Tuberculosis Prevention Development Family Model Based in Indonesia

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TUBERCULOSIS PREVENTION MODEL DEVELOPMENT FAMILY BASED IN INDONESIA

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Abstract

The progress of TB treatment has been challenged by the emergence of M. Tuberculosis strains that are resistant to OAT (Anti Tuberculosis Drugs), making it difficult to identify the symptoms of tuberculosis that develop in the family. This study aims to determine the effect of Foot Reflection Board (FRB) & booklet about tuberculosis on the treatment of suspected lung tuberculosis in families. The model used was developed from the Health Belief Model through multiple interventions. This type of research is Quasi Experimental with "Pre-test and Post-test design with control group". Data collection techniques are carried out through interview and observation methods. Next using bivariate and univariate analysis and multivariate logistic regression. The population is families that has a history of pulmonary TB in the areas of Sewon_Yogyakarta of Public Health Center, Sibela_Surakarta of Public Health Center, and Kauditan_Manado of Public Health Center. The number of samples was 150 respondents (75 experiments respondents and 75 controls respondents). As a result, multiple interventions influenced the minimization of pulmonary tuberculosis symptoms with a significance value of p=0,000. In conclusion, FRB and booklet about tuberculosis are a combination of appropriate interventions in increasing knowledge and minimizing symptoms of tuberculosis suspects experienced by families, because the higher the family's knowledge about prevention, the benefits of treatment and the dangers of treatment failure, families are increasingly aware of conducting routine treatment programs.

Keyword: *Identification, Prevention, Tuberculosis*

Introduction

Tuberculosis (TB) has once again received special international attention because it is ranked in the 10th highest cause of death in the world in 2016. Therefore tuberculosis is still a top priority in prevention and is one of the goals in Sustainability Development Goals (SDGs) (Dande, P., Samant, P. 2018; Infodatin, 2018). The prevalence of tuberculosis in Indonesia is 297 per 100,000 population. Therefore tuberculosis in Indonesia is one of the top three government programs to overcome. The disease that attacks the lungs is reported to be increasingly resistant to antibiotic drugs (WHO, 2014b) Advances in tuberculosis treatment are challenged by the emergence of M. tuberculosis strains that are resistant to Anti Tuberculosis Drugs (OAT) (Marney, M.W., Metzger, R.P. Hecht, D., Valafar, F. 2018; Saptawati,L. 2012; WHO, 2014a).

Indonesia has a high burden on tuberculosis prevention. Every year around 1,020,000 new cases are found with a mortality rate reaching 100,000 per year or equivalent to 273 people per day or every 3 minutes there is one person who died from tuberculosis. The majority of tuberculosis patients are in the productive age group (15-55 years), so there is a need for commitment and massive efforts in controlling and increasing the awareness of the Indonesian people about the impact and prevention of transmission (Surya, A.2017).

Tuberculosis control in Indonesia has been going on since the Dutch colonial era but is still limited to certain groups. In 1995 the National Tuberculosis Control Program began by implementing a short-term treatment strategy with direct supervision (Directly Observed Treatment Short-course, DOTS), which was carried out at the Public Health Center in stages. In 2000 the DOTS strategy was implemented nationally in all health service facilities especially Public Health Center which were integrated in basic health services. Until 2014, the National Strategy target for tuberculosis control refers to the Ministry of Health's strategic plan to reduce the prevalence of tuberculosis from 235 per 100,000 population to 224 per 100,000 population (RI Ministry of Health, 2014). The need for a strategy in reducing the incidence of tuberculosis, given the still high cases of tuberculosis in every province in Indonesia.

Tuberculosis case finding strategy requires community participation especially families of tuberculosis patients (Tetteh, AK, et al., (2018). A family-based treatment method is needed, meaning that family members, especially those living at home, must be involved in handling patients and finding new cases, which so far has never been done, and tuberculosis drug resistance often occurs if it does not involve the family (Marney, M.W., Metzger, R.P. Hecht, D., Valafar, F. 2018; Sangadji, N.W. & Kusnanto, H. 2017).

Drug-resistant tuberculosis is a condition where M. tuberculosis bacteria can no longer be killed with one or more OAT (Marney, M.W., Metzger, R.P. Hecht, D., Valafar, F. 2018). In 2013 WHO estimated that in Indonesia there were 6,800 new cases of tuberculosis with Multi Drug Resistance (MDR TB) each year. An estimated 2% of new tuberculosis cases and 12% of tuberculosis re-treatment cases are tuberculosis cases diagnosed or treated correctly and correctly (Infodatin, 2018; Nurjana, M.A. 2015; Vera, Rahardjo, S.S., Murti, B. 2017).

