

## DEVELOPMENT WALKER FOOT REFLECTION (WFR) PREVENTING RETURN OF TUBERCULOSIS SYMPTOMS IN INDONESIA

Jenita Doli Tine Donsu<sup>1\*</sup>, Rosa Delima Ekwantini<sup>2</sup>, Tami Eka Lestari<sup>3</sup>

<sup>1</sup>Health Polytecnic of Ministry of Yogyakarta Indonesia

<sup>2</sup>Health Polytecnic of Ministry of Yogyakarta Indonesia

<sup>3</sup>Health Polytecnic of Ministry of Yogyakarta Indonesia

\*Corresponding author: [donsu.tine@gmail.com](mailto:donsu.tine@gmail.com)

### Abstract

*Tuberculosis (TB) patients who take anti-tuberculosis drugs (OAT) tend to experience nausea and vomiting due to digestive disorders, and the TB infection itself causes decreased appetite. Likewise, heart problems that are often experienced due to TB complications such as Cardiac Tuberculosis or Cor Pulmonale Cronicum are complications of the heart that result in respiratory problems. The easiest non-pharmacological treatment for TB for families is reflexology. The acupressure points on the soles of the feet will provide reflection on the lungs, digestion and heart without side effects. The design of this research was a quasi-experiment with a pre post test design, a 2-year multi-year study in the first year carried out in the 3 (three) provinces with the highest TB cases in Indonesia, namely West Java, East Java and Central Java, with 150 respondents. The walking foot reflexology aid, hereinafter named Walker Foot Reflection (WFR), has been created based on human anatomical measurements and the size of an adult's foot and is equipped with four acupressure points. Training using WFR has an effect on reducing the number of symptoms in TB cases.*

**Keywords:** Exercise, complication, screening, Walker Foot Reflection (WFR)

### 1. INTRODUCTION

The emergence of *M. tuberculosis* strains which cause resistance to Anti-Tuberculosis Drugs (OAT) is a challenge for the progress of Tuberculosis treatment. TB is a top priority in prevention and is one of the goals in the Sustainable Development Goals (SDGs). <sup>1,2,3</sup> The prevalence rate for TB in Indonesia is 297 per 100,000 population.<sup>4</sup> The latest data shows a prevalence of 301 cases per 100 thousand population.<sup>5</sup> Therefore, TB in Indonesia is one of three superior government programs to be overcome. This disease that attacks the lungs is reported to be getting worse with antibiotics, with Indonesia having a high burden, where every year around 1,020,000 new cases are found with a death rate reaching 100 thousand per year or the equivalent of 273 people per day or every 3 minutes, one person dies from tuberculosis. It is very scary because the majority of TB patients are of productive age, namely 15-55 years, so massive commitment and efforts are needed to control and increase awareness of the Indonesian people regarding the impact and efforts to prevent transmission.<sup>6</sup>

TB sufferers who are not cured or do not receive treatment because it has not been found, are a source of infection that threatens the achievement of health status. Besides being able to cause high mortality, TB disease can also be a precursor to various other fatal diseases such as HIV/AIDS, pulmonary obstruction, heart disease, digestive tract diseases and so on. TB patients who take OAT tend to experience nausea and digestive disorders, because TB

infection itself causes decreased appetite. Likewise, heart problems that are often experienced due to complications of TB such as Cardiac Tuberculosis or Cor Pulmonale Cronicum are one of the complications of the heart due to respiratory problems.<sup>4,7,8,9</sup>

So far, the discovery of new cases has been passive, meaning sufferers come to health services when they have complaints. As long as the complaint has not been felt, the sufferer will not come to health services, meanwhile TB germs have spread around the sufferer. An adult TB sufferer can spread it quickly to children, parents, teenagers whose lifestyle behavior is less healthy, such as poor nutrition (either due to economic or other factors), an environment that is less supportive of a healthy life and the behavior of the sufferer who pays little attention. prevention and airborne transmission.<sup>4</sup> The easiest non-pharmacological treatment for TB for families is reflexology. The acupressure points on the soles of the feet will provide reflection on the lungs. Erda's research results show that there is a significant difference in systolic and diastolic blood pressure before and after doing foot reflexology massage therapy. Likewise, the results of research by Donsu, et al; regarding the development of health education and foot reflexology massage developed in the current TB treatment model which is very easy for the community to do, without side effects, and without OAT resistance, with greater benefits.<sup>6,10</sup>

