



# The Effect of Breathing Retraining on Increasing SpO2 in COPD Patients in Bima Hospital in 2018

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## Abstract

**Background:** Chronic Obstructive Pulmonary Disease (COPD) working group in 2002 reported that 12 Asia Pacific countries showed the prevalence of COPD in Indonesia was 5.6%. Based on medical record data at the Bima Regional General Hospital in April - September 2017, the number of COPD cases was 15 people. COPD is a disease characterized by progressive airway limitation caused by abnormal inflammation with general symptoms of worsening shortness of breath and decreased SpO2. To overcome this, provide breathing retraining which is a technique used to compensate for respiratory deficiencies. **Objective:** To determine the effect of breathing retraining on increasing SpO2 in COPD patients. **Methods:** Quasi Experimental research design using One Group Pretest Posttest Design with a total sample of 17 respondents. Statistical test using Paired T-Test. The data collected is in the form of respondent's characteristic data, looking at the SpO2 value before and after being given breathing training. Respondents who were given the breathing retraining intervention before and after the intervention were measured using a questionnaire. **Result:** SpO2 assessment range before intervention is more dominant than 90-95% oxygen saturation as many as 15 respondents (88.2%) and > 95% as many as 2 respondents (11.8%). Meanwhile, after the intervention was given, the saturation > 95% was more dominant as many as 13 respondents (76.5%) and saturation 90-95% as many as 4 respondents (23.5%). The results of statistical tests using Paired T-test obtained  $p = 0.000$ . **Conclusion:** There is an effect of breathing retraining on the increase in SpO2 in COPD patients in the room in RSUD Bima.

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**Key Words:** COPD, Breathing Retraining, Increased SpO2.

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## Introduction

COPD is a disease characterized by progressive airway limitation caused by abnormal inflammation, which includes diseases such as chronic bronchitis and emphysema and is most commonly caused by smoking. The predominant symptom in COPD is shortness of breath that often begins with activity. There is often a cough, which may be productive, producing sputum, and wheezing. General symptoms are progressive with increasingly severe shortness of breath and decreased SpO2 (Gleadle, 2005). Based on data

from the World Health Organization (WHO), COPD is one of the main causes of morbidity and mortality worldwide. COPD shows the 5th highest mortality rate worldwide and is estimated to be the 3rd death rate in 2020. Chronic Obstructive Pulmonary Disease (COPD) working group in 2002 reported that in 12 Asia Pacific countries, the prevalence of COPD in Indonesia was 5.6%. Based on medical record data at the Bima Regional General Hospital in April - September 2017

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obtained COPD with a total of 15 cases, in April as many as 3 people, in May as many as 4 people in June as many as 1 person in July as many as 2 people, in May August as many as 1 person in September as many as 4 people.

The average patient is treated with complaints of very severe shortness of breath and some of them come with repeated attacks of shortness of breath. COPD is a disease characterized by progressive airway limitation caused by abnormal inflammation, which includes diseases such as chronic bronchitis and emphysema and is often caused by smoking. The predominant symptom in COPD is shortness of breath that often begins with activity. There is often a cough, which may be productive, producing sputum, and wheezing. General symptoms are progressive with increasingly severe shortness of breath and decreased SpO2 (Gleadle, 2005).

Oxygen saturation is a measure of the ratio of the amount of oxygen in a given medium. Low levels of oxygen in the blood can cause serious and life-threatening medical conditions. If oxygen drops below the normal level of >92% there is a possibility that the body will experience respiratory problems such as hypoxemia. Hypoxemia is defined as a decrease in pO2 value <55 mmHg and O2 saturation value <85% (Somantri, 2007). Breathing retraining is a technique used to compensate for shortness of breath. Exercises are performed to store energy through controlled breathing. This action is carried out with the aim of relaxing the respiratory muscles and recovering anxiety, reducing uncoordinated respiratory muscle activity, reducing respiratory frequency, and reducing the respiratory burden (Sudarsono, 2000). From the description above, the researcher is interested in conducting research on the effect of breathing retraining on increasing SpO2 in the inner room of Bima Hospital.

