Adult Health Nursing Journal
Vol. 01, No. 01, Pages: 24-34
Publish Juni 2024

ORIGINAL ARTICLE

Health Education using Leaflet Media about Multidrug-Resistant Tuberculosis (MDR-TB) Improves Knowledge of Patients with Pulmonary Tuberculosis.

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ARTICLE INFORMATION

Article history
Received: 2024-05-01
Revised : 2024-05-14
Accepted: 2024-05-20

Keywords
Education; Leaflet; Knowledge; Multidrug-Resistant Tuberculosis (MDR-TB)

ABSTRACT

Introduction: *Mycobacterium Tuberculosis germ resistance is a condition where Anti-Tuberculosis Drugs (OAT) are unable to kill Mycobacterium Tuberculosis germs. One type of resistance is Multidrug Resistant Tuberculosis. The consequences of being resistant to OAT are worsening health, increased costs, longer treatment, high rates of therapeutic failure and death.* ***Objectives:*** *This study aims to analyse the effect of education about Multidrug-Resistant Tuberculosis (MDR-TB) with leaflet media on the level of knowledge of pulmonary tuberculosis patients at the Kanigaran Health Centre, Probolinggo City.* ***Methods:*** *This study used a Quasi-Experimental research design with a Pretest-Posttest with Control Group research design. The sample of this study was 60 people consisting of 30 Intervention groups and 30 Control groups with Purposive Sampling technique. Measurement of knowledge level using a questionnaire with 20 questionsThis study used the Wilcoxon test.* ***Results:*** *Pretest level of knowledge of respondents in the Intervention group in the Good category, namely 4 people (13.3%), posttest increased to 27 people (90.0%). Pretest level of knowledge of respondents in the Control group in the category of Less as many as 23 people (76.7%) and Posttest 24 people (80%). The Wilcoxone test found differences in Pre-test and Post-test knowledge in the Intervention and Control groups, namely P value 0.000 <0.05.* ***Conclusions:*** *There is an effect of education about Multidrug-Resistant Tuberculosis (MDR-TB) with leaflet media on the level of knowledge of pulmonary tuberculosis patients at Kanigaran Health Centre, Probolinggo City.*

Adult Health Nursing Journal is a peer-reviewed journal published by Fakultas Kesehatan, Universitas Nurul Jadid, Probolinggo, East Java.
Website: https://fkes.unuja.ac.id
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A. Introduction

Multidrug-Resistant Tuberculosis (MDR-TB) in Indonesia is caused by several factors, including microbiological factors, inadequate treatment programs, and non-compliance of TB patients in following treatment regimens. Microbiologically, resistance is caused by genetic mutations that render the drugs less effective against the mutant bacilli. These mutations can occur spontaneously against a particular drug, especially when inadequate anti-tuberculosis therapy (ATT) is administered. Patient non-compliance in completing the treatment regimen is the largest contributor to drug resistance. The primary reasons for patients dropping out during the intensive phase include low motivation and a lack of information about their disease (Lindha, 2012).

Lack of knowledge remains a significant issue in TB control. TB patients must be aware of how to manage their disease to address TB-related problems effectively. Insufficient information about TB among patients can lead to an increase in MDR-TB cases, which require more expensive treatment compared to DOTS (Directly Observed Treatment Short-course) and involve a relatively longer treatment duration. If MDR-TB is left untreated, it can indirectly affect the economy due to the high costs involved (Lindha, 2012).

A study by Lailatul Maghfiroh (2017) on the impact of education using illustrated and Madurese-language pocketbooks on the knowledge level of pulmonary tuberculosis patients and their Directly Observed Treatment supporters evaluated knowledge levels using questionnaires before and two days after the education was provided using the pocketbooks. The paired t-test analysis showed a statistically significant increase in TB knowledge ($p < 0.001$) (Maghfiroh, 2017).

According to Asnia Uliya Devi (2019), in her research on the factors related to the behavior of MDR-TB patients in preventing the transmission of MDR-TB in the working area of Puskesmas Kota Semarang, 76.2% of respondents had good knowledge of MDR-TB, while the remaining 23.8% had poor knowledge. The study concluded that there is a correlation between the knowledge of respondents and the behavior of MDR-TB patients in preventing the transmission of MDR-TB in the Puskesmas Kota Semarang working area (Devi, 2019).

