■ 37

Impact of Health Education on Knowledge and Awareness of Multidrug-Resistant Tuberculosis in Banyumas Regency, Indonesia

Devi Octaviana, Siwi Pramatama Mars Wijayanti*, Sri Nurlaela, Kuswanto
Public Health Department, Faculty of Health Sciences, Jenderal Soedirman University

*Corresponding author, e-mail: siwimars@gmail.com

Abstract

Background: The increased case of multidrug-resistant tuberculosis (MDR-TB) in the community required more prevention efforts to reduce the cases. Lack of knowledge and awareness in the community could be one of the causes of this problem. The study aimed are to analyse the effectiveness of health education to increase knowledge and awareness of people to MDR-TB. **Methods:** A quasi-experiment study with one-group pretest-and posttest design was used in this study. 32 respondents were included in this study with exclusion and inclusion criteria. Intervention carried out in the form of counselling to respondent for 1.5 hours with additional methods such as leaflets, modules and posters. **Results:** This study showen that health education could improve knowledge (5.45%) and awareness (3.59%) of participants about MDR-TB. Based on bivariate analysis, it is showed that there were no significant differences in knowledge of respondents pre and post-intervention however, there were significant differences in awareness of respondent. **Conclusion:** This study recommended the implementation of health education more intensively to the community about MDR-TB. The application of various media in health education was also important to improve transfer knowledge to the community. Improvement of knowledge and awareness of people about MDR-TB was a crucial aspect to conduct effective prevention effort of this disease.

Keywords: tuberculosis; multi-drug; resistant

1. Introduction

Tuberculosis (TB) is an airborne disease which is still become an important global health problem. This disease is caused by *Mycobacterium tuberculosis*[1]. Globally, the incident cases which including new and relapse cases reached 10.2 million, with a number of death was 1.3 million in 2015[2]. Transmision of this disease is spread by droplet from one person to another when cough, sneeze or speak. Usually, TB affects the lung, but could also affect other parts such as brain, intestines and the spine[3]. Indonesia is one of the 22 countries with the highest TB burdens in the world, with an estimated 1.017.378 new active TB cases in 2015, including multidrug-resistant the TB. The economic burden caused by TB problem reached approximately US$6.9 billion[4].

Tuberculosis treatment usually carried out by taking several drugs for 6 to 9 months. This treatment is aimed to cure and reduce TB transmission. Since the early 1990s, World Health Organization (WHO) has recommended the adoption of the directly observed treatment short course (DOTS) strategy[5]. The common problem of TB treatment is non-compliance of taking medication, which could be because TB treatment required a long time of period. A case of failure treatment of drop-out occured in many areas of Indonesia. Multi-

drug resistant TB (MDR-TB) occurred due to the susceptibility of *M. tuberculosis* to first and second line drugs used in the treatment of this disease. Patients categorized as MDR-TB when they resistant to both isoniazid and rifampicin[6]. Treatment for MDR-TB patients required the drug regimens for 18-24 months, much longer than regular TB[7]. This also could affect more problem, since MDR-TB patients could spread resistant bacteria to other people. Drug susceptibility testing is an important to step before the TB treatment however, this facility is still not available in several areas[8].

The increased case of MDR-TB need more prevention effort to minimize the problem. Poor knowledge and awareness of the community could be the cause of this problem. In Indonesia, local health officer facing difficulties to reach such a large population to provide health education. MDR-TB in Indonesia reached 32,000 cases in 2017 and this needs hard effort to be solved. Health education could be one of the useful and important way to increase the knowledge and awareness of people. Many people still lack of information regarding TB, MDR-TB and its consequences. The aims of this study are to find out the effectivity health education to increase knowledge and awareness of the community about MDR-TB.

2. Method

This is quasi-experiment with one-group pretest-and posttest design, involving 32 of respondents. This study carried out in Banten, Sumbang Sub District, Banyumas Regency, Central Java Indonesia.The forms of health education interventions that are carried out include a transfer of knowledge, giving media information by counselling accompanied by leaflets, modules and posters. Knowledge transfer was conducted by giving information on the MDR-TB disease, treatment and prevention. Measurement of knowledge and awareness of respondents was carried out before and after the intervention through pre and post-test. Respondents were given a pre-test for 30 minutes, then continued with intervention for 1.5 hours. Data collection on knowledge and awareness before and after the intervention are then processed and analyzed. Univariate analysis was carried out to describe the characteristics in participants, knowledge, attitudes/awareness before and after the intervention. The differences of knowledge and awareness before and after the intervention also determined. Bivariate analysis was conducted by the Wilcoxon test to determine whether there were differences in the average score of knowledge and awareness before and after the intervention.

