

## EFFECTIVENESS OF BREATHING EXERCISES IN ELDERLY TUBERCULOSIS PATIENTS IN MEDAN

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### ABSTRACT

*Introduction. Tuberculosis (TB) is an infectious disease caused by the bacterium Mycobacterium tuberculosis. It is a significant global public health problem. The purpose of this study was to assess the effectiveness of the collaboration of diaphragmatic breathing exercises and pursed lip breathing and medical drugs with medical therapy without breathing exercises on reducing shortness of breath at the Helvetia Lung Specialized Hospital, Medan. Methods. Research design with Quasi Experiment with pretest-posttest approach with two group control, 30 respondents with nonprobability sampling technique with purposive sampling method. Results: after getting medicamentous drugs, the value of tightness decreased with a significance value of  $p = 0.001$  ( $p = 0.05$ ). After getting drug administration collaborating diaphragm breathing and pursed lip breathing exercise, the value of tightness decreased with a significance value of  $p = 0.001$  ( $p = 0.05$ ). Respondents who received drug corabolation and diaphragm breathing and pursed lip breathing exercise proved the difference in the value of reducing tightness was higher than patients who were only given medicamentous drug therapy with a significance value of  $p = 0.011$  ( $p = 0.05$ ). Conclusion: the administration of drugs in collaboration with diaphragm breathing and pursed lip breathing exercise is more effective in reducing shortness of breath compared to the administration of medical drugs without breathing exercises.*

**Keywords:** Tuberculosis, shortness of breath, diafragma breathing

### INTRODUCTION

Tuberculosis (TB) is an infectious disease caused by the bacterium Mycobacterium tuberculosis (Vera et al., 2021). The disease is a significant global public health problem. The World health Organization (WHO) notes that TB is the world's leading cause of infection-related death. In 2019, there were approximately 10 million new cases of TB and 1.4 million deaths from TB, including those with pulmonary TB. The latest data from the World Health Organization (WHO) for 2022 shows that TB remains a significant global health problem. By 2020, there are expected to be around 10 million new cases of TB worldwide. However, adherence of people with pulmonary TB to treatment and care remains a major challenge in controlling this disease (WHO, 2021). Pulmonary tuberculosis (TB) remains one of the major health problems in the world, including Medan City. The disease not only impacts individual health but also affects

the social and economic aspects of the community. In accordance with Sustainable Development Goals (SDGs) goal number 3.3, which targets ending the TB epidemic by 2030, an effective strategy involving various sectors is needed to improve prevention efforts (Kemenkes RI, 2020)

In Indonesia, the prevalence of tuberculosis also shows an alarming trend. Based on data from the Ministry of Health of the Republic of Indonesia, the prevalence of tuberculosis in Indonesia reaches around 6.3% of the adult population, with higher rates in those over 60 years old (Environmental conditions such as air pollution in urban areas and high smoking habits are the main factors for the increase in tuberculosis cases in Indonesia (Ministry of Health Indonesia., 2023). Medan City as one of the major cities in Indonesia also faces similar problems. Based on a preliminary survey conducted by the Medan City Health

Office in 2023, the prevalence of tuberculosis among the elderly (aged over 60 years) reached 8.2% (BioMed Central). The survey also showed that most tuberculosis patients in Medan have a history of active or passive smoking, as well as exposure to air pollution due to industrial activities and transportation. (Rochadi et al., 2020)

A preliminary survey of 100 elderly patients with tuberculosis at several health centers in Medan showed that 60% of them experienced significant breathlessness that affected their daily quality of life. More than 70% of patients revealed that they did not regularly perform breathing exercises as part of their tuberculosis management, and only 20% were educated on the importance of breathing exercises to reduce symptoms (Marshall et al., 2022)

Job Control	N	%	Job Treatment	N	%	P-value
Wiraswata	6	40		8	53.3	0.236
Supir	3	20		4	26.7	
Pensiunan	6	40		3	20	

Based on these data and surveys, it is important to explore effective interventions to reduce symptoms of breathlessness in elderly tuberculosis patients in Medan. Breathing exercises are one of the non-pharmacological methods that has been shown to be effective in increase lung capacity and reduce shortness of breath in tuberculosis patients in international in various international studies. Therefore, this study aims to evaluate the effectiveness of breathing exercises in elderly tuberculosis patients in Medan, with the hope of providing evidence-based recommendations to improve the quality of life of these patients. improve the quality of life of these patients (Tarigan et al., 2019).

## METHOD

This study uses a quantitative research design with a quasi-experimental method. The sample used was 30 respondents who were taken using a purpose sampling technique

divided into two main groups, namely the intervention group and the control group. (Creswell, 2018). Of the 30 patients, 15 respondents served as the intervention group, namely the group that received breathing exercise treatment. While 15 respondents were used as a control group, namely the group that did not receive intervention. Both groups measured the degree of tightness before and after, using the Borg scale. This study was conducted in Medan City

## RESULT AND DISCUSSION

**Table 1. Characteristics of respondents based on age**

Age Control	N	%	Age Treatment	N	%	P-value
50-60	9	60	50-60	11	73.2	0.045
61-70	6	40	61-70	4	26.6	

Based on table 1 data, the majority of control respondents were aged 50-60 years by 60%, while the majority of the treatment group were aged 50-60 years by 70%.

**Table 2. Characteristics of respondents based on occupation**

Based on table 2, the data of the control respondents, the majority of respondents were self-employed at 40%, while the majority of the treatment group, the majority of respondents were self-employed at 53.3%.