Another study conducted by Ummami (2016) on the effect of health education about tuberculosis on increasing patient knowledge and attitudes toward TB transmission prevention at the Simo Health Center found a significant difference in knowledge levels before and after health education on pulmonary tuberculosis. The Wilcoxon statistical test value was -4.082, with a p-value of 0.000. Since the p-value was smaller than the significance level of 0.005 (<0.005), the null hypothesis (Ho) was rejected. Thus, it was concluded that health education significantly affected the level of knowledge among pulmonary tuberculosis patients at the Simo Health Center, Boyolali Regency (Ummami, 2016).

A similar result was found in another study by Sukmawati (2016) on the effectiveness of health education on the knowledge of tuberculosis (TB) patient care. The Wilcoxon test revealed a difference in knowledge between the pre- and post-test in the intervention group (p-value: $0.006 < 0.05$), while no difference was found in the control group (p-value: $0.98 > 0.05$) (Sukmawati, 2017).

The management of MDR-TB cases is carried out using the DOTS Plus strategy, where “S” refers to a strategy, not Short-course therapy, and “plus” indicates the use of second-line anti-tuberculosis drugs along with infection control. The DOTS Plus strategy, recommended by

WHO for managing MDR-TB, emphasizes five key components: sustained political commitment to address MDR-TB, case detection through sputum smear microscopy, treatment with a combination of second-line Anti-Tuberculosis Drugs (ATDs) under the direct supervision of a treatment supporter (PMO), ensuring the regular, comprehensive, and timely availability of quality-assured second-line ATDs, and a standardized recording and reporting system to facilitate the monitoring and evaluation of the MDR-TB control program. The DOTS Plus strategy shares a similar framework with the DOTS strategy for pulmonary TB control, differing mainly in the treatment duration and the use of second-line ATDs. The treatment duration for pulmonary TB under the DOTS strategy is 6 months, whereas for MDR-TB under the DOTS Plus strategy, it is 2 years (Ministry of Health, National Strategy for TB Control in Indonesia, 2014).

Efforts to reduce MDR-TB cases include providing education to patients with Multidrug-Resistant Tuberculosis (MDR-TB). As educators, nurses must pay attention to the effectiveness of the nursing education provided to TB patients. Based on this background, the researcher is interested in studying "The Effect of Education on Multidrug-Resistant Tuberculosis (MDR-TB) Using Leaflet Media on the Knowledge Level of Pulmonary Tuberculosis Patients at the Kanigaran Health Center, Probolinggo City."

B. Methods

The design used in this study was a Quasi-Experimental research design with a Pretest-Posttest with Control Group research design. The sample in this study was total sampling, namely Pulmonary Tuberculosis Patients who met the criteria as many as 60 respondents who were divided into 2 groups, namely: 30 respondents in the intervention group and 30 respondents in the control group.

The intervention group (experimental) respondents were given a pre-test questionnaire about Multidrug-Resistant Tuberculosis (MDR-TB), then respondents were given education about Multidrug-Resistant Tuberculosis (MDR-TB) using leaflets for 30 minutes. Two days later, respondents were given a post-test questionnaire about Multidrug-Resistant Tuberculosis (MDR-TB).In the control group, respondents were given a pre-test questionnaire about Multidrug-Resistant Tuberculosis (MDR-TB). Two days after the pre-test, respondents were given a post-test about Multidrug-Resistant Tuberculosis (MDR-TB). After the post-test, the control group was then given education about Multidrug-Resistant Tuberculosis (MDR-TB).

Data were analysed using the Wilcoxon signed rank test to measure the significance of differences between two groups of paired ordinal data.

C. Results and Discussion

1. Intervention Group

   Research results indicate that the Knowledge Level of Pulmonary Tuberculosis Patients at Kanigaran Health Center, Probolinggo City, before (Pre-test) receiving Education about Multidrug-Resistant Tuberculosis (MDR-TB) using Leaflet Media in the Intervention Group, showed the highest knowledge level in the Poor category, with 26 individuals (86.7%). However, after receiving the education (Post-test) on Multidrug-Resistant Tuberculosis (MDR-TB), the highest knowledge level was in the Good category, with 27 individuals (90.0%).

Table.1
Frequency of Knowledge Levels of Pulmonary Tuberculosis Patients at Kanigaran Health Center, Probolinggo City, Before and After Receiving Education on Multidrug-Resistant Tuberculosis (MDR-TB) Using Leaflet Media in the Intervention Group

Knowledge	Pre Test Intervensi		Post Test Intervensi	
	(n)	(%)	(n)	(%)
Good	4	13.3	27	90.0
Not enough	26	86.7	3	10.0
Total	30	100	30	100

This indicates that providing education about MDR-TB using leaflet media has an impact on the knowledge level of pulmonary tuberculosis patients at Wonoasih Health Center, Probolinggo City. According to Maulana, factors influencing health education include the material provided, the educational media used, and the target audience. The effectiveness of the education can be assessed by the respondents' enthusiasm towards the content (Maulana, 2012).