**Research Methods**

The research will be conducted in the zaal room in the Bima Hospital. The research design used in this study is a quasi-experimental (quasi-experimental) considering that not all variables (symptoms that appear) and experimental conditions can be tightly regulated and controlled. With a one group pre-test-post-test design approach. The research group was observed before and after the intervention. (Nursalam, 2010; Kurtieva et al., 2021). The population in this study were all COPD patients in the zaal room in Bima Hospital. The

sample in this study was COPD patients in the Zaal Dalam room at the Bima Hospital with a total of 15 respondents on July 15, 2018 in accordance with the inclusion criteria set by the researcher. In this study, observation sheets were used before and after being given breathing retraining to monitor and record changes in the SpO2 value that occurred in COPD patients.

**Data Analysis**

Data retrieval is done by the respondent doing breathing retraining. Exercises are carried out 3 times a week: the first week of training is carried out with a duration of 10 minutes, the second week of 15 minutes duration, the third week of 20 minutes duration, the fourth week of 25 minutes duration. For the safety of the respondents, the researcher said to stop the exercise if there were symptoms of shortness of breath, chest pain or fatigue.

Data based on the results of researchers' observations on respondents were coded according to predetermined criteria, tabulated, analyzed quantitatively and then analyzed by statistical tests with the Paired T-Test technique aimed at knowing the effect between the independent variable and the dependent variable with a significance level of  $p < 0, 05$ . The formulation of the significance of  $p < 0.05$  means that if the statistical test shows  $p < 0.05$  then there is a significant relationship between the independent variable and the dependent variable. The results of the study contain the characteristics of respondents which include: age, gender and type of work of the respondent, the SpO2 value before and after being given breathing retraining, and the distribution of the effect of breathing retraining on the increase in SpO2 of respondents for a quasi-experimental statistical test.

**Research Results**

*General Data*

Characteristics of respondents based on age group Table 1 Distribute the frequency of respondents by age group in the room in RSUD Bima.

**Table 1.** The majority of respondents are in the adult age group

No.	Age group	Age	f	%
1	Teenagers	12-25 years	5	29,5%
2	Adult	26-59 years	4	23,5 %
3	Elderly	60-65 years	8	47 %
	Total		17	100%



Based on Table 1 shows that the majority of respondents are in the adult age group, namely the elderly, with a total of 8 people (47%).

**Classification of Respondents by Gender**

**Table 2.** Distribution of the frequency of respondents by gender in the room in RSUD Bima

No	Gender	f	%
1	Male	15	88,2 %
2	Female	2	11,8 %
<b>Total</b>		17	100 %

Based on Table 2 shows that the majority of respondents are male, namely 17 people (88.2%).

**Classification of Respondents based on Education Level**

**Table 3.** Distribution of the frequency of respondents based on the level of education in the room in RSUD Bima

No	Education lever	f	%
1	Primary school	5	29,6 %
2	Junior high school	2	11,7 %
3	High school	9	52,9 %
4	Bachelor	1	5,8 %
<b>Total</b>		17	100%

Based on table 3 shows that the majority of respondents' education level is at the high school level, with a total of 9 people (68.9%).

**Classification of Respondents by Type of Work**

**Table 4.** Frequency distribution of respondents based on work in the room in RSUD Bima

No	Type of work	f	%
1	Farmer	11	64,7 %
2	civil servant	2	11,8 %
3	entrepreneur	4	23,5 %
<b>Total</b>		17	100 %

**Cross Table of the Effect of Breathing Re-training on Increasing SpO2 in Patients with Chronic Obstructive Pulmonary Disease (COPD) in 2018**

**Table 7.** Frequency distribution based on saturation before and after breathing retraining

Before * After Crosstabulation		Before			Total
		90-95% (good)	>96% (very good)		
Before	90-95% (good)	Count	4	11	15
		% of Total	23.5%	64.7%	88.2%
	>96% (very good)	Count	0	2	2
		% of Total	.0%	11.8%	11.8%
Total		Count	4	13	17
		% of Total	23.5%	76.5%	100.0%
Paired T- test		P = 0.000			

Based on Table 4 shows that the majority of respondents' occupations are farmers with a total of 11 people (64.7%).

**Special Data**

SpO2 value range before breathing re-training is given.

**Table 5.** The following will describe the SpO2 value before being given brathing re-training

No	Oxygen Saturation	f	%
1	>96	2	11,8 %
2	90 - 95	15	88,2 %
3	85 - 89	-	-
4	80 - 84	-	-
<b>Total</b>		17	100 %

Based on Table 5 can be seen that the SpO2 assessment range is more dominant than 90-95% oxygen saturation as many as 15 respondents (88.2%) and > 95% as many as 2 respondents (11.8%).