The failure of the tuberculosis prevention program was caused by various factors including: inadequate in the preparation of the tuberculosis prevention program, namely commitment in case finding, case management, and health care organizations themselves (Nisa, S.M. & Dyah, Y.P.S. 2017). Patients with tuberculosis who do not recover or do not receive treatment because they have not been found, are a contagious source that threatens the achievement of health status. Tuberculosis, not only serve as a cause to high mortality, but also a precursor to a variety of other fatal diseases such as HIV/AIDS, obstructive pulmonary disease, etc (Dinkes DIY. 2013; Infodatin, 2018).

The discovery of new cases has so far been carried out passively, meaning that patients come to the health service if there are complaints. As long as symptoms are not felt, the patient will not come to the health service, while tuberculosis germs have spread around the patient. An adult tuberculosis sufferer can transmit the backteria quickly to children, parents, adolescents whose behavior is less healthy, such as poor nutrition (whether due to economic or other factors), an environment that is less supportive for a healthy life and the behavior of patients who pay less attention prevention and transmission through air (Fogel, N. 2015; Infodatin, 2018).

The easiest treatment for non-pharmacological tuberculosis by families is reflexology foot massage. The acupressure points found on the soles of the feet will give a reflection of the lungs, such as the results of Rezky's research, R.A. (2015) that, there were significant differences in systolic and diastolic blood pressure before and after performing reflexology massage therapy. Likewise, the study of Ernawati, K., Kardiana, A., Duarsa, A.B.S., Muhammad, F. (2017) that the handling of tuberculosis cases in North Sulawesi is not only pharmacological but also non-pharmacological and health education is deemed necessary to increase knowledge. Knowledge can improve understanding of tuberculosis both suspect and MDR.

Method

This research is a Quasi Experimental study with "Pre-test and Post-test with control group design" on 150 samples taken randomly in 3 (three) locations in Indonesia (Yogyakarta, Surakarta and Manado). The number of samples was 150 divided into 2 groups consisting of experimental groups and control groups. Each study location was taken 50 respondents consisting of experimental groups and control groups. The experimental group was given assistance with foot reflexology training interventions and counseling about the dangers of tuberculosis and giving a booklet about tuberculosis. Whereas the control group was only given counseling about health. The intervention carried out 3 (three) times a month. In the experimental and control groups the pre-test and post-test measurements were carried out, the multivariate logistic regression test. The products of this study are: Foot Reflection Board, booklet, "HKI" registration and publication proceeding International conference.

Result and Discussion

Characteristics of Respondents and Families with Suspect Tuberculosis. Characteristics of respondents and families with suspected tuberculosis are the hallmarks of this study. The following are the characteristics of respondents consisting of age, sex, education and occupation, can be seen in the following table:

Table 1. Characteristic of Respondent

Variable	Category	Exp (n=75)		Control (n=75)		P value
		f	%	f	%	
Age	<40	9	12	18	24	*0,005
	40-60	48	64,0	52	69,3	
	>60	18	24,0	5	6,7	
Gender	Male	48	64,0	53	70,7	*0,384
	Female	27	36,9	22	29,3	
Education	Elementary	13	17,3	12	16,0	
	Midle School	37	49,3	39	52,0	
	High School	13	17,3	21	28,0	*0,008
	Academy	8	10,7	1	1,3	
	Bachelor	4	5,3	2	2,7	
Job	Civil Servant	6	8	3	4	
	Private	8	10,7	8	10,7	
	Entrepreneur	14	18,7	15	20,0	*0,478
	Retirement	4	5,3	5	6,7	
	Laborer	22	29,3	14	18,7	
	Others	21	28,0	30	40,0	

*Level of significant 0.05

Age variables in the experimental group (64.0%) and control (69.3%) were the most in the 40-60 years category. Gender in the male category of the experimental group (64.0%) and control (70.7%). Most education variables in the category of junior high school education both experimental group (43.2%) and control (52.0%). While the most jobs in the experimental group were in the labor category (29.3%) while in the control group (20.0%) were in the entrepreneurial work category.

