

## Social Support on the Adherence to Treatment of Tuberculosis in Cilacap, Indonesia

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### ABSTRACT

**Background:** Indonesia is one of the countries with high Multi Drug Resistance of Tuberculosis (MDR-TB). One of the causes of MDR-TB was irregular administration of Anti Tuberculosis Drug. Many Tuberculosis patients experience physical, psychological, and social effect of irregular drug intake. The purpose of this study was to determine the effect of social support on adherence to Anti Tuberculosis treatment.

**Subjects and Method:** This was a case control study carried out in twelve clinics and hospitals, in Cilacap. A total of 128 samples were selected consisting of 42 patients who took Anti Tuberculosis treatment regularly and 86 patients who took Anti Tuberculosis treatment irregularly. The dependent variable was adherence to Anti Tuberculosis treatment. The independent variables were intention, attitude, distance, self-efficacy, social support, education, and knowledge. The data were collected by questionnaire and medical record and analyzed using path analysis.

**Results:** Education was positively associated with knowledge ( $b = 0.17$ ; 95% CI = 0.02 to 0.13;  $p = 0.023$ ) and attitude ( $b = 1.23$ ; 95% CI = 0.29 to 2.16;  $p = 0.001$ ). Knowledge was positively associated with attitude ( $b = 0.56$ ; 95% CI = -1.47 to 0.35;  $p = 0.228$ ). Intention was positively associated with attitude ( $b = 0.99$ ; 95% CI = 0.05 to 1.94;  $p = 0.039$ ), social support ( $b = 0.5$ ; 95% CI = -0.22 to 1.89;  $p = 0.123$ ), and self-efficacy ( $b = 1.04$ ; 95% CI = -0.16 to 2.26;  $p = 0.089$ ). Intention was negatively associated with distance ( $b = -0.59$ ; 95% CI = -1.49 to 0.31;  $p = 0.202$ ). Adherence to Anti Tuberculosis treatment was positively associated with intention ( $b = 2.1$ ; 95% CI = 1.24 to 2.97;  $p = 0.001$ ).

**Conclusion:** Education, knowledge, behavior, social support self-efficacy are associated with adherence to Anti Tuberculosis treatment.

**Keywords:** attitude, distance, social support, self-efficacy, adherence to Anti Tuberculosis treatment.

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### BACKGROUND

Multidrug Resistant Tuberculosis (MDR TB) is a problem health issue in the world. MDR TB is caused by *Mycobacterium Tuberculosis* which is resistant to two minimum Anti Tuberculosis drug, the first one is rifampicin and isoniazid (WHO, 2014; Ershova *et al.*, 2015). Indonesia's Ministry of Health (2014) reported that there were 6900 MDR TB patients WHO (2015). Indonesia is categorized as High-Burden

Countries for MDR TB case. In 2014, Central Java had 144 of treated-MDR TB patients (Public Health Office of Central Java, 2015). The Public Health Office of Cilacap regency found 11 MDR TB suspects in 2015 and 14 positive patients Of MDR TB (Public Health Office of Cilacap Regency, 2016).

In controlling MDR TB and achieving End TB program with 95%, that is very important to increase the DOTS quality

strategy (Direct Observed Treatment Short-course). However, some obstacles emerge in implementing DOTS program, moreover for the developing country. Those things are less family support, low education level, low supervising supervisee's support in consuming medicine (PMO), the existence of side effect and finance problem. They can cause the MDR TB (Reviono *et al.*, 2014; Bloss *et al.*, 2010).

Social support is a factor causing the MDR TB. Quoted from Barker (2007), Reid (1989) stated that social support has its four characteristics which are instrumental support, informational support, affiliative support and emotional support. These things are basic to approach and do healthy promotion along with TB's patients' prosperity. Therefore, TB patients can do their medical treatment regularly to prevent MDR TB (Keshavjee *et al.*, in WHO, 2014). Several factors that affect TB's treatment regularity are part of Green theory (1992) which is in fourth phase, they are educational and organizational. Three main factors relate toward health behavior, they are predisposing, reinforcing and enabling factors. Both education and knowledge are predisposing factors, for the supporting factor is distance and for the main factor is social support for TB patients consuming OAT regularly (Obat Anti Tuberkulosis).

TB's patients' behavior depends on their own intention. This statement is in line with the Theory of Planned Behavior (TPB). According to the theory, the main determiner of someone's behavior is the intention to behave, by the reason of intention to behave as the nearest antecedent of behavior (Fishbein dan Ajzen's, 2010).

The study applied new formula which was path analysis model. This analysis applied was to know how far the relationship between variables directly or indirectly. Based on the explanation, the researcher

interested to study about the contribution of social support toward the adherence to Tuberculosis treatment in Cilacap regency.