**SpO2 Value after being given Breathing Re training**

**Table 6.** The SpO2 assessment after breathing re-training is carried out in the room in the BIMA Hospital

No	Value range SpO2	f	%
1	>95	13	76,5%
2	90-95	4	23,5%
3	85-89	-	-
4	80-84	-	-
<b>Total</b>		17	100%

Based on Table 6 can be seen that the SpO2 assessment range is more dominant with saturation > 95%, namely 13 respondents (76.5%) and 90-95% saturation as many as 4 respondents (23.5%).



Table 7 shows that respondents with good saturation before the breathing retraining action were 15 people, after the breathing retraining action 11 (64.7%) of them experienced a change in saturation to very good, and 4 (23.5%) people were good, then from 2 respondents before the breathing retraining action was carried out in very good condition, after being given the breathing retraining action 13 (76.5%) of them experienced a change in saturation to be very good. Based on the results of statistical tests carried out using the Paired T-test technique, the results obtained were  $p = 0.000$  or less than  $= 0.05$  ( $p. 0.000 < 0.05$ ) with a dominant post-test saturation score of  $>95\%$  and a dominant pretest of  $90-95\%$ .  $H_0$  is rejected and  $H_1$  is accepted, which means that there is a significant effect between breathing re-training on increasing SpO2 in the Inner Room of RSUD Bima.

## Discussion

### *Characteristics of Respondents*

From the data obtained, the characteristics of the respondents are mostly found in the age group 46-65 years, the sex is male, high school education level with the type of work as a farmer.

### *Identify the Level of SpO2 in COPD Patients Prior to Breathing Retraining*

Based on table 4.5 shows that, of the 17 respondents studied, 2 respondents were in the vulnerable score  $>96\%$  (11.7%) and 15 respondents were in the range of  $90-95\%$  (88.3%). Breathing re-training is an exercise used in pulmonary exercises by means of diaphragm breathing and purse-lips that can help increase air resistance, reduce transmural gradient pressure, help reduce trapped air exhalation so that it can control exhalation and facilitate maximal alveolar emptying (Aini, 2012; Nurcahyo et al., 2021).

Based on data from WHO, COPD is one of the main causes of morbidity and mortality worldwide. COPD represents the 5th highest mortality rate worldwide. Meanwhile, in Indonesia, the COPD working group in 2002 reported that in 12 Asia Pacific countries, the prevalence of COPD in Indonesia was 5.6%. COPD is a disease characterized by progressive airway limitation caused by abnormal inflammation, including chronic bronchitis and emphysema and most commonly caused by smoking. The predominant symptom in COPD is shortness of breath that often begins on exertion. There is often a cough, which

may be productive of sputum production, and wheezing. General symptoms are progressive with increasingly severe shortness of breath and decreased SpO2 (Gleadle, 2005).

### *Identify the Level of SpO2 in COPD Patients after Breathing Retraining*

Based on table 4.6 shows that, of the 17 respondents who were examined after breathing re-training, there were 4 respondents who were at  $90-95\%$  (23.5%) and 13 respondents were at  $>96\%$  (76.5%). Breathing re-training is a technique used to compensate for shortness of breath. Exercise is used to store energy through controlled breathing. This action is carried out with the aim of relaxing the respiratory muscles and recovering anxiety, reducing uncoordinated respiratory muscle activity, reducing respiratory frequency, and reducing the respiratory burden (Sudarsono, 2000).

### *Effect of Breathing Retraining on Increasing SpO2*

The results of the statistical test which showed significant results with a success percentage of 64% showed an increase in SpO2 with the paired sample test results  $p = 0.000, = 0.05$  ( $p = 0.000 < = 0.05$ ) because the p value was less than  $= 0.05$  then it can be concluded that there is a significant effect between breathing re-training on the increase in SpO2 in the room in the Bima Hospital. Breathing re-training is a technique used to compensate for shortness of breath. Exercise is used to store energy through controlled breathing. This action is carried out with the aim of relaxing the respiratory muscles and recovering anxiety, reducing uncoordinated respiratory muscle activity, reducing respiratory frequency, and reducing the respiratory burden (Sudarsono, 2000; Widana et al., 2020).

## Conclusion

Based on the results of research and discussion, the following conclusions can be drawn:

- Based on the SpO2 assessment before breathing re-training, it was found that most of them were in the good category.
- Based on the SpO2 assessment after breathing re-training, it was found that most were in the very good category.

Based on the Paired T-test statistical test, it was found that there was a significant effect between breathing re-training on the increase in SpO2.

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