One family member with suspected tuberculosis has different stories from other families. Some of the stories are a family experiences tuberculosis symptoms, another family checks health at a health service, another family has suffered from tuberculosis before, some of the family taken tuberculosis medicine before, or has ever heard about tuberculosis counseling, and another has ever smoked at home, and also has ever smoked at home using foot reflection board, and some have ever received BCG immunization in infancy. Here are the results of the analysis in the table below:

Table 2 Family Characteristics of Respondents

Variable	Category	Family of Respondent (n=150)		
		f	%	Cumulative %
The family has tuberculosis	ever	81	54	54
	never	69	46	
Check health in health services	ever	42	28	28
	never	108	72	
Suffered from tuberculosis before	ever	18	12	12
	never	132	88	
Take tuberculosis medicine	ever	0	0	0
	never	150	150	
Listen to tuberculosis counseling	ever	9	6,0	6,0
	never	141	94	
Smoke in the house	ever	22	14,7	14,7
	never	128	85,3	
Use Foot Reflection Board	ever	0	0	0
	never	150	100	
immunization of BCG	ever	42	28	28
	never	108	72	

Characteristics of the respondent's family, where there are family members who experience symptoms of tuberculosis (54%), but only the health check (28%) while (72%) never control health in health services. Previous tuberculosis (12%) and (88%) had never been. Based on this amount (100%) have never taken tuberculosis medicine. Families who have never heard counseling about tuberculosis (94%) and only (6%) have heard counseling about tuberculosis. Families never smoke at home (85.3%) and (14.7%) smoke at home. All families have never used the Foot Reflection Board (FRB) (100%). BCG immunization has never been experienced by the family (72%) is the highest number.

a. Use of Foot Reflection Board (FRB) + Booklet + counseling.
Analysis of differences between the experimental groups using FRB + booklet + counseling with booklets alone in the control group. The intervention in the experimental group was using the FRB + booklet and in the control group only using the booklet. The two different interventions in the experimental and control groups turned out to give significant results, as in the following table:

Table 3. Use *FRB, Booklet, Counseling*

Variable	Pre-test (n=150)		Post-test (n-150)		P value
	Mean	SD	Mean	SD	*0,000
Experiment FRB+ Booklet	30,706	1,795	31,690	1,546	
Control Booklet	30,706	1,795	30,733	1,473	

b. Analysis of differences in the number of symptoms of suspect tuberculosis before and after the foot reflection board and pocket books were given to the experimental group.

Table 4. Suspect Tuberculosis Before & After Intervention

Variable	Pre-test (n=150)		Post-test (n-150)		P value
	Mean	SD	Mean	SD	*0,000
Experiment symptoms of suspected tuberculosis	30,706	1,495	31,960	1,546	
Control symptoms of suspected tuberculosis	3,746	0,855	3,933	0,890	

c. Analysis of differences in the number of symptoms of tuberculosis before and after given FRB and booklets in the experimental group.

Table 5. Symptoms of Tuberculosis Before & After Use *FRB + Booklet*

Variable	Pre-test (n=150)	Post-test (n-150)	Mean	SD	Correlation	P value
Symptoms of tuberculosis Before &After use *FRB + Booklet*	4,523	2,773	1,480	0,890	0,574	*0,000

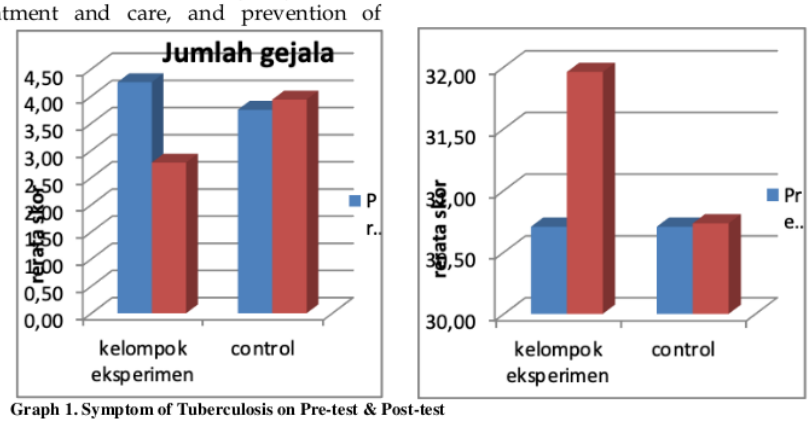
d. Analysis of Family Decisions Using FRB