3. Results and Discussion
3.1 Results

Most of the respondents in this study were 36-45 years old and all of them were female. 56.2% of respondents only finished basic education, and 77.14% of respondent were housewives. In order to find out the effectiveness of health education, we collected data of knowledge and awareness of respondents before and after the intervention. Explanation of knowledge score of respondents can be seen in Table 1.

Table 1. Knowledge Score of Respondents Before and After the Intervention

Knowledge Level	Lowest value	Highest value	Mean
Pre Test	17	30	24.03
Post Test	15	30	25.34

Information about MDR-TB in the interventions covered aetiology, transmission, a definition of MDR-TB and treatments. Based on Table 1, there was an increase of mean of knowledge as a amount of 5.45%. Detail of each question of knowledge can be seen in Table 2 and Table 3 .

Table 2. Univariate Analysis of Knowledge Before and After the Interventions about Definition, Symptoms, Risk Factor and Transmission, and Preventio

No.	Knowledge	Pre-Test				Post-Test				Difference (%)
		True		False		True		False		
		n	(%)	n	(%)	n	(%)	n	(%)	
Definition										
1.	Tuberculosis is communicable disease	31	96.9	1	3.1	31	96.9	1	3.1	0
2.	MDR TB is caused by bacteria which resistant to anti-tuberculosis drug	30	93.8	2	6.2	31	96.9	1	3.1	+3.1
Symptoms										
3.	MDR-TB had almost similar symptoms with regular TB	25	78.1	7	21.9	31	96.9	1	3.1	+18.8
4.	Anemia is one of the symptoms of pulmonary TB*	21	65.6	11	34.4	24	75	8	25	+9.4
Risk Factors and Transmission										
5.	A person can be developed to MDR TB due to incomplete tuberculosis treatment	29	90.6	3	9.4	31	96.9	1	3.1	+6.2
6.	MDR TB is only experienced by TB patients whose treatment is not complete*	11	34.4	21	65.6	5	15.6	27	84.4	-18.8
7.	People who have never experienced TB cannot be infected with MDR-TB*	17	53.1	15	46.9	18	56.2	14	43.8	+3.1
8.	MDR TB can be transmitted by sputum spills from MDR TB patients	30	93.8	2	6.2	32	100	0	0	+6.2
9.	Anyone can immediately suffer from MDR TB if had direct contact with MDR TB patients	27	84.4	5	15.6	21	65.6	11	34.4	-18.8
Prevention										
10.	Effort to prevent the transmission of MDR-TB are early detection and treatment to patients with sensitive TB drugs.	32	100	0	0	30	93.8	2	6.2	-6.2
11.	MDR-TB also can be prevented by early detection and treatment of obstructive/resistant tuberculosis patients	26	81.2	6	18.8	30	93.8	2	6.2	+12.5
12.	Transmission of MDR TB can be prevented by using a regular mask	24	75	8	25	29	90.6	3	9.4	+15.6
13.	This disease can be prevented by avoiding direct contact with MDR TB patients	29	90.6	3	9.4	24	75	8	25	-15.6
14.	Good air ventilation and home lighting can reduce the risk of MDR TB transmission	30	93.8	2	6.2	32	100	0	0	+6.2

Based on Table 2 and 3, it is known that the change after the interventions mostly on their knowledge about risk factors of MDR-TB, duration, and procedure of treatment. While for respondents' awareness result can be seen in Table 4.

Table 4. Awareness of Respondents Before and After the Treatment

Awareness	Mean	Median	Standard deviation	Min	Max
Pre-Test	94.84	95	6.773	79	107
Post-Test	98.22	97	7.495	84	114

Table 5. Bivariate analysis of knowledge and awareness

Variables	pvalue	α	Interpretation
Knowledge	0.005	0.05	No significant differences
Awareness	0.004	0.05	Significant differences

Based on data analysis, it is showen that there was a change in awareness of respondent on MDR-TB after the interventions (from mean 94.84 to 98.22), with an increase as much as 3.59%. We also carried out bivariate analysis to find out the difference between knowledge and awaraness before and after the interventions. Bivariate analysis can be seen in Table 5.

