowledge of pulmonary TB treatment, whether there is a Drugs Supervisor (PMO), side effects of drugs, the behaviour of health care workers, patients' perceptions of health education, and the distance between the patient's house and the community health centre (Zuliana, 2009). In this study, the research was limited to patients with pulmonary tuberculosis who were ≥ 15 years old, lived in the working area of the Timika Community Health centres, and were undergoing a medical examination or not undergoing treatment (Najib, 1999). For this reason, this study aims to determine the influences of non-compliance by patients being treated for pulmonary tuberculosis, in the working area of Timika Health Centre in Mimika Regency in 2017; including patient knowledge, patient attitudes, patient education level, socioeconomic level, patient distance from community health centre services, availability of transportation and costs thereof, supervisors swallowing drugs, and the availability of health information (Soekidjo, 2007).

Research Methods

This type of research is a quantitative study with a cross-sectional study design. Cross-sectional research (survey) studies the dynamics of the correlation between risk factors and effects, by way of approach, observation, or data collection at one time (point time approach) (Erni, 2009). That is, each research subject was only observed once and measurements were made of the character status or subject variables at the time of examination (Riduwan, 2011). This does not mean that all research subjects were observed at the same time (Sofyan & Heri, 2011). This design reveals the risk factors as to whether there is an effect or not. The risk factors here are knowledge, attitudes, education level, socioeconomic level, distance/location of health centres, availability of transportation, transportation costs, Drug Swallowing Supervisors (DSS), and health education (Manjula, 2018). The effect factor is TB sufferers who do not comply with treatment. The population in this study were all patients with TB who sought treatment at the Health Service Unit in Timika from January to December 2015. The target population was all patients with pulmonary TB who first went to the Health Service Unit in Timika from January

to December 2015. The affordable population are all patients with non-compliant pulmonary TB who sought treatment at the Unit from January to December 2016.

The sample in this study was pulmonary TB patients who first went to the Health Care Unit in Timika in January to December 2016, and did not comply with treatment that met the inclusion and exclusion criteria (Ahmad, 2008).

To calculate the sample size in the Partial Least Square (PLS) method requires ten times the number of paths that lead to the structural model (Setyo, 2008). In this study, 90 people were sampled. The inclusion criteria of this study were: Patients with pulmonary TB who first went to the public health centre in Timika from January to December 2015 and were not compliant in seeking treatment, TB patients with OAT resistance and/or complications from other diseases, aged more than 15 years, willing to be a respondent, and able to communicate well (Widoyono, 2005).

The Research Results
Overview of the Timika Community Health Centre

The Timika community health centre is located in Kwamki's new village, Koperapoka sub-district. It has an area of 100 x 100 m^2, with a building area of 30 x 50 m^2 containing a permanent building constructed by PT Freeport in 1995. Since 2013 the working area of the Timika Community Health Centre has been divided into 2 (Two) Districts: Kwamki new District and Wania Jaya District. The Timika community health centre oversees 6 (six) villages, namely Kamoro Jaya Village, Wonosari Jaya Village, Nawaripi Village, Inagua Village, Koperapoka Village, and Kwamki Baru Village, from these six villages there are integrated service posts; 23 Posyandu with 130 cadres.. There are three supporting community health centres, namely Nawaripi Helper community health centre, Kamoro Jaya Helper community health centre, and Wonosari Jaya Helper community health centre.

Characteristics of Respondents

At this stage, a Univariate analysis was performed to analyse respondents' characteristics, which include Age Group, Gender, Latest Education, and Employment, Family Income.

Table 1: Frequency Distribution of Respondents by Respondent Characteristics\In the 2017 Timika Community Health Centre area

Characteristics of Respondents	Frequency	percent (%)
Age group		
15– 30 year	18	23,08
31 – 45 year	36	46,15
46 – 60 year	19	24,36
> 60 year	5	6,41
Gender		
Male	41	52,56
Female	37	47,44
The latest acquired education		
No school	24	30,77
Elementary school	17	21,79
Middle School	10	12,82
High school	19	24,36
College	7	8,97
Type of work		
Does not work	37	47,44
Farmers	26	33,33
Private / Employee	10	12,82
Civil servants	4	5,12
Army / Police	1	1,28
Student	0	0
Family Income		
< relative minimum wage Regency	71	91,1
> Regency relative minimum wage	7	8,9
amount	78	100

Source: 2017 Primary Processed Data

Bivariate Analysis

Effect of DSS Availability Factors with Non-compliance with Lung TB Control in Patients with Lung TB

Table 2: Results of Statistical Tests on the Effects of Drug Swallowing Supervisors (DSS) on Non-compliance with Pulmonary TB Treatment in Patients with Lung TB in the Work Area of Timika Health Centre in 2017.

