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The Role of The Pharmacist in The Success of Tuberculosis (Tb) Treatment in Jeneponto Regency

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Abstract. *Tuberculosis (TB) is an infectious disease caused by the bacterium called Mycobacterium tuberculosis leading to the inflammation of the lung parenchyma. This study aims to determine the effect of counseling on drugs and disease on TB patients and Medication Supervisors (PMO) as well as to determine the effect of PMO in increasing TB patient compliance with monitoring of each respondent. This study used two instruments, the first instrument was the TB-P10 instrument to measure the knowledge of respondents and PMO with pre and post-monitoring. The second instrument was MARS-5, given to the respondent and PMO to see how the respondent's compliance after therapy. Based on the results of the analysis of the paired t-test, it is known that the significance so it can be concluded that there is an average difference between the pre-test and post-test knowledge levels of PMO, which means that there is an effect of pharmacist counseling interventions to respondents and PMO in improving their knowledge. Meanwhile, the performance of PMO in increasing patient medication compliance showed a good performance with 48 patients (96%) who adhered to taking medication, while the poor performance was 2 patients who did not adhere to taking medication (4%). Based on the results of the analysis of the Wilcoxon test, it is known that the significanc, so it can be concluded that there is a relationship between PMO performance on patient medication compliance with clinical outcomes in the presence of patient weight gain and negative final of AFB results.*

Keywords : *Medication Supervisorsm (PMO), knowledge, compliance*

INTRODUCTION

Tuberculosis (abbreviated as TB) is an infectious lung disease as a health problem in the world, specifically in developing countries. WHO (Word Health Organization) has declared TB a Global Emergency since 1992 (Kemenkes RI, 2016). In 2015, TB was included in the top 10 causes of death worldwide. There were 10.4 million people with TB and 1.8 million who died from TB (Kemenkes RI, 2009). According to the WHO report, there were 202 countries estimated to have TB in 2019. Most TB cases are in the Southeast Asian region (44%), Africa (24%), and the West Pacific (18%). Eight countries account for two-thirds of the global total, including India (27%), China (9%), Indonesia (8%), Philippines (6%), Pakistan (6%), Nigeria (4%), Bangladesh (4%) and South Africa (3%) (Kemenkes RI, 2016).

Since 1995, WHO has recommended the DOTS (Directly Observed Treatment Short-course) strategy for TB control. The DOTS strategy is a TB management strategy that emphasizes the importance of supervision to ensure patients complete appropriate treatment until they are cured (Kemenkes RI, 2016). The World Bank declared that the DOTS strategy is one of the most effective health interventions (Nurjana, 2015). There are many factors affecting the success of TB treatment. The TSR (Treatment Success Rate) is influenced by several factors, including: a). Patient factors: Patient compliance to taking anti-tuberculosis drugs (ADT), patients moving to other health service facilities, and their disease being resistant to anti-tuberculosis drugs. B). Medication supervisor factor (PMO); No PMO or poor performance. C). Drug factors: the supply of ADT is disrupted so that patients delay or do not continue the drug, and the quality of ADT decreases because storage is not according to standards (Kemenkes RI, 2019).

The role of the Medication Supervisor (PMO) in the field is a determining factor for the success of TB therapy. The role of the medication supervisor (PMO) is consistent assistance to TB patients, which is essential to improve TB patient recovery (Sitorus, 2015). Tuberculosis requires long-term treatment for a full recovery. Pulmonary TB, for example, can be cured if treated regularly for 6-8 months. TB treatment aims to cure patients, prevent death, prevent a recurrence, break the chain of transmission, and prevent the emergence of germ resistance to Anti-Tuberculosis Drugs (ATD). Whereas the relapse cases are

tuberculosis patients who have previously received tuberculosis treatment and have been declared cured or complete treatment, re-diagnosed with positive smears (smear or culture) (Ariani et al, 2015).

The pharmacist is to detect early symptoms of TB disease and take appropriate action, monitor patient compliance , side effects, interactions with other drugs, and the role as a whole. Pharmacists must actively prevent resistance, recurrence, and death (Kulkarni et al, 2013). Clark Dekk (2007) reported that TB patient compliance who received counseling from pharmacists was higher than those who did not (Isbaniah et al, 2012)

Pharmacy activities that are most related to patient care and relationships with other health professionals are clinical pharmacy activities which include treatment and monitoring of therapy, drug information services, drug counseling to patients, mixing of injecting drugs, handling and monitoring of drugs, and evaluation of drugs. Based on the duties and responsibilities of the pharmacist, it is necessary to formulate an ideal working collaborative relationship between pharmacists and other health workers in handling TB cases (Siregar et al, 2012).