The government's next strategy is detection starting from health facilities, tracing targets per village, sub-district to province. In this regard, the Ministry of Health is targeting a reduction in the death rate to 6 per 100 thousand population. This strategy includes 3 (three) things, namely; prevention, detection and therapy.<sup>5</sup> As part of society, we participate in this activity by carrying out case finding outside health facilities and being the spearhead of screening, case finding and non-pharmacological therapy which is younger for the community.<sup>6</sup> Based on the explanation above, treatment of patients is through door to door screening using a TB screening tool that has been used in previous research and treatment via a foot reflexology tool is carried out 3 times a week. After the use of the Foot Reflection Board (FRB) succeeded in reducing the incidence of hypertension and preventing tuberculosis symptoms in previous research, this tool was developed into the Walker Foot Reflection (WFR), which can reduce the incidence of recurrence of TB symptoms such as heart problems, digestive and respiratory problems. This supports the 6th pillar of health transformation in preventing tuberculosis by creating appropriate technology in the health sector.

## 2. METHODOLOGY

This research is a Quasi Experimental research with a Non Equivalent Control Group design followed by a "Prettest and Posttest without Control Group Design" design. Participant samples were taken directly from respondents. The respondent variables were old and new tuberculosis patients who had their health checked at the Community Health Center before and after doing foot reflexology exercises using a walker foot reflection device with the predictor variable being the number of tuberculosis symptoms experienced while taking tuberculosis medication. Data were collected using observation sheets and analyzed using the T-test. on SPSS version 21 (confidence level 0.95%).

### 3. RESULTS and Discussion

#### 3.1 Characteristics of Respondents and Families with Suspected TB

quickly infect other family members, then these symptoms develop and affect the respiratory, digestive and heart systems. However, people are not yet fully aware that these symptoms will have a big impact on their health. When he came to the health service, his TB symptoms had gotten worse and the doctor diagnosed him with suspected TB. Hearing the word TB creates feelings of shame and fear about coming for further treatment. The culture is embarrassed to be diagnosed with TB but is afraid when symptoms appear such as nausea, vomiting, fever, night sweats, and even coughing up blood. Based on this number (100%) have never taken TB medication. The lack of public awareness of pulmonary TB treatment is still very low. There are various limitations to the community in controlling and treating TB disease based on the results of direct interviews with families, showing that they feel embarrassed and afraid of the large costs if they have to seek treatment for a long period of time. This means that families with suspected TB need assistance starting from the time of diagnosis, through the treatment process, through to healing and recovery.<sup>5, 8, 11</sup>

Families who had never listened to counseling about TB (90%) and only (10%) had ever listened to counseling about TB. This means that the family has not been exposed to education about TB. Counseling about TB can increase family knowledge regarding TB prevention so that by knowing about TB prevention, families can avoid transmission through direct or indirect contact.<sup>5</sup> The largest number of families have smoked in the house (52.7%). This means that families do not understand the consequences of cigarette smoke. All families had never used (WFR) Walker Foot Reflection (100%). Family knowledge about TB must be increased through various means, such as providing education, distributing booklets, leaflets, posters and other media to increase family understanding about TB. Various interventions including non-pharmacological interventions such as foot reflexology using WFR to minimize the symptoms of TB that appear, such as; fever, nausea, vomiting, shortness of breath, dizziness, coughing, and so on. Transmission of TB germs can occur anywhere and at any time, even more quickly at home to family members because there is frequent contact and interaction. Transmission can also occur in conditions where the house lacks ventilation and does not receive sunlight so that germs breed more easily in damp places.<sup>5,8</sup> Smoking behavior in the house is also one of the consequences of ignorance which can be imitated by other family members without realizing it. become a habit that supports passive and active smoking behavior so that everyone experiences negative impacts.<sup>5</sup>

The family has never experienced BCG immunization (68%), which is the highest number in this category. Providing active immunity is by means of BCG immunization during infancy. A history of BCG immunization means that throughout life a person who receives BCG immunization will have immunity against tuberculosis germs. Prevention by immunization or vaccination is an invasive action that results in a person having better body resistance, so that they are able to defend themselves against disease or the entry of germs from outside. Vaccination against tuberculosis uses the *Bacillus calmette guerin* (BCG) vaccine from a weakened mycobacterium strain. The BCG vaccine is mandatory in 64 countries and recommended in several other countries.<sup>5,8,11,14</sup>

Indonesia has been implementing BCG vaccination since 1973, and it is now recognized that BCG vaccination can at least prevent the occurrence of severe pulmonary TB in children. Many clinical studies have been carried out to prove the limited ability of this vaccine to ward off tuberculosis. BCG is effective for preventing milder tuberculosis, severe pulmonary TB, and TB meningitis in children but not

pulmonary TB in adults. The immune response is closely related to the body's ability to fight disease. The BCG vaccine received as a baby apparently does not provide TB protection at all as an adult.<sup>6</sup>

### 3.2 Use of Walker Foot Reflection (WFR)

3.1.1 Analysis of differences between experimental group-1 using WFR training and experimental group-2 using WFR & booklet.