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### **SUBJECT AND METHOD**

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The study methodology was observational design using field research. The study used case control approach. Targeted population was 1,499 and main population was 746. The study implemented fixed disease sampling to choose sample which is basically implemented in case control study (Murti, 2013).

The comparison of case group and control group is 1:2. Case group is TB's Patients with irregular treatment with the total of subjects was 42, meanwhile control group is a group of 86 TB patients by applying regular treatment. The study was carried out in 12 clinics by taking randomly and it also involved the RSUD of Cilacap to complete case group in the study.

Dependent variable is TB's patient treatment regularity. Meanwhile, variable independent is education, knowledge, distance, social support, self-efficacy, behavior and intention for the treatment. The study used questionnaire as an instrument. First, the instrument was tested to test the validity by involving three experts such as linguist, physiologist, and tuberculosis expert.

Then the questionnaire was tested to know the reliability for 30 subjects. In this study, the analysis of testing the instrument used analysis program of IBM SPSS 20 by calculating the correlation item score and Alpha Cronbach. The instrument is indicated good and consistent if the total of correlation item score is  $\geq 0.20$  and Alpha Cronbach score is  $\geq 0.60$ . There were 41 and 51 number significant and reliable questions. The statistical analytic method in this study implemented path analysis and after that it was carried out by using STATA

application 13 and SEM program (Struc-

tural Equation Modeling).

**Table 1. Subjects' characteristic u**

Characteristic	Criteria	Case		Control	
		N	%	N	%
Age	< 20 years	2	4.76	4	4.65
	20 – 35 years	9	21.43	47	54.65
	≥ 35 years	31	73.81	35	40.7
Sex	Male	24	57.14	46	53.49
	Female	18	42.86	40	46.51
Occupation	House Wife and Jobless	15	35.71	28	32.56
	Laborer and farming labor	8	19.05	18	20.93
	Farmer and Fisherman	10	23.81	8	9.3
	Private company and entrepreneur	9	21.43	29	33.72
Education	Civil Servant	0	0	3	3.49
	Primary Education	37	88.1	52	60.47
	Secondary Education	5	11.9	34	39.53
Family Member	< 4	37	88.1	52	60.47
	≥ 4	5	11.9	34	39.53
Treatment	0-2 months	15	35.71	33	38.37
Duration	≥2 - 4 months	27	64.29	53	61.63

### RESULT

The result of this study presented the characteristics of subject study. As it can be seen through the table 1, it showed that

most of the subjects who were >35 years old was 73.81% for case group. While control group who were most of the subjects was 20-35 years old was 54.65%.

**Table 2. Chi-square's test in each variable**

Independent	Dependent	OR	CI 95%		P
			Lower Limit	Lower Limit	
Knowledge	Education	3.94	1.10	14.07	0.035
Knowledge	Behavior	3.73	1.49	9.35	0.005
Education	Behavior	2.19	0.91	5.33	0.081
Behavior	Intention	5.01	2.19	11.43	0.001
Distance	Intention	0.64	0.29	1.39	0.258
Social Support	Intention	5.44	2.26	13.09	0.001
Self-Efficacy	Intention	5.93	2.19	16.04	0.001
Intention	Adherence to Anti Tuberculosis drug	8.22	3.47	19.50	0.001

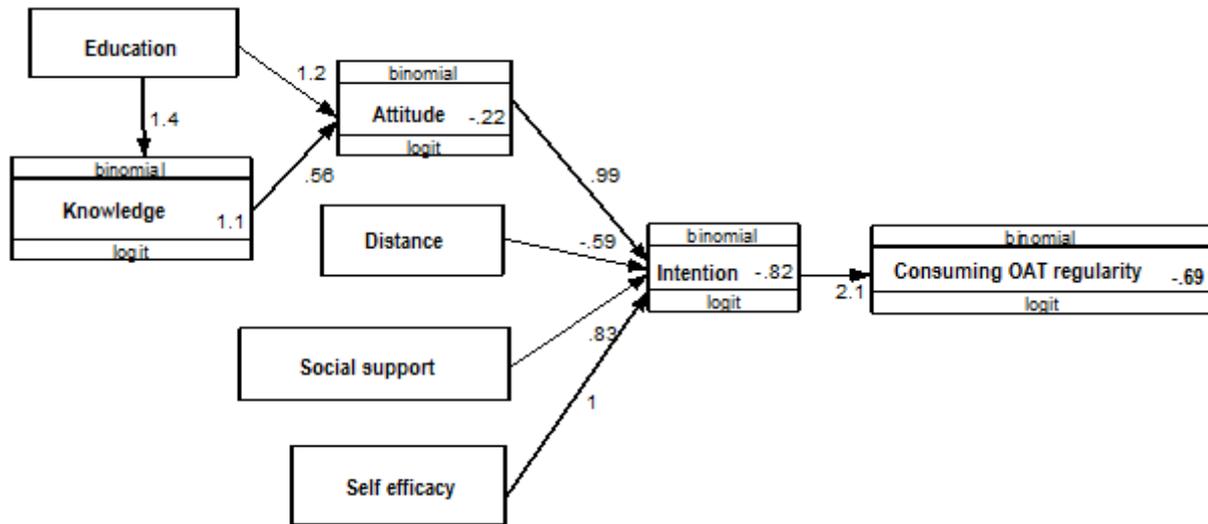
For sex category, the result showed that the subject whom most of them were male was 57.4% for the case group. The control group's result was 53.49% by obtaining 46 male subjects which was bigger than the other group. Most of the respondents did not attend the occupation and they worked as house wife performed 35.71% for case group. The result in the control group was different from the case group which was 33.72% with most of the

