

# Association between DOTS program and the outcome of previous therapy in MDR-TB patients: a case study in Tasikmalaya district, West Java, Indonesia

Mira Miratul Jannah<sup>1\*</sup>, Ivan S. Pradipta<sup>1</sup>, Prayudi Santoso<sup>2</sup>, Irma M. Puspitasari<sup>1,3</sup>

<sup>1</sup> Department of Pharmacology and Clinical Pharmacy, Faculty of Pharmacy, Universitas Padjadjaran, Jln. Bandung Sumedang KM. 21, Jatinangor 45363. <sup>2</sup> Dr. Hasan Sadikin Hospital, Bandung Indonesia. <sup>3</sup> Center of Excellence in Higher Education for Pharmaceutical Care Innovation, Universitas Padjadjaran, Indonesia.

**Correspondence:** Mira Miratul Jannah, Department of Pharmacology and Clinical Pharmacy, Faculty of Pharmacy, Universitas Padjadjaran, Jln. Bandung Sumedang KM. 21, Jatinangor 45363. E-mail: miratuljannah@gmail.com

## ABSTRACT

**Background:** Multi-Drug Resistant Tuberculosis (MDR-TB) had been the major health problem in Indonesia. The Directly Observed Treatment Shortcourse (DOTS) is the internationally recommended strategy for TB control that has been recognized as a highly efficient and cost-effective strategy. Tasikmalaya district is one of the districts in West Java with a high prevalence of TB. The aim of this study was to determine the association between DOTS and the failure of previous therapies in MDR-TB patients from Tasikmalaya district. **Methods:** This study was a preliminary study in analyzing risk factors of MDR-TB in West Java. The patient data was obtained from medical records in January 2015-March 2018 from major TB referral hospitals. All subjects included in this study were adult patients confirmed with MDR-TB with GeneXpert test from Tasikmalaya district and had complete data. Chi-square analysis was performed to determine the association. **Results:** The total number of subjects included in this study was 31 patients comprised of 19 male (61.3%) and 12 female (38.7%). Twenty subjects (64.5%) received their previous treatment in the DOTS program, and 11 subjects (35.5%) received their treatment in a non-DOTS program. The proportion of outcome (failure and non-failure) of previous therapy was 74.2% to 25.8% ; respectively. The result revealed that the association between the DOTS program and the outcome of previous therapy in MDR-TB was not significant ( $P=0.251$ ). **Conclusion:** Although this study had limitations, it showed that there was no association between the DOTS program and the outcome of previous therapy in MDR-TB patients in the Tasikmalaya district.

**Keywords:** DOTS, MDR-TB, Association, Tasikmalaya district.

## Introduction

Cases of Multi Drug Resistant Tuberculosis (MDR-TB) have increased in recent years, as Tuberculosis (TB) has remained a global major health problem. According to the global data by the World Health Organization (WHO), there were 10.4 million new TB cases in 2015 included as one of the 10 most terminal diseases. At the same time, 480.000 patients of MDR-

TB were reported, with most cases and death occurring in Asia <sup>[1]</sup>

Indonesia is one of the countries with high TB burden. There were 324.549 new TB cases in 2014, with 1752 new MDR-TB cases. There was a rapid increase of a new case number, particularly MDR-TB cases: the number of cases had increased to 1850 patients in the second trimester of 2015 <sup>[2]</sup>.

Adiagnose of MDR-TB is confirmed through a bacterial resistant check using *GeneXpert*. Those who meet the suspect criteria are recommended to undergo the test. Suspect criteria for MDR-TB is mostly described as a subject who had a previous therapy on TB with first or second line TB agents in the treatment. The other criteria were symptomatic, household contacts, and HIV positive. Previous treatments of TB have been considered as major suspects of MDR-TB criteria. There were two type of Previous treatment of TB, namely DOTS and non-DOTS program <sup>[3]</sup>.

## Access this article online

Website: [www.japer.in](http://www.japer.in)

E-ISSN: 2249-3379

**How to cite this article:** Mira Miratul Jannah, Ivan S. Pradipta, Prayudi Santoso, Irma M. Puspitasari. Association between DOTS program and the outcome of previous therapy in MDR-TB patients: a case study in Tasikmalaya district, West Java, Indonesia. *J Adv Pharm Edu Res* 2019;9(1):69-71. Source of Support: Nil, Conflict of Interest: None declared.