		Disobedient		Total	P
		obey	not obey		
Availability DSS	there is	28	8	36	0.00
	there is no	15	27	42	
Total		43	35	78	

Source: 2017 Primary Processed Data

Table 2 shows patients with pulmonary TB who have Drug Swallowing Supervisors (DSS). It included 28 respondents, 8 were missing treatment. Further, 15 respondents did not have a compliant PMO for treatment, whereas 27 respondents did not get treatment. There was an effect (p = 0.00 α α: 0.05) based on statistics using the Chi-Square test. Its significance relates to Drug Swallowing Supervisors with Non-compliance with TB Treatment in Patients with Pulmonary TB in the work area of the Timika Health Centre.

Effects of Health Counselling Factors on Non-compliance with Lung TB Treatment in Patients with Lung TB

Table 3: Results of Statistical Tests on the Effects of Health Counselling with Non-Compliance with Pulmonary TB Treatment in Lung TB Patients in the Work Area of Timika Health Centre in 2017.

		Disobedient		Total	p
		obey	not obey		
Counselling Health	Good	30	8	38	0.00
	Not good	13	27	40	
Total		43	35	78	

Source: 2017 Primary Processed Data

Table 3 indicates that 30 respondents were patients with pulmonary TB who accumulated knowledge on well-being and patients, who adhered to treatment, while 13 respondents were not compliant. Further, 13 respondents accumulated knowledge on a poor health topic and were obedient in seeking treatment, whereas 27 respondents did not comply. It can be also seen from Table 3 that there was a significant effect (p = 0.00 <α: 0.05) based on statistics, using the Chi-Square test. It means that there was an influence of Health Counselling Factors with Non-

compliance with Pulmonary TB Treatment in Patients with Pulmonary TB in the working area of Timika Health Centre (Ganaprakasam, 2018).

The Influence of Knowledge Factors on Patients with Non-compliance Obedience of Lung TB in Patients with Lung TB

Table 4: Statistical Test Results of the Influence of Knowledge of Patients With Non-compliance with Lung TB Treatment in Lung TB Patients in the Work Area of Timika Health Centre in 2017.

| | | Disobedient | | Total | *p* |
		obey	not obey		
Knowledge Sufferers	Good	28	8	36	0.00
	Not good	15	27	42	
Total		43	35	78	

Source: 2017 Primary Processed Data

Table 4 describes 28 respondents who have a piece of good knowledge, and adhered to medical treatment. There were eight disobedient respondents. There were 15 respondents with poor knowledge who were obedient in seeking treatment, while 27 respondents were not interested in finding treatment. There was a significant effect (p = 0.00 <α: 0.05) based on statistics by using the Chi-Square test. As a result, there was an influence of the Knowledge Factors of Patients with Non-compliance with Pulmonary TB Treatment in Patients with Pulmonary TB in the working area of Timika Health Centre.

Influence Factors of Patient Attitudes with Non-compliance Obedience of Lung TB in Patients with Lung TB

Table 5: Results of Statistical Tests on the Effect of Attitudes on Patients with Non-compliance with Lung TB Treatment in Lung TB Patients in the Work Area of Timika Health Centre in 2017.

| | | Disobedient | | Total | *p* |
		obey	not obey		
Attitude Sufferers	Good	32	7	39	0.00
	Not good	11	28	39	
Total		43	35	78	

Source: 2017 Primary Processed Data

Table 5 shows 32 respondents with a good attitude, who were obedient to treatment, whereas seven respondents did not comply with treatment. Also, 11 respondents had a good attitude as to seeking treatment, while 28 respondents were not obedient in seeking treatment. Statistics

based on the Chi-Square test showed the intended effect (p = 0.00 <α: 0.05). It means that something was affecting the attitude of patients with Non-Treatment of Pulmonary TB Treatment in Patients with Pulmonary TB in the working area of Timika Health Centre.

Lung in Lung TB Patients

Table 6: Results of Statistical Tests on the Effects of Patient Actions With Non-Treatment of Lung TB Treatment in Lung TB Patients in the Work Area of Timika Health Centre in 2017.