3.1.2 Intervention in experimental group-1 and using WFR and in experimental group-2 using WFR+booklet. The two different interventions in the experimental-1 and experimental-2 control groups turned out to provide significant results, as in the following table:

**Table 3 Use of WFR and Booklets**

Variable	Pre-test (n=150)		Post-test (n-150)		P value *0,000
	Mean	SD	Mean	SD	
<b>Eksperimen1-1 WFR</b>	30,705	1,796	31,691	1,545	
<b>Eksperimen2-2 WFR+Booklet</b>	30,705	1,796	30,734	1,475	

3.1.3 Analysis of differences in the number of TB suspect symptoms before and after being given WFR and booklets in experimental group-1 and experimental group-2

**Table 4 Number of TB Suspects Before & After Intervention**

Variable	Pre-test (n=150)		Post-test (n-150)		P value *0,000
	Mean	SD	Mean	SD	
<b>Eksperiment-1 Symptom of Suspected TB</b>	30,705	1,496	31,960	1,546	
<b>Eksperiment-2 Symptom of Suspected TB</b>	3,745	0,856	3,9341	0,891	

There are a number of TB symptoms before and after being given WFR and booklets, where the TB symptoms can be recognized through the symptoms of suspected TB, namely: 1) in general the patient experiences a cough; 2) persistent 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) sweating at night even without activity; 8) fever for more than a month.<sup>6</sup> There is a correlation between the number of symptoms suspected of TB and WFR+booklet. Reflection training on the FRB for approximately 1 (one) month which was carried out three (three) times, resulted in a significant reduction in the number of symptoms suspected of TB. Reflexology points in the human body are located at peripheral nerve endings such as the palms of the hands and soles of the feet. The soles of the feet were chosen because the reflection point is wider so it is easy to reflect. The points on the soles of the feet are located to resemble the anatomy of the body and the reflex points on the soles of the feet can relax the feet thereby helping blood circulation return to the heart. Reflexology points are nerve points that are

connected to the body's organs and tissues through the body's meridian points (blood vessels, muscles and nerves).<sup>15,17</sup>

### 3.1.4 Family Decision Analysis Using WFR

Table 5 Family Decisions Using WFR

Variable	Pre-test (n=150)	Post-test (n-150)	Exp (b)	S. E	Wald	p value
			9,714	0,281	65,61 5	*0,000
Available	14	150				
Not Available	136	0				
Total	150	150				

Knowledge significantly increased after giving booklets and brief counseling to families. The higher the level of education is one of the factors that influences a person's perception to accept new knowledge more easily and the higher a person's education, the better their knowledge.<sup>6,11</sup> High knowledge has a high level of compliance, while medium level of knowledge has a low level of compliance.<sup>15</sup> 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 medication, the more compliant the respondent will be in carrying out treatment programs and routine visits according to the schedule determined by health workers. The lower the knowledge, the more non-compliant the respondent is in the pulmonary tuberculosis treatment program.<sup>16,17,18,19</sup>

## 4. CONCLUSIONS

- 4.1 The walking foot reflexology aid, hereinafter named Walker Foot Reflection (WFR), has been created based on the size of human anatomy and the size of an adult's foot and is equipped with four acupressure points, which have an effect on tuberculosis symptoms that do not appear while taking tuberculosis medication.
- 4.2 Trials have been carried out on the use of the WFR device in cases of suspected tuberculosis and the majority have found comfort in using the device.
- 4.3 Most families with suspected symptoms of tuberculosis can benefit from understanding more about preventing tuberculosis symptoms and maintaining family health through booklets.