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-Non Commercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

The government of Indonesia has set the Directly Observed Treatment Shortcourse as a major strategy to control TB. DOTS is the internationally recommended strategy for TB control that has been recognized as a highly efficient and cost-effective strategy. DOTS mainly consists of five strategies including political commitment, case findings, standardized therapy, the management and the availability of effective anti-tuberculosis agents, and finally a monitoring, documentation and reporting system which support the program [4]. Although DOTS had been a government program, there were still some private practitioners who treated their TB patients out of DOTS.

Tasikmalaya is one of the districts in West Java with a high prevalence of MDR-TB. Its public health office recorded 37 MDR-TB cases between 2015-2017. Therefore, this study aimed to determine the association between DOTS and the failure of previous therapy in MDR-TB patients from the Tasikmalaya district.

## Methods

### Subjects

Subjects included in this study were all adult patients from Tasikmalaya, confirmed MDR-TB with GeneXpert test, had a history of previous treatment, and were registered from January 2015 to March 2018. Subjects with incomplete data were excluded from this study. The patients' clinical data including previous treatments (DOTS or non-DOTS) were collected from their medical records. The subjects were divided into two groups: failure and non-failure treatment groups. The criteria of the failure group in this study included failed, default and undefined outcome on previous treatment. Non-failure group criteria included healed and complete outcome on previous treatment.

### Data analysis

The data was analyzed using SPSS 15.0 software for Windows. Chi-square analysis was performed to determine the association between the DOTS program and the outcome of the previous therapy, and  $P < 0.05$  was considered to indicate a statistically significant difference.

### Ethics approval

Ethics approval for this study was obtained from the ethics committee of Dr. Hasan Sadikin Hospital, Bandung, West Java, Indonesia.

## Results

### Patient characteristic

Table 1 presents the characteristics of the patients of this study. Thirty-one confirmed MDR-TB patients from the Tasikmalaya district were included in this study. Sixteen (51.61%) subjects were at their productive ages (30-45 years), seven patients (22.58%) were below 30 years old, and the rest (25.81%) were above 45 years old. Most subjects (61.29%) were male and

married (83.87%). Twenty subjects (64.50%) had DOTS program on previous treatment, and 23 subjects (74.20%) had failure outcomes from previous treatments.

Table 1. Patient Characteristics

Characteristics		N	(%)
Age	< 30	7	(22.58)
	30 – 45	16	(51.61)
	> 40	8	(25.81)
Gender	Male	19	(61.29)
	Female	12	(38.71)
Marriage	Married	26	(83.87)
	Not married	5	(16.13)
Type of previous treatment	DOTS	20	(64.50)
	Non-DOTS	11	(35.50)
Outcome of previous treatment	Failure	23	(74.20)
	Non-failure	8	(25.80)

### The Association between DOTS program and the outcome of previous therapy in MDR-TB patients

Table 2 shows the cross-tabulation of patients who had DOTS and non-DOTS in their previous treatments. The association between DOTS program in the previous treatment and the outcome of their previous therapy in MDR-TB patients in the Tasikmalaya district was analyzed by performing chi-square analysis to find whether DOTS program influenced the outcome of therapy. The result revealed that there was no association between the DOTS program and the outcome of the previous therapy in MDR-TB ( $P=0.251$ ).

Table 2. The cross-tabulation of patients who had DOTS and non-DOTS on previous treatment

	DOTS	Non DOTS	Chi square p value
Failure	13	10	0.251
Non-failure	7	1	

## Discussion

Although this was a preliminary study and had limitations in clinical data, the study demonstrated no association between DOTS program and the outcome of previous therapy in MDR-TB ( $P=0.251$ ). The results indicated that the DOTS program in previous treatment did not influence the outcome of therapy in MDR-TB patients in the Tasikmalaya district, West Java, Indonesia. The result was expected to show a significant association between those two variables, since DOTS has been recognized as a highly efficient and cost-effective strategy for TB control, and it has been internationally recommended strategy.

The result may describe the real condition about TB treatment programs in Tasikmalaya or West Java in general. A previous survey in China by Zhao et al. found that ineffective DOTS

program would increase the risk factor of MDR-TB. It also revealed other factors that corresponded to MDR-TB such as the lack of treatment and the availability of anti TB agents<sup>[5]</sup>. In Indonesia, Aderita found that there was an association between DOTS and the risk of MDR-TB although it was not statistically significant<sup>[1]</sup>.