Table 6. Family Decisions Using FRB

Variable	Pre-test (n=150)	Post-test (n-150)	Exp (b)	S.E	Wald	P value
			9,714	0,281	65,615	*0,000
Ready	14	150				
Not ready	136	0				
Total	150	150				

e. Knowledge

Knowledge is measured based on measuring instruments with 33 items. Valid instruments were adapted from previous studies. The benefit is to measure the respondent's knowledge before and after the intervention, namely by providing a booklet in the form of a booklet on understanding, symptoms, treatment and care, and prevention of pulmonary tuberculosis. Also equipped with the benefits of using foot reflection board which is useful to reduce the symptoms of tuberculosis through the acupressure point on the sole of the foot. Knowledge is analyzed before and after the intervention, as in the following graph:



Graph 1. Symptom of Tuberculosis on Pre-test & Post-test

Discussion

Characteristics of Respondents and Families with Suspect TB. Families living together are Indonesian culture, even though the children have grown up. Age variables in the experimental group (64.0%) and control (69.3%) were the most in the 40-60 years category. In general, each family has more than 2 (two) family members who live in the same house. Age 40-60 years including productive age to be able to do various activities and work outside the home in meeting the needs of life. Towards the age of 60 years there is a decrease in endurance due to enter old age. Usually at this age various diseases can appear with a variety of symptoms, including symptoms of suspected tuberculosis. According to Nurjanah, M.A., (2015) that the case of tuberculosis in Indonesia attacks almost all age groups and can be detrimental to society especially the productive age group. Sufferers can be a burden on the family and affect the family economy. Age characteristics can affect the incidence of pulmonary tuberculosis because the older a person is, the more susceptible to pulmonary tuberculosis. Age factors in the incidence of pulmonary tuberculosis. The risk of getting pulmonary tuberculosis can be said as a normal inverse curve, which is high at first, decreases because over 2 years until adulthood has a good resistance to pulmonary tuberculosis.

Gender in the male category of the experimental group (64.0%) and control (70.7%). The data illustrates categories based on sex more in males than females. Gender can also cause pulmonary TB disease. Where this is due to smoking habits in men which is almost double compared to women. Pulmonary tuberculosis tends to be higher in male sex than women (according to WHO), but at least in a year there are about 1 million women who die from pulmonary TB, it can be concluded that in women more deaths occur due to tuberculosis Lung compared with due to the process of pregnancy and childbirth. In the male sex this disease is higher because of smoking tobacco and drinking alcohol so that it can decrease the body's defense system, making it easier to be exposed to the agents that cause Lung tuberculosis.

Most education variables in the category of junior high school education both experimental group (43.2%) and control (52.0%). While the most jobs in the experimental group were in the labor category (29.3%) while in the control group (20.0%) were in the entrepreneurial work category. Education is related to the level of knowledge. According to Nurjanah, M.A. (2015) that the level of education is related to the incidence of tuberculosis in the productive age. The lower one's education, the greater the possibility / risk for suffering from tuberculosis. This means that education is related to knowledge that will later relate to the search for treatment. The higher a person's education, the better knowledge about tuberculosis, so that control is not transmitted and treatment efforts if infected will also be maximized. According to Damayati, D.S., Susilawaty, A., Maqfirah. (2018), that education about pulmonary tuberculosis is influenced by an educational background that gives a positive influence on healing. The relatively low level of education in patients with pulmonary tuberculosis causes limited information about the symptoms and treatment of pulmonary tuberculosis. Although low education does not guarantee it can cause a lack of public awareness of personal health in this case in the form of prevention of disease problems.

Characteristics of the respondent's family, where there are family members who experience symptoms of TB (54%), but only the health check to the health care center (28%) while (72%) never control health in health services. Previously suffered from TB (12%) and (88%) had never had health control. Based on this amount (100%) have never taken tuberculosis medicine. Lack of public awareness of pulmonary tuberculosis treatment is still very low. Various limitations of the community to carry out control and treatment of tuberculosis based on the results of direct

interviews with families that there is a feeling of shame and fear with a large enough cost if you have to seek treatment for a long time. That is, families with suspected tuberculosis need assistance that starts when diagnosed, the treatment process, to healing and recovery.