		Disobedient		Total	*p*
		obey	not obey		
Action Sufferers	Good	32	3	35	0.00
	Not good	11	32	43	
Total		43	35	78	

Source: 2017 Primary Processed Data

It can be seen from Table 6 that 32 well-behaved respondents were obedient to medical treatment, while three were not interested in well-being. Further, 11 respondents had poor treatment and were obedient in seeking treatment, whereas 32 respondents were not compliant with treatment. The statistics of the Chi-Square test showed a significant effect (p = 0.00 <α: 0.05). As a result, there was an influence of Patient Action Factors with Non-compliance with Pulmonary TB Treatment in Patients with Pulmonary TB in the working area of Timika Health Centre.

Influence Factors Distance of Houses to Health Centres with Non-compliance Obedience of Lung TB in Patients with Lung TB

Table 7: Results of Statistical Tests on the Effect of Distance of Home to Puskesmas with Non-compliance with Lung TB Treatment in Patients with Pulmonary TB in the Work Area of Timika Health Centre in 2017

		Disobedient		Total	*p*
		obey	not obey		
Distance Home to Public health centre	Near	31	2	33	0.00
	Far	12	33	45	
Total		43	35	78	

Source: 2017 Primary Processed Data

Patients with pulmonary TB who lived at a remote place from the health centre, or near it, are displayed in Table 7; 31 respondents were living near the health centre, two of them were not interested in treatment. Twelve respondents lived far from the community health centres and were compliant in seeking treatment, while 33 respondents were not compliant. Statistics by using the Chi-Square test showed that there was a significant effect (p = 0.00 <α: 0.05). Consequently, there was an influence of the distance factor of the patient's house to the

community health centres, with non-compliance with pulmonary TB treatment in patients with pulmonary TB in the working area of the Timika health centre.

The Influence of Transportation Availability Factors for Patients with Non-compliance with Lung TB Control in Patients with Lung TB.

Table 8: Statistical Test Results of the Effects of Transportation Availability with Non-compliance with Pulmonary TB Treatment in Lung TB Patients in the Work Area of Timika Health Centre in 2017.

		Disobedient		Total	*p*
		obey	Non obey		
Availability of Transportation	Easy	31	3	34	0.00
	Not easy	12	32	44	
Total		43	35	78	

Source: 2017 Primary Processed Data

Table 8 shows the number of patients with pulmonary TB who have easily available transportation; 31 respondents were adherent to treatment, while those who did not adhere to treatment included three respondents. The number of those, whose transportation was not easy, was 44; 12 of them were interested in treatment whereas 32 respondents were not compliant in seeking treatment. Statistics of the Chi-Square test showed a significant effect ($p = 0.00 < α$: 0.05). It means that transportation availability influenced non-compliance of pulmonary TB treatment in patients with pulmonary TB in the working area of Timika Community Health Centre.

Effects of Transportation Cost Factors on Non-compliance with Lung TB Control in Patients with Lung TB

Table 9: Results of Statistical Tests on the Effects of Transportation Costs with Non-compliance with Pulmonary TB Treatment in Patients with Pulmonary TB in the Work Area of Timika Health Centre in 2017.

		Disobedient		Total	*p*
		obey	Non obey		
Travel Expenses	Cheap	30	4	34	0.00
	Expensive	13	31	44	
Total		43	35	78	

Source: 2017 Primary Processed Data

Table 9 indicates 78 patients whose health treatment depended on travel expenses. There were 30 respondents with pulmonary TB, and cheap transportation costs, and were obedient as to

treatment. However, four people were not obedient. Although 13 respondents with expensive transportation costs were obedient in seeking treatment, 31 respondents were not interested in treatment. Statistics of the Chi-Square test showed a significant effect (p = 0.00 <α: 0.05), which means that transportation cost factored into Non-compliance with Pulmonary TB Treatment in Patients with Pulmonary TB in the working area of Timika Health Centre.

Multivariate Analysis

Multivariate Analysis using the Logistic Regression statistical test with the Enter Method to analyse which variables most influenced Non-compliance with Pulmonary TB Treatment in Patients with Pulmonary TB in the work area of the Timika Health Centre.

Table 10: Results of Statistical Tests of Multivariate Analysis to Analyse the Variables that Most Influenced the Non-Compliance of Pulmonary TB Treatment in Patients with Pulmonary Tuberculosis in the Work Area of Timika Health Centre in 2017.