Pharmacist interventions provide space for pharmacists through counseling for tuberculosis (TB) patients, monitoring therapy, assessing patient compliance and collaborating with other health workers. But unfortunately, the role of pharmacists in the treatment of tuberculosis in this study was not optimal and was mostly carried out by nurses (TB program). Pharmacists should have a broad role in TB care and control including assessing patient risk factors, promoting compliance, managing TB drugs, providing drug information, and monitoring effectiveness, adverse reactions and drug interactions. Services that are limited to the management of OAT can be improved by intervening with pharmacists in improving the outcomes of TB patients (Isbaniah et, al, 2012). Therefore, this study aims to find out the role of pharmacists in tuberculosis patients and medication supervisors (PMO) on the success of TB treatment in Jeneponto district, South Sulawesi, to determine the effect of counseling and monitoring on drug and disease knowledge by patientvs and medication supervisors (PMO), as well as to find out the effect of the medication supervisor (PMO) in increasing TB patient compliance in taking medication.

METHOD

This study is a type of observation research using a quasi-experimental approach. Data was collected by using a questionnaire with validated instruments. The research took place at health centers located in Jeneponto district. This study will be carried out for two to three months until the minimum sample size is met. The inclusion criteria in this study were men and women who were at least 18 years old with educational levels ranging from elementary school (SD), junior high school (SMP), senior high school (SMA), and undergraduate with a diagnosis of tuberculosis (Bacilis Acid Resistant or Thorax X-Ray) by specialist doctors as well as pharmacists and other health workers who act as TB managers in health facilities who have received a certificate of training in temporary TB control for PMO inclusion criteria is one house with a patient suffering from TB, a respected person in the family, can read and write and is active. Meanwhile, the exclusion criteria in this study were those who refused to join as respondents. The sample size used a numerical measurement scale between the two paired groups. It is said to be in pairs because the data on the knowledge and compliance of TB patients is measured twice in the same individual. Thus the formula for the sample size chosen is: (Nanang et al, 2016)

$$n1 = n2 = \left(\frac{(Z\alpha+Z\beta)S}{X_1 - X_2}\right)^2$$

Based on the results of the calculation above, the number of respondents is 35 respondents. In previous studies, it is often found that selected samples experience dropouts. In anticipating it, the number of respondents is added to 15% of the minimum number of respondents so that 40.35 respondents are rounded up to 41 respondents. The data collection technique in this research was a questionnaire instrument on the level of knowledge of tuberculosis patients and medication supervisors (TB-10P) by Dr. Nanang M.Yasin, M.Pharm., Apt, which has been validated and is in Indonesian language, as well as MARS-5 (*Medication Compliance Rating Scale-5)* to measure patient medication compliance (Nanang et al, 2016)

Participants were asked to fill out a questionnaire with instruments that had been tested in previous studies, perfected and presented in Indonesian, and had undergone

adaptation tests. Participants' sociodemographic data, such as gender, age, occupation, and education level, were obtained from self-reports on questionnaires and interviews. The patient knowledge was obtained from a questionnaire (source: Indonesian Clinical Pharmacy Journal Vol, 6. No. 4 December 2017), while patient compliance was measured using MARS-5 (*Medication Compliance Rating Scale-5*) (Firdiawan et al, 2021). Data were analyzed using the paired t-test and the Wilcoxon test. Paired t-test was conducted because, in this study, two tests were carried out with the same respondent, pre-post test patient counseling and patient monitoring. While the Wilcoxon test on performance and compliance of respondents.

RESULT

Table 1
Characteristics of Patient Respondents

Characteristics		Frequency	Percentage
Gender	Male	31	62%
	Female	19	38%
Age	< 18 years	1	2%
	18-35 years	14	28%
	36-50 years	19	38%
	> 50 years	16	32%
Marriage Status	Married	41	82%
	Not married yet	9	18%
Last education	Not completed in primary school	9	18%
	Elementary school	12	24%
	Junior high school	10	20%
	High school	15	30%
	Undergraduate	4	8%
Occupation	Not working	15	30%
	Laborer	3	6%
	Self-employed	6	12%
	Farmer	15	30%
	Housewife	5	10%
	Student	4	8%
	Civil servant	1	2%
	Fisherman	1	2%

Sources: processed data

Table 1, the results obtained 100 respondents, consisting of 50 patients and 50 PMOs. There were 31 male and 19 female patients, while the PMO were 4 male and 46 female. Table 2 based on the results of the study, it was shown that of the 50 respondents from the patient group, it consisted of 1 respondent aged <18 years, 14 respondents aged 18-35 years, 19 respondents aged 36-50 years, and 16 respondents aged >50 years while respondents from the PMO group consisted of 1 respondent aged <18 years, 18 respondents aged 18-35 years, 30 respondents aged 36-50 years and 1 respondent aged> 50 years. There were 4 males and 46 females.