Previous treatment on TB was a definite risk factor for MDR-TB<sup>[6]</sup>. Many studies have shown that subjects with a history of previous treatment on TB had a bigger possibility to have MDR-TB<sup>[7-12]</sup>. The failure of previous treatment has also been known as a MDR-TB risk factor<sup>[5]</sup>. All subjects in this preliminary study had a history of previous treatment, but there was no association between DOTS program and the outcomes of previous therapy.

However, the results of this study could not be compared since it was inhibited with limitations, including the facts that the data sampling was based only on the medical records, and the case-control method was not employed. The finding had to be confirmed with a further investigation about other factors that correspond to therapy outcomes. There is a specific need to investigate how policymakers regulate the DOTS programs and how the public health centers serve the TB patients directly.

## Conclusion

Although inhibited with limitations, this preliminary study showed that there was no association between DOTS program and the outcome of previous therapy in MDR-TB patients in the Tasikmalaya district, West Java, Indonesia. Further investigation should be conducted to confirm the current results.

## Acknowledgment

The authors would like to thank all members of the TB-Team at Dr. Hasan Sadikin Hospital, particularly the DOTS clinic and TB-MDR clinic's staff.

## Conflict of interests

The authors had no conflict of interests to declare.

## Funding statement

This article's research was supported by Ministry of Research, Technology and Higher Education. The article's publication was supported by the United States Agency for International Development (USAID) through the Sustainable Higher Education Research Alliance (SHERA) Program for Universitas Indonesia's Scientific Modeling, Application, Research and Training for City-centered Innovation and Technology (SMART CITY) Project, Grant #AID-497-A-1600004, Sub Grant #IIE-00000078-UI-1.

## References

1. Aderita NI, Murti BandSuryani N. Risk Factors Affecting Multi-Drug Resistant Tuberculosis in

- Surakarta and Wonogiri, Central Java, Indonesia *Journal of Health Promotion and Behavior*. 1(2):88-101.(2016)
2. Ahmad AM, Akhtar S, Hasan R, Khan JA, Hussain SFandRizvi N. Risk factors for multidrug-resistant tuberculosis in urban Pakistan: A multicenter case-control study. *international journal of mycobacteriology*. 1:137-42.(2012)
3. Chen S, Huai P, Wang X, Zhong J, Wang X, Wang K, et al. Risk factors for multidrug resistance among previously treated patients with tuberculosis in eastern China: a case-control study. *Int Journal of Infectious Diseases*. 17:e1116-e20.(2013)
4. Gomes M, Correia A, Mendonça DandDuarte R. Risk Factors for Drug-Resistant Tuberculosis *Journal of Tuberculosis Research*. 2:111-8.(2014).
5. Zhao Y, Xu S, Wang L, Chin DP, Wang S, Jiang G, et al. National Survey of Drug-Resistant Tuberculosis in China *N Engl J Med* 366:2161-70.(2012).
6. Mulisa G, Workneh T, Hordofa N, Suaudi M, Abebe GandJarso G. Multidrug-resistant Mycobacterium tuberculosis and associated risk factors in Oromia Region of Ethiopia. *Int Journal of Infectious Diseases*. 39:57-61.(2014).
7. Kemenkes, A. National Action Plan: Programmatic Management of Drug Resistance Tuberculosis Pengendalian Tuberkulosis Indonesia: 2011-2014. Indonesian Ministry of Health. (2011).
8. Pusdatin. Infodatin Tuberculosis, Find Care Until Healed. Indonesian Health Ministry. (2016)
9. Shariff NM, Shah SAandKamaludin F. Previous treatment, sputum-smear nonconversion, and suburban living: The risk factors of multidrugresistant tuberculosis among Malaysians. *Int Journal of mycobacteriology*. 5:51-8.(2016)
10. Skrahina A, Hurevich H, Zalutskaya A, Sahalchyk E, Astrauko A, Hoffner S, et al. Multidrug-resistant tuberculosis in Belarus: the size of the problem and associated risk factors *Bull World Health Organ* 91:36-45.(2013).
11. WHO. WHO | Global tuberculosis report 2016. 2015. Available from: [http://www.who.int/tb/publications/global\\_report/en/\(2017\)](http://www.who.int/tb/publications/global_report/en/(2017))
12. Workicho A, Kassahun Wand Alemseged F. Risk factors for multidrug-resistant tuberculosis among tuberculosis patients: a case-control study. *Infection and Drug Resistance*. 10:91-6. (2017).