Table 3. Univariate Analysis of Knowledge Before and After the Interventions about Treatment

No.	Knowledge	Pre-Test				Post-Test				Difference (%)
		True		False		True		False		
		n	(%)	n	(%)	n	(%)	n	(%)	
	Treatment									
1.	MDR TB patients can be cured with regular treatment	32	100	0	0	31	96.9	1	3.1	-3.1
2.	Treatment of MDR TB is carried out through 2 stages, namely the initial stages and the advanced stages	31	96.9	1	3.1	31	96.9	1	3.1	0
3.	Duration of treatment for MDR TB patients with standard treatment is 4-6 months*	5	15.6	27	84.4	20	62.5	12	37.5	+46.9
4.	Unregular MDR TB treatment can cause death	27	84.4	5	15.6	32	100	0	0	+15.6
5.	In the initial MDR TB treatment, patients were only given injections for 6 months*	10	31.2	22	68.8	2	6.2	30	93.8	-25
6.	During treatment, patients must be accompanied regularly by the closest person	30	93.8	2	6.2	31	96.9	1	3.1	+3.1
7.	Patients can stop treatment if they experience side effects without the knowledge of person who monitor drug treatment*	18	56.2	14	43.8	28	87.5	4	12.5	+31.2
8.	MDR TB patients can stop treatment whenever they feel they have healed*	22	68.8	10	31.2	29	90.6	3	9.4	+21.8
9.	Community support is needed for the success of MDR TB treatment	31	96.9	1	3.1	29	90.6	3	9.4	-6.2
10.	Tingling is one of the most common side effects of MDR TB treatment	15	46.9	17	53.1	16	50	16	50	+3.1
11.	Serious side effects that can occur as a result of MDR TB treatment are visual impairments*	16	50	16	50	5	15.6	27	84.4	-34.4
12.	During treatment, patients need to go to the hospital regularly every week to check phlegm and undergo various examinations*	6	18.8	26	81.2	2	6.2	30	93.8	-12.5
13.	Patients who returned to treatment after being negligent from treatment were suspected of suffering from MDR TB	24	75	8	25	30	93.8	2	6.2	+18.8
14.	TB patients should not consume foods that contain high protein*	15	46.9	17	53.1	20	62.5	12	37.5	+15.6
15.	The source of carbohydrates consumed by TB patients is prioritized by complex carbohydrate sources such as rice, bread, potatoes	29	90.6	3	9.4	30	93.8	2	6.2	+3.1
16.	During treatment MDR TB patients may consume all types of food	14	43.8	18	56.2	18	56.2	14	43.8	+12.5

3.2. Discussion

In this study, health education intervention was carried out by giving respondents information through counselling with the addition of health media promotion such as video, leaflet to increase knowledge and awareness of people about MDR-TB. The results of this study showed that there was an increase of mean of knowledge as an amount of 5.45%, and 3.59% increase in their awareness of MDR-TB. Based on bivariate analysis, it is showen that there ware no significant differences in knowledge of respondents pre and post-intervention, however there were significant differences in awareness of respondents. This result in accordance with previous studies which showed that health education intervention could improve knowledge and attitude effectively[9-11]. The increase of knowledge is important so that the community could aware of MDR TB transmission and carried out proper prevention efforts[12]. In this study, health education carried out by counselling with additional media such as leaflets, modules and posters. Several studies showed that educational leaflet could be an effective tool to improve knowledge and awareness of people[17]. Visual images such as leaflet and poster could make people

easier to grasp information and improve their understanding. The graphical design and physical appearance of leaflet and poster also could determine the success of knowledge transfer[18, 19].

In this study, the increase of respondent's knowledge of respondents was particularly on the duration of treatment and treatment procedures. However, there was still a lack of knowledge about risk factors and mode of transmission of MDR-TB. Respondents understand that low adherence of drug treatment or unfinished treatment of regular TB could develop MDR-TB, and treatment for MDR-TB is required specific drugs for a longer period than regular TB. However, most therespondents still did not understand that being exposed to MDR-TB patients could be a risk factor of the disease. Resistant bacteria which spread by droplet and transmit to other susceptible hosts could develop MDR-TB infection directly[13]. It is important to note that MDR-TB is not only developed in consequences of unfinished treatment or low drug adherence of regular TB patient but also could transmit by droplet containing resitant bacteria from MDR-TB patients to susceptible host[14]. Preventing tranmission of MDR-TB is critical because this disease could cause psychological, social, and economic stress on patients, since treatment for MDR TB is more complicated than treating drug-sensitive TB. Treatment of MDR-TB required second-line TB drug which often more toxic, need intravenous administration and less effective than the first line of TB drugs[15]. It is also required a longer period of treatment (could take until 2 years) which could be resulting several impacts such as social isolation, loss of employment, and long-term socioeconomic and psychological effects[16].
.

4. Conclusion

This study emphasizes the importance of health education to increase knowledge and awareness of the community about MDR-TB. This study recommends the implementation of health education more intensively to the community about MDR-TB. The application of various media in health education was also important to improve transfer knowledge to the community. Improvement of knowledge and awareness of people to MDR-TB is crucial to conduct effective prevention effort and stop the transmission of disease.