Table 2
Characteristics of Medication Supervisors (PMO) Respondents

Karakteristik		Frequency	Percentage
Gender	Male	4	8%
	Female	46	92%
Age	< 18 years	1	2%
	18-35 years	18	36%
	36-50 years	30	60%
	> 50 years	1	2%
Marriage Status	Married	42	84%
	Not married yet	8	16%
Last education	Not completed in primary school	4	8%
	Elementary school	9	18%
	Junior high school	13	26%
	High school	21	42%
	Undergraduate	3	6%

Occupation	Not working	25	50%
	Laborer	1	2%
	Self-Employed	5	10%
	Farmer	3	6%
	Housewife	14	28%
	Private employee	1	2%
	Civil Servant	1	2%

Sources: processed data

Table 3
Results of Counseling Interventions in the Form of Increasing Patient Knowledge

Knowledge level	Total of Respondent		*p-value*	Frequency	Percentage
	Pre Counseling	Post Counseling			
Low	22 (44%)	0			
Medium	16 (32%)	13 (26%)			
High	12 (24%)	37 (74%)	0,000		
Constant				15	30%
Increase				35	70%
Total				50	100%

Sources: processed data

Based on Table 3, in pre-counseling, there were 22 patients had a low level of knowledge (44%), 16 patients with a medium level (32%), and 12 patients with a high level of knowledge (24%), while in post-counseling, there were no patients are in a low level of knowledge, 13 patients with a moderate level (26%) and 37 patients with high knowledge level (74%). The patients who experienced increased knowledge were 35 people (70%) and 15 people (30%) with a constant level.

Table 4
The Results of Counseling Interventions in the Form of Medication Supervisors (PMO) Knowledge Improvement

Knowledge level	Total of Respondent		*p-value*	Frequency	Percentage
	Pre Counseling	Post Counseling			
Rendah	24 (48%)	0			
Sedang	15 (30%)	6 (12%)	0,000		
Tinggi	11 (22%)	44 (88%)			
Constant				13	26%
Increase				37	74%
Total				50	100%

Sources: processed data

Based on Table 4, in pre-counseling, 24 medication Supervisors (PMO) (48%) had a low level of knowledge, 15 people (30%) with a moderate level of knowledge, and 11 people (22%) with a high level of knowledge, while in post-counseling, there were no PMOs had low levels of knowledge, 6 people (12%) with moderate levels of knowledge, and 44 people (88%) with high levels of knowledge. Meanwhile, 37 people (74%) of PMOs experienced a knowledge improvement, and 13 people (26%) of PMOs with a constant level.

Table 5
Medication Supervisor (PMO) Performance in Improving Patient Medication Compliance

Medication Supervisor (PMO) Performance	Compliance		Total	*p-value*
	Adhere	Non-Adhere		
Good	48	0	96%	
Poor	0	2	4%	0,000
Total			100%	

Sources: processed data

Based on table 5, shows that in PMO with good performance, 48 patients (96%) adhered to taking medication, while in PMO with poor performance, 2 patients (4%) did not

adhere to taking medication. Based on the Table 6 above, 44 (88%) patients experienced weight gain, 6 patients (12%) had a constant weight, and none of the patients experienced weight loss. Based on the results of Acid-Fast bacteria (AFB), 49 patients (98%) tested negative, and 1 patient (2%) had positive AFB.

Table 6
Patient's Clinical Outcome

Clinical Outcome Indicators		Number of Patients	Percentage (%)
Body Weight	1. Increase	44	88
	2. Fixed	6	12
AFB results	1. Negative	49	98
	2. Positive	1	2
Patient Complaints	1. No Complaints	26	52
	2. Joint Pain	13	26
	3. Decreased appetite	3	6
	4. Reddish Urine	1	2
	5. Unable to Walk	1	2
	6. Still coughing	1	2
	7. Nausea	1	2
	8. Joint Pain, Itching	1	2
	9. Joint Pain, Dizziness	1	2
	10. Joint Pain, Nausea, Dizziness	1	2
	11. Joint Pain, Nausea	1	2

Sources: processed data

The results showed 100 respondents, consisting of 50 patients and 50 PMOs. There were 31 male and 19 female patients, while 4 males and 46 females were medication supervisor (PMO) patients. These results are consistent with research in the article Enhancing Pharmacist's Role and Tuberculosis Patient Outcomes Through Training-Education-Monitoring-Compliance-Networking (TEMAN) Pharmacist model Intervention by Nanang M. Yasin, which says that the training participants are more female than male (Nanang et al, 2016).