subjects worked as employee and entrepreneur. Most of the subject study had primary education or <SMA for both case and control group. The subjects whom the education was <SMA of the case group were 37 or it was around 88.1% and the control group was 52 or around 60.47%.

Most of the tuberculosis patients who have ≤4 of family member were 37 or 88.1% for the case group. The result for the control group was the same as the case

group, the family member who was  $\leq 4$  people obtained bigger number than tuberculosis patients who obtained  $>4$  family member in a family. The last characteristic

was the treatment duration. Most of the tuberculosis patients in both case and control group did the treatment during  $> 2-4$  months.



Picture 1. Structural Model with Estimation

Table 3. The path analysis results of relationship between social supports on the adherence to Tuberculosis treatment in Cilacap regency

Dependent Variable	Independent Variable	Path Coefficient	95% CI		P
			Lower	Upper	
<b>Indirect Effect</b>					
Education	← Education $\geq$ Senior High School	1.4	0.09	2.64	0.035
Behavior	← Education	1.23	0.29	2.16	0.010
	← Knowledge	0.56	-0.35	1.47	0.228
Intention	← Behavior	0.99	0.05	1.94	0.039
	← Distance	-0.59	-1.49	0.31	0.202
	← Social Support	0.83	-0.22	1.89	0.123
	← Self-Efficacy	1.04	-0.16	2.26	0.089
<b>Direct Effect</b>					
Consuming OAT regularity	← Intention	2.1	1.24	2.97	0.001
Log Likelihood =		-271.54			

The multivariate analysis result was obtained from data processing using STATA application 13 and SEM program (Structural Equation Modeling). It is because the data in the form of categorical and framework and it leads to multiple logistic regression path analysis design. The SEM calculating result was described in

table 3. The result of statistic test using path analysis was first the Tuberculosis patients whom the education level were  $\geq$ senior high school had 0.17 unit for the knowledge higher than those who were  $<$ senior high school ( $b=0.17$ ;  $95\% \text{ CI} = 0.02$  to  $0.13$ ;  $p= 0.023$ ).

Tuberculosis patients with the education  $\geq$ senior high school met point on 1.23 score of treatment regularity behavior which was higher than <senior high school ( $b= 1.23$ ; 95%CI =0.29 to 2.16;  $p=0.01$ ). High education tuberculosis patients had higher score of the adherence to treatment behavior which was 0.56 than the tuberculosis patients with low education level ( $b= 0.56$ ; 95% CI= -0.35 to 1.47;  $p= 0.228$ ). Tuberculosis patients with good behavior obtained higher score which was 0.99 unit than those who were having bad habit in adherence to the treatment ( $b=0.99$ ; 95% CI = 0.05 to 1.94;  $p=0.039$ ).

The distance of the patients' house toward unreachable health service ( $\geq 3$  km) had 0.59 unit lower score of treatment regularity than the patients with reachable distance (3 km) ( $b= -0.59$ ; 95% CI= -1.49 to 0.31;  $p= 0.202$ ). Tuberculosis patients with high social support obtained higher score for the treatment regularity which was 0.83 unit than the patients with low social support ( $b= 0.8$ ; 95% CI= -0.22 to 1.89;  $p= 0.123$ ). The tuberculosis patients who had good self-efficacy had higher score which was 1.04 unit of the treatment regularity than the patients with bad self-efficacy ( $b= 1.04$ ; 95% CI= -0.16 to 2.26;  $p=0.089$ ). The patients who had high intention to obtain treatment performed higher score than the patients who had less intention which was 2.1 unit ( $b= 2.1$ ; 95% CI= 1.24 to 2.97;  $p= 0.001$ ).