This study is consistent with the research conducted by Lailatul Maghfiroh (2017) on the Impact of Education Using Illustrated Pocketbooks in Madurese on the Knowledge Level of Pulmonary Tuberculosis Patients and their Directly Observed Treatment Supporters. The findings showed a significant increase in respondents' knowledge before and after receiving the education. The paired t-test analysis resulted in a P value of <0.001, indicating that the education using illustrated pocketbooks in Madurese had a significant effect on the knowledge level of both patients and their treatment supporters. The results demonstrated an improvement in respondents' knowledge levels from before to after the education. Prior to the education, the majority of respondents had a moderate level of knowledge. However, after receiving the education using illustrated pocketbooks in Madurese, most respondents had a high level of knowledge (Maghfiroh, 2017).

Tabel.2
Correlation of Knowledge Levels of Pulmonary Tuberculosis Patients at Kanigaran Health Center, Probolinggo City, Before and After Receiving Education on Multidrug-Resistant Tuberculosis (MDR-TB) Using Leaflet Media in Intervention Group

Intervention Group	N	Mean	*P* value
Pretest	30	7.47	.000
Posttest	30	15.30	

In Table 2. the results indicate that the number of respondents in the intervention group was 30, with an average knowledge score about Multidrug-Resistant Tuberculosis (MDR-TB) in the intervention group being 7.47 in the pre-test and 15.30 in the post-test. The Wilcoxon test yielded a P value of 0.000, which is less than 0.050. Since the P value is smaller than the significance level (0.050), the initial hypothesis (H_a) is accepted. Therefore, there is an effect on the Knowledge Level of Pulmonary Tuberculosis Patients at Kanigaran Health

Center, Probolinggo City, before and after receiving Education on Multidrug-Resistant Tuberculosis (MDR-TB) using Leaflet Media in the Intervention Group.

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Factors influencing health education include the content provided, the educational media used, and the appeal of the material as reflected in the respondents' enthusiasm, which helps them more easily absorb the information presented. The educational media used in this study was a leaflet containing information about MDR-TB, supplemented with images. This leaflet was well-received by the respondents. The study results indicate that the leaflet is effective in enhancing respondents' knowledge.

2. Control Group

This study shows that the Knowledge Level of Pulmonary Tuberculosis Patients at Kanigaran Health Center, Probolinggo City, regarding Multidrug-Resistant Tuberculosis (MDR-TB) in the Control Group before (Pre-test) revealed that the highest knowledge level was in the Poor category, with 23 individuals (76.7%). After (Post-test), the highest knowledge level remained in the Poor category, with 24 individuals (80%).

Table.3
Frequency of Knowledge Levels of Pulmonary Tuberculosis Patients at Kanigaran Health Center, Probolinggo City, Before and After Receiving Education on Multidrug-Resistant Tuberculosis (MDR-TB) Using Leaflet Media in Control Group.

Knowledge	**Pre Test control**		**Post Test control**	
	(n)	**(%)**	**(n)**	**(%)**
Good	7	23.3	6	20
Not enough	23	76.7	24	80
Total	30	100	30	100

Tabel.4
Correlation of Knowledge Levels of Pulmonary Tuberculosis Patients at Kanigaran Health Center, Probolinggo City, Before and After Receiving Education on Multidrug-Resistant Tuberculosis (MDR-TB) Using Leaflet Media in Control Group

Control Group	**N**	**Mean**	***P* value**
Pretest	30	7.47	.613
Posttest	30	15.30	

Based on Table 4. there were 30 respondents in the control group, with an average knowledge score about Multidrug-Resistant Tuberculosis (MDR-TB) of 7.47 before (pre-test) and 15.30 after (post-test). In this study, the Wilcoxon test result yielded a P value of Sig 0.613, which is greater than 0.050, meaning that the initial hypothesis (H_a) is rejected. This indicates that there is no difference in the Knowledge Level of Pulmonary Tuberculosis Patients at Kanigaran Health Center, Probolinggo City, regarding Multidrug-Resistant Tuberculosis (MDR-TB) in the Control Group.

This study is consistent with the research conducted by Ermalynda Sukmawati (2017) on "The Effectiveness of Health Counseling on Tuberculosis (TB) Patient Care Knowledge," which found no significant difference in knowledge between pre-test and post-test in the control group (P value 0.980 > 0.050). This indicates that there was no difference in the effectiveness of health counseling on tuberculosis patient care knowledge (Sukmawati E., 2017).