Based on the results showed that from the 50 respondents of the patient group, 1 respondent aged <18 years, 14 respondents aged 18-35 years, 19 respondents aged 36-50 years, and 16 respondents aged> 50 years, while respondents from the PMO group consisted of 1 respondent aged <18 years, 18 respondents aged 18-35 years, 30 respondents aged 36-50 years and 1 respondent aged > 50 years. Thus, the total numbers are 4 males and 46 females. These results are consistent with research in the article Enhancing Pharmacist's Role and Tuberculosis Patient Outcomes Through Training-Education-Monitoring-Compliance-Networking (TEMAN) Pharmacist Model Intervention by Nanang M. Yasin, which states that the respondents involved in the research were respondents with an average age of 36-50 years old with a history of smokers, diabetes, and one patient has leprosy accompanied by diabetes. In this study, no potential drug interactions were found in TB respondents who were accompanied by diabetes mellitus and leprosy, who were then given OAT therapy after the patient's leprosy treatment was completed and declared cured (Nanang et al, 2016).

Based on tables 1 and 2 show that the majority of respondents had high school education, namely in the group of patient respondents, as many as 15 people, and from the PMO group, as many as 21 people. It is consistent with research conducted by Nanang et al (2016), "Enhancing Pharmacists' Role and Tuberculosis Patient Outcomes Through Training-Education-Monitoring- Compliance-Networking (TEMAN) Pharmacist Intervention model. In this study, most respondents are a high school education (Nanang et al, 2016). Based on the table above, at pre-counseling, patients with a low level of knowledge, as many as 22 patients (44%), a moderate knowledge level was 16 patients (32%), and a high knowledge level was 12 patients (24%), post-counseling, patients with a low level of knowledge did not exist, moderate knowledge level was 13 people (26%), and high knowledge level was 37 people (74%). Of the patients who experienced increased knowledge, there were 35 respondents (70%) and 15 respondents (30%) with constant knowledge.

Based on the results of the analysis of the paired t-test, the significance value (p-value) obtained was 0.000 <0.05, it can be concluded

that there is an average difference between the pre-test and post-test knowledge levels of patients, which means that there is an effect of pharmacist counseling interventions to patients in increasing patients' knowledge. Based on the table above shows that in pre-counseling, medication supervisors (PMO) with a low knowledge level were 24 people (48%), with a medium knowledge level were 15 people (30%), and with a high knowledge level were 11 people (22%), whereas, in post-counseling, there was no level of medication supervisor (PMO) with low knowledge level, as many as 6 people (12%) with moderate knowledge and 44 people (88%) with high knowledge level. The medication supervisor (PMO) who experienced an increase in knowledge was 37 people (74%) and 13 people (26%) with a constant knowledge level.

Based on the results of the analysis of the paired t-test, it is known that the significance value (p-value) is 0.000 <0.05, so it can be concluded that there is an average difference between the pre-test and post-test knowledge levels of medication supervisor (PMO), which means that there is an effect of pharmacist counseling interventions on medication supervisor (PMO) in increasing knowledge. Based on the table above shows that the medication supervisor (PMO) with good performance had 48 patients (96%) who adhered to taking medication. Meanwhile, the medication supervisor (PMO) with poor performance had 2 patients who were non-adherent in taking medication (4%). Based on the analysis results from the Wilcoxon test, it is known that the significance value (p-value) is 0.000 <0.05. It can be concluded that there is a relationship between PMO performance and patient medication adherence.

In this study, the Wilcoxon test was used to determine the relationship between the performance of PMO in increasing patient compliance. Based on the Wilcoxon test, it is known that the significance value (p-value) is 0.000 <0.05. It can be concluded that there is a relationship between medication supervisor (PMO) performance and patient medication compliance (Nanang et al, 2016). Based on the assessment and monitoring, it is possible to know the patient's clinical outcome. Based on the weight, it shows that 44 patients (88%) experienced weight gain and 6 patients (12%) had a constant weight, and no patients experienced weight loss. It is consistent with a study conducted by Nanang et al (2016), which revealed no patients with decreased body weight at the beginning of the month of treatment and showed that the patient's clinical response had improved and there was no failure potential for therapy or recurrence of TB (Utukaman et al, 2021); (Firdiawan et al, 2021). Based on the results of AFB, 49 patients (98%) tested negative and 1 patient (2%) had positive AFB. It is consistent with research conducted by Nanang M. Yasin, who said that several studies reported that weight loss after the first month of therapy and a positive AFB test at the end of the second month was associated with treatment failure (Nanang et al, 2016).

CONCLUSION

The result shows that there is an average difference between the pre-test and post-test knowledge levels of patients medication supervisor (PMO), which means that there is an effect of pharmacist counseling interventions to patients and medication supervisor (PMO) in increasing their knowledge There is a relationship between medication supervisor (PMO) performance in increasing patient medication adherence based on the significant value of the Wilcoxon test. The results of this analysis indicate that the performance of the PMO has a significant effect on patient medication adherence.

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