Families who have never listened to counseling about tuberculosis (94%) and only (6%) have heard counseling about tuberculosis. Counseling about tuberculosis can increase family knowledge of tuberculosis prevention and can avoid transmission through direct or indirect contact. Families never smoke at home (85.3%) and (14.7%) smoke at home. All families have never used the Foot Reflection Board (FRB) (100%). Family knowledge about tuberculosis must be increased through various means such as providing counseling, distributing booklets, leaflets, posters and other media to increase family understanding of tuberculosis. Various interventions include practicing the use of foot reflection boards to minimize tuberculosis symptoms such as; fever, nausea, vomiting, shortness of breath, dizziness, cough, and so forth.

BCG immunization has never been experienced by the family (72%) is the highest number. Active administration of immunity by BCG immunization during infancy. A history of BCG immunization means that for a lifetime a person who is immunized with BCG will have immunity against tuberculosis. According to Rosandali, F; Azis, R; Suharti, N. (2016), that prevention by immunization or vaccination is an action that results in a person having better endurance, so that he is able to defend himself against disease or the entry of germs from outside. Vaccination against tuberculosis using the Bacillus calmette guerin (BCG) vaccine from the attenuated mycobacterium strain. According to Khaparde, K., et al (2015) this BCG vaccine has been required in 64 countries and recommended in several other countries.

Indonesia has carried out the BCG vaccination since 1973, and now it is recognized that BCG vaccination can at least prevent the occurrence of severe pulmonary tuberculosis in children. Many clinical studies have been conducted to prove the ability of this vaccine is considered limited to ward off tuberculosis. BCG is effective for preventing millier tuberculosis, severe pulmonary tuberculosis, and tuberculosis meningitis in children but not for pulmonary tuberculosis in adults. The immune response is closely related to the body's ability to fight disease. The BCG vaccine obtained during infancy did not provide tuberculosis protection in adulthood at all (Rosandali, F; Azis, R; Suharti, N. 2016).

There were a number of TB symptoms before and after the FRB and booklet were given to the experimental group, where the TB symptoms could be identified through TB suspicious symptoms, namely: 1) in general, the patient had a cough; 2) continuous phlegm for 2-3 weeks or more accompanied by blood; 3) shortness of breath; 4) weak body; 5) decreased appetite; 6) decreased body weight; 7) night sweats even without activities; 8) fever more than a month (Dande, P., Samant, P. 2018; Infodatin, 2018; WHO, 2010). There is a correlation between the number of TB suspicious symptoms and the FRB + booklet. Through reflection training on FRB for approximately 1 (one) month which is done every day, there is a significant decrease in the number of TB suspicious symptoms. According to Wahyuni, S. (2014), the point of reflection in the human body is located at the tip of the surface of the body such as the palms and soles of the feet. The soles of the feet are chosen because the points of reflection are large so they are easily reflected. The point on the sole of the foot resembles the anatomy of the body and the point of reflection on the sole of the foot can relax the foot thereby helping blood circulation back to the heart. Reflection points are nerve points that are related to organs and tissues through the body's meridians (blood vessels, muscles, and nerves).

Knowledge was significantly increased after giving booklets and brief

unseling to families. The higher level of education is one of the factors that influence one's perception to more easily accept new knowledge and the higher a person's education the better his knowledge. According to Bawihu, L.C, Lolo, W. A., Rotinsulu, H. (2017) that, the high level of knowledge has a high level of compliance while the medium level of knowledge has a low level of compliance. In this case, the higher the respondent's knowledge about prevention, the benefits of treatment and the dangers of treatment failure or interruption in taking drugs, the more obedient the respondent to carry out a treatment program and routine visits according to the schedule determined by the health worker. The lower the knowledge, the more disobedient respondents are in the pulmonary tuberculosis treatment program.

Conclusion and Suggestion

The characteristics of families with suspected TB can be identified by age which affects the incidence of pulmonary TB, because the older a person is, the more susceptible to various diseases, especially pulmonary TB. Likewise sex, generally identified a men because smokers are the main cause of pulmonary TB.

The cause of the emergence of TB symptoms in families is very high risk because patients who are identified with TB generally do not complete treatment so that it becomes a source of transmission to families, especially those living in the same house.

Foot reflection board and booklet about TB are a combination of appropriate interventions in increasing knowledge and minimizing symptoms of suspected TB experienced by families, because the higher the family's knowledge about prevention, the benefits of treatment and the dangers of treatment failure or interruption of medication consumption, the family will be more aware in doing routine treatment program.

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