References

1. Fogel N. Tuberculosis: A disease without boundaries. *Tuberculosis*. 2015;95(5):527-31.
2. Kyu HH, Maddison ER, Henry NJ, Mumford JE, Barber R, Shields C, et al. The global burden of tuberculosis: results from the Global Burden of Disease Study 2015. *The Lancet Infectious Diseases*. 2018;18(3):261-84.
3. Zaman K. Tuberculosis: a global health problem., population, and nutrition. *Journal of health* 2010;28(2):111-3.
4. Collins D, Hafidz F, Mustikawati D. The economic burden of tuberculosis in Indonesia. The international journal of tuberculosis and lung disease. *The official journal of the International Union against Tuberculosis and Lung Disease*. 2017;21(9):1041-8.
5. Rabahi MF, Silva Júnior JLRd, Ferreira ACG, Tannus-Silva DGS, Conde MB. Tuberculosis treatment. *Jornal brasileiro de pneumologia*: *publicacao oficial da Sociedade Brasileira de Pneumologia e Tisilogia*. 2017;43(6):472-86.
6. Tsara V, Serasli E, Christaki P. Problems in diagnosis and treatment of tuberculosis infection. *Hippokratia*. 2009;13(1):20-2.
7. Millard J, Ugarte-Gil C, Moore DAJ. Multidrug resistant tuberculosis. *BMJ: British Medical Journal*. 2015;350:h882.
8. Nathanson E, Nunn P, Uplekar M, Floyd K, Jaramillo E, Lönnroth K, et al. MDR Tuberculosis — Critical Steps for Prevention and Control. *New England Journal of Medicine*. 2010;363(11):1050-8.
9. Bisallah CI, Rampal L, Lye M-S, Mohd Sidik S, Ibrahim N, Iliyasu Z, et al. Effectiveness of health education intervention in improving knowledge, attitude, and practices regarding Tuberculosis among HIV patients in General Hospital Minna, Nigeria - A randomized control trial. *PloS one*. 2018;13(2):e0192276-e.
10. Panaligan R, Guiang J. Impact of health education on the knowledge and awareness of tuberculosis among high school students. *European Respiratory Journal*. 2012;40(Suppl 56):P2655.

11. Wang M, Han X, Fang H, Xu C, Lin X, Xia S, et al. Impact of Health Education on Knowledge and Behaviors toward Infectious Diseases among Students in Gansu Province, China. *BioMed Research International*. 2018;2018:12.

12. Ramos J, Wakoff-Pereira MF, Cordeiro-Santos M, Albuquerque MdFMd, Hill PC, Menzies D, et al. Knowledge and perceptions of tuberculosis transmission and prevention among physicians and nurses in three Brazilian capitals with high incidence of tuberculosis. *Jornal brasileiro de pneumologia*: *publicacao oficial da Sociedade Brasileira de Pneumologia e Tisilogia*. 2018;44(2):168-70.

13. Leung ECC, Leung CC, Kam KM, Yew WW, Chang KC, Leung WM, et al. Transmission of multidrug-resistant and extensively drug-resistant tuberculosis in a metropolitan city. *European Respiratory Journal*. 2013;41(4):901-8.

14. Almeida Da Silva PE, Palomino JC. Molecular basis and mechanisms of drug resistance in Mycobacterium tuberculosis: classical and new drugs. *Journal of Antimicrobial Chemotherapy*. 2011;66(7):1417-30.

15. Kendall EA, Azman AS, Cobelens FG, Dowdy DW. MDR-TB treatment as prevention: The projected population-level impact of expanded treatment for multidrug-resistant tuberculosis. *PloS one*. 2017;12(3):e0172748-e.

16. Morris MD, Quezada L, Bhat P, Moser K, Smith J, Perez H, et al. Social, economic, and psychological impacts of MDR-TB treatment in Tijuana, Mexico: a patient's perspective. The international journal of tuberculosis and lung disease. *Journal of the International Union against Tuberculosis and Lung Disease*. 2013;17(7):954-60.

17. Al Bardaweel S, Dashash M. E-learning or educational leaflet: does it make a difference in oral health promotion? A clustered randomized trial. *BMC oral health*. 2018;18(1):81.

18. Ilic D, Rowe N. What is the evidence that poster presentations are effective in promoting knowledge transfer? A state of the art review. *Health information and libraries journal*. 2013;30(1):4-12.

19. Arslan D, Koca T, Tastekin D, Basaran H, Bozcuk H. Impact of poster presentations on academic knowledge transfer from the oncologist perspective in Turkey. Asian Pacific *journal of cancer prevention* : APJCP. 2014;15(18):7707-11.