Variables in the Equation							
		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	Drug Swallowing Supervisors (DSS)	-1.590	.869	3.347	1	.067	.204
	Counselling (1)	-.615	.874	.496	1	.481	.540
	Knowledge (1)	-1.731	.792	4.778	1	.029	.177
	Attitude (1)	-1.643	.926	3.150	1	.076	.193
	Actions (1)	-2.301	1.193	3.717	1	.054	.100
	Distance (1)	-2.120	1.591	1.777	1	.183	.120
	Transport (1)	-.516	1.045	.244	1	.622	.597
	Cost (1)	2.230	1.826	1.492	1	.222	9.300
	Constant	2.767	.759	13.302	1	.000	15.918

Source: 2017 Primary Processed Data

Based on Table 10, the results of multivariate analysis using the Logistic Regression test showed the variable that most influenced the non-compliance of pulmonary TB treatment, in pulmonary TB patients in the working area of Timika Health Centre. The most influential variables are the Knowledge variable (Significance value: 0.02) and the Action variable (Significance value: 0.05).

Conclusion

To sum up, the results of this study confirm the influence of the Drug Swallowing Supervisory Factor (PMO); there was an influence on the presence of health information and on the patient attitude factors. There was also an effect on Patient Action Factors, and on the distance of the house to the health centre. The influence on the availability of transportation and transportation Cost Factors played a key role as well. However, there was no influence on patient's knowledge factor from non-compliance with pulmonary TB treatment. The most influential factor on non-compliance with pulmonary TB treatment in patients with pulmonary TB in the working area of the Timika Community Health Centre was the Knowledge Factor and Actions of Patients with Pulmonary TB.

REFERENCES

Ahmad, H. (2008). Tuberculosis is easily treated. Jakarta: University of Indonesia Faculty of Medicine Publisher Institute.

Bachti, A. (2007). Tuberculosis in Indonesia: Host response and patient care. Jakarta: Dian Rakyat.

Eliska. (2005). The relationship of work and health services to the level of compliance with pulmonary TB treatment at Teladan City Health Center Medan. Thesis. University of Northern Sumatra.

Erni, E. (2009). Factors affecting non-compliance with treatment in patients with pulmonary TB in the work area of the West Dompu puskesmas in Woja District Dompu Regency, NTB Province. In: community medicine news. Vol 25.

Ganaprakasam, C. (2018). Emotional intelligence on suicidal ideation and mental health. Muallim Journal of Social Sciences and Humanities, 2(3), 185-195.

Genis, G. W. (2008). Practical guidelines to prevent and ward off tuberculosis in children. Jakarta: Dian Rakyat.

Manjula, G. (2018). Healthy way of life style through Siddha system of medicine [நோயில்லா நெறிக்குச் சித்த மருத்துவம்]. Muallim Journal of Social Sciences and Humanities, 2(2), 156-160.

Mimika Health Service. (2010). Mimika Regency annual TB report. Timika: Mimika Health Service Sub-Bid P2M PL.

Ministry of Health. (2011). National guidelines for tuberculosis control. Jakarta: Ministry of Health of the Republic of Indonesia Directorate General of Disease Control and Environmental Health.

Ministry of Health. (2011). National Strategy for TB Control in Indonesia 2010-2014. Jakarta: Ministry of Health Republic of Indonesia Directorate General of Disease Control and Environmental Health.

Najib. (1999). Factors related to non-compliance with taking medicines for patients with pulmonary tuberculosis at the Kenari Public Health Center in Yogyakarta. Thesis. UGM.

Riduwan. (2011). editor Scale of measurement of research variables. Bandung: Alfabeta.

Simamora. (2004). Factors related to non-compliance with treatment of pulmonary TB patients at the Binjai City Health Center. Thesis. University of Northern Sumatra.

Soekidjo, N. (2007). Health promotion and behavioral science. Jakarta: Rineka Cipta.

Sofyan, Y, & Heri, K. (2011). The new generation processes research data with Partial Least Square Path Modeling. Jakarta: Salemba Infotek.

Setyo, H. W. (2008). Structural Equation Modeling. Yogyakarta: Graha Science.

WHO. (2012). Global tuberculosis control: WHO report 2012.

WHO. (2009). Global tuberculosis control: WHO report. Health 2009.

Widoyono. (2005). Tropical diseases: epidemiology, transmission, prevention and eradication. Jakarta: Erlanggga.

Zuliana. (2009). Influence of knowledge and the role of PMO on pulmonary TB patients' compliance in the Pekanbaru Labuhan Health Center Medan City. Thesis. University of Northern Sumatra.