## 5. REFERENCES

1. Holicka, Y., Tagliani, E., Cirillo, D.M., Nikolayevskyy, V. (2022). Utility of the Whole Genome Sequencing based methodologies in routine European tuberculosis reference laboratory network setting. DOI: <https://doi.org/10.1016/j.tube.2022.102185>. *Journal Tuberculosis*. Vol. 134, p:1-4
2. Andr  es M, et al. (2019). Molecular and genomic typing for tuberculosis surveillance: a survey study in 26 European countries. *PLoS One* 2019;14(3): e0210080.
3. World Health Organization. (2021). Global tuberculosis report 2021. Geneva: World Health Organization; Licence: CC BY-NC-SA 3.0 IGO.
4. Infodatin. 2018. *Tuberkulosis*. Kementerian Kesehatan RI, Pusat Data dan Informasi, Jakarta; Rasuna Said.
5. Widyawati, (2021). Biro Komunikasi dan Pelayanan Masyarakat, 2021. Hotline Halo Kemenkes melalui nomor hotline 1500-567, SMS 081281562620, faksimili (021) 5223002, 52921669, dan alamat email kontak@kemkes.go.id (D2)

6. Donsu, JDT., Harmilah, Ratnawati, A., Adriani, RB., Agussalim, (2021). Tuberculosis Prevention Development Family Model Based in Indonesia. *Journal of Drug and Alcohol Research*. Vol. 10, 1-5
7. Mbuagbaw, L. Guglielmetti, L., Hewison, C., Bakare, N., Bastard, M., Caumes, E. (2019) Outcome of Bedaquiline Treatment in Patients with Multidrug-Resistant Tuberculosis. *Emerging Infectious Diseases*, <https://doi.org/10.3201/eid2505.181823>, 5, 936-943.
8. Jindal, S.K. (2022). Is pulmonary tuberculosis a true risk factor for chronic obstructive pulmonary disease. *Indian Journal of Tuberculosis*, Vol. 69, (2); 131-133.
9. Kosambyi, J.K., Vadgama, P., Samudyata, V.C., Rathod, D., Buch, R., Damor, R. (2022). Active case finding of pulmonary tuberculosis and HIV infection among prisoners of South Gujarat: A cross sectional study. *Indian Journal of Tuberculosis*. Vol. 69 (2); 213-219.
10. Erda, R., Tamara, F., Yona, T., Yunasp, D. (2020). The effect of foot reflection massage on hypertension in elderly of Batam City. *Indonesian Journal of GlobalHealth Research*, Vol. 2, (4), pp.343-350
11. Tagliani E, et al. (2021). Use of a whole genome sequencing-based approach for *Mycobacterium tuberculosis* surveillance in Europe in 2017-2019: an ECDC pilot study. *Euro Respir Journal*. Vol. 57(1).
12. Nikolayevskyy V, et al. (2021). Impact of the COVID-19 pandemic on tuberculosis laboratory services in Europe. *Euro Respir Journal*. 2021;57(1).
13. Chen, G., Guo, L., Fang, M., Zheng, H., Xie, S., Wang, Y., Tong, Y., Ma, X., Li, R., (2022). The characteristics of clinical laboratory indicators in anticardiolipin antibody positive cerebral infarction patients, *International Immunopharmacology*, Vol. 102. 1-8
14. Anniwaer, J.M.Z., Liu, K.D., Xue, A. Maimaiti, A., Xiamidixiding, (2019). Homocysteine might increase the risk of recurrence in patients presenting with primary cerebral infarction, *International Journal Neurosci*. Vol. 129 (7). 650-659.
15. Sharifi N, Bahri N. (2019). The effect of foot reflexology on the severity of labor pain: a systematic review study. *Iran J Obstet Gynecol Infertil*. 22(9):85–93.
16. Akköz, Ç.S, Incedal İ. (2020). The effect of reflexology on labor pain, anxiety, labor duration, and birth satisfaction in primiparous pregnant women: a randomized controlled trial. *Health Care Women Int*. 2020:1–16.
17. Sharifi N, Bahri N, Talasaz FH, Azizi H, Nezami H. (2020). The effect of foot reflexology in the fourth stage of labor on postpartum hemorrhage and after pain: a randomized controlled trial protocol. *Adv Integr Med*.
18. Fernandes, L., Norvekar, A., Lawande. (2022). Efficacy of smoking cessation intervention delivered through mobile tele-counseling among smokers with tuberculosis in a revised National Tuberculosis Control Program. *Indian Journal of Tuberculosis*. Vol. 69, (2); 207-212.
19. Althomsons, SP., Winglee, K., Heilig, C.M., Talarico, S., Silk, B., Wortham, J., Hill, A.N., Navin, T.R., (2022). Using Machine Learning Techniques and National Tuberculosis Surveillance Data to Predict Excess Growth in Genotyped Tuberculosis Clusters. *American Journal of Epidemiology*, Vol. 191, (11);1936-1943, <https://DOI.Org/10.1093/aje/kwac117>