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## DISCUSSION

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Tuberculosis patients who were  $\geq$ senior high school had higher score for knowledge score on 0.17 than <senior high school. Slavin (2005) stated that formal education level is a base for someone to do something, make it more understanding, or accept and reject something. Formal education level possibly effects different knowledge and

making decision. Anugrah (2007) did a study about adherence of consuming medicine for pulmonary tuberculosis patients. The result of the study showed that the majority of the subjects in the study were having basic education (82.22%). Education level affects knowledge and behavior toward the tuberculosis treatment.

The tuberculosis patients whom they had education  $\geq$ senior high school obtained higher score which was 1.23 unit than those who were  $\geq$ senior high school. The result was different from the result which was conducted by Anugrah (2007). The result of the study which was conducted at Jatibarang clinic was there was significant correlation between education and TB patients' behavior in medication adherence. The statistic result of Chi square showed  $p= 0.527$ .

The tuberculosis patients with high knowledge performed higher score 0.56 unit than those who had low knowledge. The result was in line with the study which was done by Dhewi et al., (2012). It was indicated that there was significance between knowledge and needs of consuming pulmonary TB drugs in BKPM in Pati (RP= 3.857; 95% CI= 1.953 to 7.619;  $p= 0.001$ ) which meant the patients who had low knowledge had chance to not take medication as much as 3.857 times.

The tuberculosis patients who had good behavior performed higher score which was 0.99 unit than those who had lack of treatment regularity. The result of the study was supported by (Dhewi et al., 2012) which showed  $p=0.0001$  ( $p<0.05$ ). It meant that there was a significant relationship between behavior and needs of consuming pulmonary TB drugs in BKPM in Pati (RP= 3.44; 95% CI= 1.82 to 6.53 which meant the patients who had less behavior might have a chance to skip taking medicine as much as 3.44 times. The result was

different from the study conducted by Anugrah (2007) with 45 subject of Jatibarang clinic, Indramayu regency which showed there was no significant correlation between behavior and obedience ( $p= 0.428$ ).

Patients' house distance toward the unreachable healthy service ( $>3\text{km}$ ) obtained lower score than reachable place  $\leq 3$  km which was 0.59 unit. The result was different from the study done by Erawatyningasih *et al.*, (2009) in West Dompu clinic, Woju districts, Dompu regency, NTB province. The result showed that there was significant influence between house distance and healthy service place toward the needs of taking medicine of pulmonary TB patients. Irrelevant study was conducted by Maesaroh (2009) showed that there was no correlation between clinic distance and treatment compliance. It was proved by statistical test ( $OR= 1.429$ ;  $95\%$   $CI= 0.646$  to  $3.159$ ;  $p= 0.495$ ).

The Tuberculosis patients with high social support had higher score than with low social support which was 0.83 unit. The study was done by Rifat *et al.*, (2015) stated that MDR TB patients tended to have incomplete treatment four times. Incomplete treatment was caused by the side effect which was part of information support about drug side effect. Other statistical calculation was DOTS management officer associated with MDR TB incidence with the score ( $OR= 3.8$ ;  $95\%$   $CI= 1.6$  to  $9.5$ ), therefore the better the management of DOTS is the more it decreased the MDR TB risk.

Tuberculosis patients with good self-efficacy performed higher score of treatment regularity which was 1.04 than those who were with less self-efficacy unit than those who had less self-efficacy. Self-efficacy of TB patients was the score of TB's patients regarding their capacity or ability to regulate and administer the regular tuberculosis treatment as a necessary to

reach total recovery Bandura (1977). TB treatment regularity was influenced by control beliefs which meant a belief about factors may encourage or inhibit the TB's patients to obtain regular treatment (Ajzen, 1991).

The Tuberculosis patients who had high intention of taking treatment obtained higher score 2.1 unit than those who were with low intention in treatment regularity. The TB's regularly treatment represents cognitive and conative from TB patients' readiness to carry out the TB's treatment regularly. Regular treatment intention becomes the determiner and disposition of TB patients' behavior to take TB treatment regularly. Regular treatment behavior is based on a willingness factor which involves a consideration to do or not, in its process, the consideration builds TB treatment regularly (Fishbein and Ajzen, 1975).

The study result showed that there was direct correlation between education and knowledge, education and knowledge toward behavior along with intention toward treatment regularity. There were indirect correlation as well between behavior, distance, social support and self-efficacy toward the adherence to consuming OAT by intention. The study limitation was the researcher should be detailed in deciding the adherence to taking drug, the way how the researcher did study was by asking the remaining drug when the TB patients had re-visit. These may be a suggestion for the next to be more detailed in diagnosing of adherence to taking drug .

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