**Table 3. Characteristics of respondents based on education**

Age Control	N	%	Age Treatment	N	%	P-value
SMP	1	6.7		3	20	0.086
SMA	6	40		4	26.7	
Perguruan Tinggi	8	53.3		8	53.3	

Based on table 3, the majority of control and treatment respondents had a college education of 53.3%, while the lowest junior high school education was 6.7%.

**Table 4. Rate of reduction in responder tightness**

Tightness value	N	Min	Max	Mean	SD
<b>Group control</b>					
Pre test	15	2	4	3.73	0.594
Post test	15	2	3	2.33	0.448
<b>Group Treatment</b>					
Pre test	15	2	4	3.60	0.828
Post test	15	1	2	1.40	0.507

Based on table 4, Control group Before administration of medicamentous drugs, the The mean score of tightness was  $3.73 \pm 0.594$  with a minimum score of 2 and a maximum score of 4. minimum 2 and maximum 4. After the administration of medication, the mean score of The mean score of tightness was  $2.33 \pm 0.448$  with a minimum score of 2 and a maximum score of 3. minimum 2 and maximum 3. While in the treatment group before administration of drugs with breathing exercises the average score value of tightness was  $3.60 \pm 0.828$  with minimum value of 2 and maximum value of 4. After administration of medication with breathing exercises the mean score of tightness is  $1.40 \pm 0.507$  with a minimum value of 1 and a maximum of 2. maximum 2.

**Table. 5 Difference between control and treatment groups**

	Group	N	Mean	SD	p-value
Scala Borg	Treatment	15	1,50	0.509	0,012
	Kontrol	15	1.80	0.805	

Based on the above Mann-Whitney Test results, there is a difference between the administration of medical drugs and the administration of medical drugs in collaboration with breathing exercises (diaphragm breathing exercise and pursed lip breathing exercise) from the p value =  $0.012 (< 0.05)$ . The results of the study state that the administration of medical drugs with

breathing exercises is more effective in reducing shortness of breath in COPD patients, compared to the administration of medical drugs alone..

This condition will aggravate the progressive state of COPD in old age age, so that at the age of over 50 years manifestations of pain are increasingly felt. Various symptoms in the respiratory system appear and need treatment, this is what brings patients to to the health facility and usually already in the advanced stage of COPD. Changes in respiratory structure begin in middle adulthood and as age, the elasticity of the chest wall chest wall elasticity, alveoli elasticity, and lung capacity decrease and there will bethick ening of the bronchial glands (Kongkamol et al., 2024).

Respondents were mostly highly educated, namely 16 people or 53.3%. The results of research by (Garg et al., 2020) showed that the majority of respondents were categorized as highly educated as much as 75%. This study is not in line with research conducted by which states 69.2% of studies conducted at low education levels obtained a low quality of life (Sulistiyawati & Ramadhan, 2021) state that patients with higher education will have better self-efficacy and self-care because they are more mature towards changes in themselves so that they are easier to accept positive influences from outside including health information.

The results of this study showed that both intervention groups had the highest number of self-employed workers (drivers, traders, craftsmen) which amounted to 80%. This is different from research conducted by (Ratnasari & Handayani, 2023) which showed that the occupation owned by the most tuberculosis respondents was farmers, namely 35 people (58.33%). While research conducted by (Sipayung et al., 2023) found that most respondents with tuberculosis worked as laborers (50%). Research conducted by (Sazali et al., 2023) stated that there was no relationship between a person's occupation and the incidence of tuberculosis.

Based on the results of the study that before the administration of medical drugs, tuberculosis patients had an increased respiratory frequency so that moderate shortness of breath was as many as 15 people. After the administration of medical drugs, the respondents' degree of moderate shortness of breath and severe shortness of breath was reduced, experiencing a decrease in shortness of breath as many as 15 tuberculosis respondents in Medan City showed that there was a significant effect of medical therapy on reducing shortness of breath in tuberculosis patients with mild shortness of breath as many as 11 people and moderate shortness of breath 4 people. Researchers made this observation for 4 weeks with 8 times treatment with the results of sig value  $p = 0.001 < 0.05$ . This is in accordance with research conducted by (Woimo et al., 2017) that community involvement and adherence to taking medication and respiratory litanca can accelerate the recovery of tuberculosis patients.

This exercise also has the effect of strengthening the respiratory muscles and improving circulation. Those suffering from tuberculosis are also encouraged to engage in this practice. This exercise is designed to improve respiratory function and to train. The (Kulkarni et al., 2022) exercises also serve to enhance FEV1. The lip breathing exercises are a One breathing control technique that can be employed for the enhancement of This breathing technique is designed to improve lung function. It involves pursed lips. It is possible that an increase in pressure within the oral cavity may occur, subsequently This results in pressure being transmitted to the bronchial branches, thereby preventing The occurrence of narrowing of the respiratory tract during exhalation. Consequently, an increase in FEV1 is observed (Sazali et al., 2023).

## CONCLUSION

Based on the results of the research and discussion that has been described previously regarding the effect of the administration of medical drugs with the administration of medical drugs and breathing exercises on

reducing shortness of breath of tuberculosis patients, it is concluded as follows:

1. There is an effect of medical therapy on reducing the degree of shortness of breath in tuberculosis patients in Medan.
2. There is an effect of medication administration in collaboration with breathing exercises on reducing the degree of shortness of breath in tuberculosis patients in Medan.
3. that the difference between the provision of medication therapy alone and the provision of medication in collaboration with breathing exercises (diaphragm breathing exercises and pursed lip breathing exercises) from the p value of 0.011 ( $< 0.05$ ).

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