Another study by Monika Bedy (2018) on "The Impact of Education Using Booklets on Knowledge, Attitudes, and Vegetable and Fruit Consumption Among Adolescents" found that in the control group, there was no significant difference in the average knowledge of students between pre-test and post-test, with a P value of 0.807 > 0.05 (Bedy, 2018).

Low or insufficient knowledge can be addressed by providing accurate information about Tuberculosis, the impact of non-compliance, and MDR-TB when patients seek healthcare services. The goal is for TB clients who have limited knowledge about MDR-TB to become informed and prevent such cases. Providing this information can be achieved through various means such as posters, leaflets, or other informational materials, ensuring that TB clients are exposed to information about MDR-TB. This is intended to prevent clients with low knowledge from becoming sources of transmission to family members or the broader community.

3. Intervention and Control Group

Based on Table 5. it can be seen that the average knowledge score of Pulmonary Tuberculosis Patients at Kanigaran Health Center, Probolinggo City, regarding Multidrug-Resistant Tuberculosis (MDR-TB) in the Intervention Group was 7.80, while the average score in the Control Group was 11.467. The study used the Wilcoxon test, which resulted in a significance value (Sig) of 0.000, which is less than 0.050. Therefore, the alternative hypothesis (H_a) is accepted, indicating that there is an effect of education about Multidrug-Resistant Tuberculosis (MDR-TB) using leaflet media on the Knowledge Level of Pulmonary Tuberculosis Patients at Kanigaran Health Center, Probolinggo City, in both the Control and Intervention Groups.

Tabel.5
Correlation of Knowledge Levels of Pulmonary Tuberculosis Patients at Kanigaran Health Center, Probolinggo City, Before and After Receiving Education on Multidrug-Resistant Tuberculosis (MDR-TB) Using Leaflet Media in Intervention and Control Group

Group	N	Mean	*P* value
Intervention	30	7.80	.000
Control	30	11.467	
Total	60		

The results of this study indicate that the Wilcoxon test yielded a significance value (Sig) of 0.000, which is less than 0.050. This means that the null hypothesis (H_a) is accepted, suggesting that there is an effect of education about Multidrug-Resistant Tuberculosis (MDR-TB) using leaflet media on the knowledge level of pulmonary tuberculosis patients at Kanigaran Health Center, Probolinggo City, in both the control and intervention groups. In conclusion, using leaflets for education is more effective in enhancing TB patients' knowledge about MDR-TB.

This finding is consistent with research conducted by Monika Bedy (2018) on "The Effect of Education Using Booklets on Knowledge, Attitudes, and Vegetable and Fruit Consumption Among Adolescents." The study compared knowledge changes between intervention and control groups, and the Mann-Whitney test revealed a significant difference, with a P value of 0.000. The average knowledge level was higher in the intervention group after the post-test (Bedy, 2018).

The study clearly demonstrates that health education about Multidrug-Resistant Tuberculosis (MDR-TB) using leaflets is crucial and significantly impacts TB patients' knowledge. Research conducted by Dorothea Oje Linda showed that 59.7% of respondents had low knowledge about MDR-TB. Similarly, Hang et al. found that low knowledge about drug use was a primary cause of resistance in Hong Kong. Becerra et al. reported that approximately 90% of family members caring for MDR-TB patients were infected due to inadequate knowledge about TB care (Lindha, 2012).

According to theory, the method of acquiring knowledge can affect an individual's knowledge level. This theory suggests that people can gain knowledge through trial and error, trying various possibilities until a different result is obtained, as measured by the initial questionnaire (Nurhamsyah, 2015).

Leaflets have the advantage of being adaptable to the respondents' time, allowing them to review the content more leisurely. They can provide detailed information, often reinforced with images. However, leaflets have the disadvantage of being short-lived and easily lost. In this study, the advantage of leaflets was evident as they enhanced respondents' knowledge. After the educational session, leaflets were distributed to each respondent for storage. This allowed respondents to read about Multidrug-Resistant Tuberculosis (MDR-TB) at their own pace and repeatedly, and to discuss the information with their families, thus improving their understanding of MDR-TB.

D. Conclusion

Health education using leaflet media about Multidrug-Resistant Tuberculosis (MDR-TB) can enhance the knowledge of pulmonary tuberculosis patients. It is recommended that future research should avoid comparisons between intervention and control groups. Researchers are also encouraged to further develop other methods of health education.

Acknowledgments

We would like to extend our sincere gratitude to all those who assisted in completing this research, with special thanks to Universitas Nurul Jadid..

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